Extended Mathematics
Topic : Number
Year:May2013-May2024
Paper - 2
Questions Booklet

Question 1

Sheila can pay her hotel bill in Euros (€) or Pounds (£).
The bill was €425 or £365 when the exchange rate was £1 = €1.14 .

In which currency was the bill cheaper?
Show all your working.

Answer ..... [2]

Question 2

The time in Lisbon is the same as the time in Funchal.
A plane left Lisbon at 08 30 and arrived in Funchal at 10 20.
It then left Funchal at 12 55 and returned to Lisbon.
The return journey took 15 minutes more.

What time did the plane arrive in Lisbon?

Answer ..... [2]

Question 3

Use a calculator to find

(a) $\sqrt{5\frac{5}{24}}$,

Answer(a) ..... [1]

(b) $\frac{\cos 40°}{7}$.

Answer(b) ..... [1]

Question 4

Write the following in order of size, **smallest** first.

$(1.5)^{\frac{2}{3}}$ $\left(\frac{2}{3}\right)^{1.5}$ $\left(\frac{2}{3}\right)^{-1.5}$ $\left(-\frac{2}{3}\right)^{\frac{2}{3}}$

Answer ..... < ..... < ..... < ..... [2]

Question 5

Calculate, giving your answers in standard form,

(a) $2 \times (5.5 \times 10^4)$,

Answer(a) ..... [2]

(b) $(5.5 \times 10^4) - (5 \times 10^4)$.

Answer(b) ..... [2]

Question 6

The first five terms of a sequence are shown below.

13 9 5 1 –3

Find the nth term of this sequence.

Answer ..... [2]

Question 7

Calculate $(4.3 \times 10^8) + (2.5 \times 10^7)$.

Give your answer in standard form.

Answer ..... [2]

Question 8

George and his friend Jane buy copies of the same book on the internet.
George pays \$16.95 and Jane pays £11.99 on a day when the exchange rate is \$1 = £0.626.

Calculate, in dollars, how much more Jane pays.

Answer \$ ..... [2]

Question 9

(a) Use your calculator to work out $\sqrt{65} - 1.7^2$.

Write down all the numbers displayed on your calculator.

Answer(a) ..... [1]

(b) Write your answer to **part (a)** correct to 2 significant figures.

Answer(b) ..... [1]

Question 10

Joe measures the side of a square correct to 1 decimal place.
He calculates the **upper** bound for the area of the square as $37.8225\,\text{cm}^2$.

Work out Joe's measurement for the side of the square.

Answer ..... cm [2]

Question 11

Without using a calculator, work out $\frac{6}{7} \div 1\frac{2}{3}$.

Write down all the steps in your working.

Answer ..... [3]

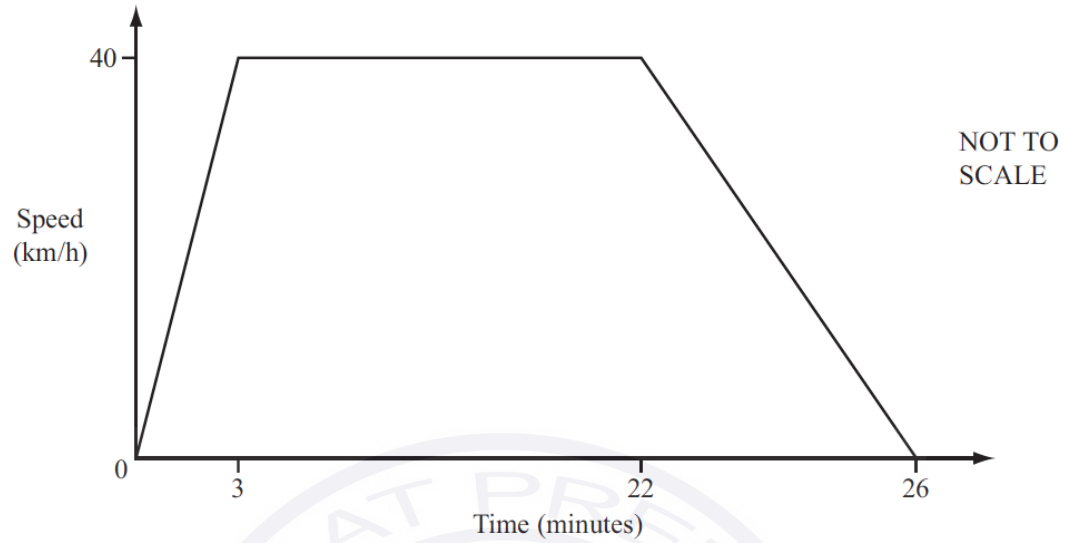
Question 12

Carol invests $6250 at a rate of 2% per year compound interest.

Calculate the **total** amount Carol has after 3 years.

Answer $ ..... [3]

Question 13



The diagram shows the speed-time graph of a train journey between two stations.

The train accelerates for 3 minutes, travels at a constant maximum speed of 40 km/h, then takes 4 minutes to slow to a stop.

Calculate the distance in kilometres between the two stations.

Answer ..... km [4]

Question 14

One January day in Munich, the temperature at noon was 3°C.
At midnight the temperature was −8°C.

Write down the difference between these two temperatures.

Answer ..... °C [1]

Question 15

(a) Calculate $\sqrt{5.7} - 1.03^2$.

Write down all the numbers displayed on your calculator.

Answer(a) ..... [1]

(b) Write your answer to **part (a)** correct to 3 decimal places.

Answer(b) ..... [1]

Question 16

Pedro and Eva do their homework.
Pedro takes 84 minutes to do his homework.

The ratio Pedro's time : Eva's time = 7 : 6.

Work out the number of minutes Eva takes to do her homework.

Answer ..... min [2]

Question 17

Show that $1\frac{1}{2} \div \frac{3}{16} = 8$.

Do not use a calculator and show all the steps of your working.

Answer

[2]

Question 18

An equilateral triangle has sides of length 16.1 cm, correct to the nearest millimetre.

Find the lower and upper bounds of the perimeter of the triangle.

Answer Lower bound = ... cm

Upper bound = ... cm [2]

Question 19

Martina changed 200 Swiss francs (CHF) into euros (€).
The exchange rate was €1 = 1.14 CHF.

Calculate how much Martina received.
Give your answer correct to the nearest euro.

Answer € ..... [3]

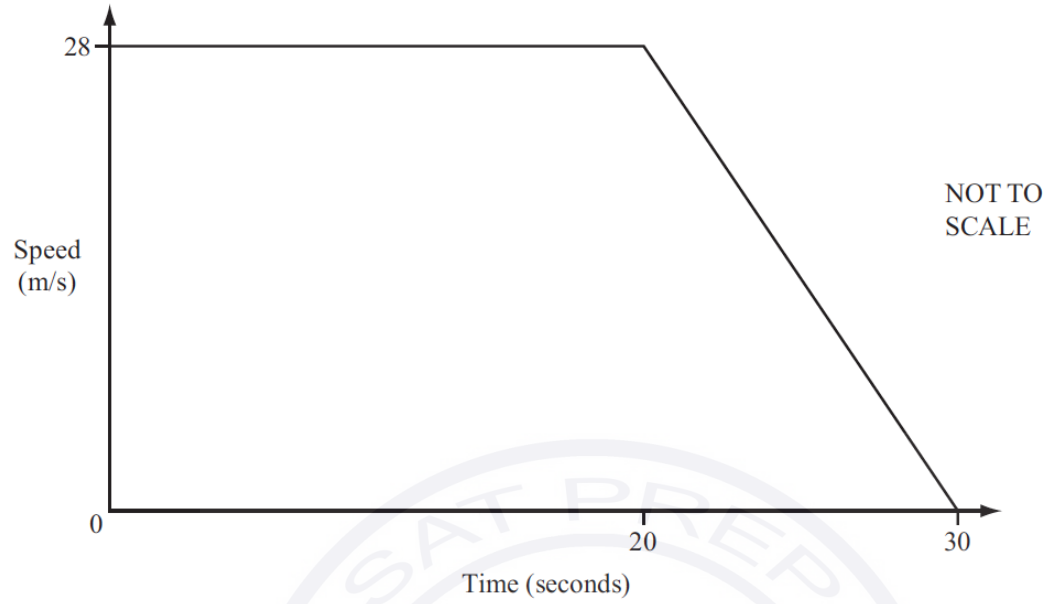
Question 20

Bruce invested $420 at a rate of 4% per year compound interest.

Calculate the **total** amount Bruce has after 2 years.
Give your answer correct to 2 decimal places.

Answer $ ..... [3]

Question 21



The diagram shows the speed-time graph of a car.
It travels at 28 m/s for 20 seconds and then decelerates until it stops after a further 10 seconds.

(a) Calculate the deceleration of the car.

Answer(a) ..... m/s^2 [1]

(b) Calculate the distance travelled during the 30 seconds.

Answer(b) ..... m [3]

Question 22

Christa had a music lesson every week for one year.
Each of the 52 lessons lasted for 45 minutes.

Calculate the total time that Christa spent in music lessons.
Give your time in hours.

Answer ..... h [2]

Question 23

Write the following in order of size, smallest first.

$\cos 100°$ $\tan 100°$ $\frac{1}{100}$ $100^{-0.1}$

Answer ..... < ..... < ..... < ..... [2]

Question 24

Write

(a) 60 square metres in square centimetres,

Answer(a) ..... cm^2 [1]

(b) 22 metres per second in kilometres per hour.

Answer(b) ..... km/h [2]

Question 25

In 2012 the cost of a ticket to an arts festival was $30.
This was 20% more than the ticket cost in 2011.

Calculate the cost of the ticket in 2011.

Answer $ ..... [3]

Question 26

Write the answer to the following calculations in standard form.

(a) $600 \div 8000$

Answer(a) ..... [2]

(b) $10^8 - 7 \times 10^6$

Answer(b) ..... [2]

Question 27

Write the following in order of size, smallest first.

19% $\quad \frac{1}{5} \quad$ $\sqrt{0.038}$ $\quad \sin 11.4° \quad$ 0.719^5

Answer ..... < ..... < ..... < ..... < ..... [2]

Question 28

Use a calculator to work out the following.

(a) $3\,(-4 \times 6^2 - 5)$

Answer(a) ..... [1]

(b) $\sqrt{3} \times \tan 30° + \sqrt{2} \times \sin 45°$

Answer(b) ..... [1]

Question 29

The table shows how the dollar to euro conversion rate changed during one day.

Time	10 00	11 00	12 00	13 00	14 00	15 00	16 00
$1	€1.3311	€1.3362	€1.3207	€1.3199	€1.3200	€1.3352	€1.3401

Khalil changed $500 into euros (€).

How many more euros did Khalil receive if he changed his money at the highest rate compared to the lowest rate?

Answer € ..... [3]

Question 30

Pam wins the student of the year award in New Zealand.
She sends three photographs of the award ceremony by post to her relatives.

- one of size 13 cm by 23 cm to her uncle in Australia
- one of size 15 cm by 23 cm to her sister in China
- one of size 23 cm by 35 cm to her mother in the UK

Maximum lengths	Australia	Rest of the world
13 cm by 23.5 cm	\$1.90	\$2.50
15.5 cm by 23.5 cm	\$2.40	\$2.90
23 cm by 32.5 cm	\$2.80	\$3.40
26 cm by 38.5 cm	\$3.60	\$5.20

The cost of postage is shown in the table above.
Use this information to calculate the total cost.

Answer \$ ..... [3]

Question 31

Work out 72 cents as a percentage of 83 cents.

Answer ..... % [1]

Question 32

Calculate $\frac{5.27 - 0.93}{4.89 - 4.07}$.

Give your answer correct to 4 significant figures.

Answer ..... [2]

Question 33

Calculate 17.5% of 44 kg.

Answer ..... kg [2]

Question 34

The length, p cm, of a car is 440 cm, correct to the nearest 10 cm.

Complete the statement about p.

Answer ..... $\leqslant p <$ ..... [2]

Question 35

Emily invests \$$x$ at a rate of 3% per year simple interest.
After 5 years she has \$20.10 interest.

Find the value of x.

Answer $x =$ ..... [3]

Question 36

Find the nth term in each of the following sequences.

(a) $\frac{1}{3}, \quad \frac{2}{4}, \quad \frac{3}{5}, \quad \frac{4}{6}, \quad \frac{5}{7}, \quad \ldots\ldots$

Answer(a) ..... [1]

(b) 0, 3, 8, 15, 24, ...

Answer(b) ..... [2]

Question 37

Work out.

(a) $\frac{3}{4} - \frac{1}{12}$

Answer(a) ..... [2]

(b) $2\frac{1}{2} \times \frac{4}{25}$

Answer(b) ..... [2]

Question 38

(a) Convert 144 km/h into metres per second.

Answer(a) ..... m/s [2]

(b) A train of length 120 m is travelling at 144 km/h.
It passes under a bridge of width 20 m.

Find the time taken for the whole train to pass under the bridge.
Give your answer in seconds.

Answer(b) ..... s [2]

Question 39

In March 2011, the average temperature in Kiev was 3°C.
In March 2012, the average temperature in Kiev was 19°C lower than in March 2011.

Write down the average temperature in Kiev in March 2012.

Answer ..... °C [1]

Question 40

Chris changes \$1350 into euros (€) when €1 = \$1.313 .

Calculate how much he receives.

Answer € ..... [2]

Question 41

(a) Use your calculator to find the value of $7.5^{-0.4} \div \sqrt{57}$.
Write down your full calculator display.

Answer(a) ..... [1]

(b) Write your answer to **part (a)** in standard form.

Answer(b) ..... [1]

Question 42

Without using a calculator, work out $1\frac{1}{4} - \frac{7}{9}$.

Write down all the steps in your working.

Answer ..... [3]

Question 43

A rectangle has length 127.3 cm and width 86.5 cm, both correct to 1 decimal place.

Calculate the upper bound and the lower bound for the perimeter of the rectangle.

Answer Upper bound = ... cm

Lower bound = ... cm [3]

Question 44

Calculate $\frac{\sqrt[3]{16}}{1.3^2}$.

Answer ..... [1]

Question 45

(a) Write 569 000 correct to 2 significant figures.

Answer(a) ..... [1]

(b) Write 569 000 in standard form.

Answer(b) ..... [1]

Question 46

The mass of 1 cm^3 of copper is 8.5 grams, correct to 1 decimal place.

Complete the statement about the total mass, T grams, of 12 cm^3 of copper.

Answer ..... $\leqslant T <$ ..... [2]

Question 47

Write the following in order, smallest first.

$\sqrt{0.1}$ $\quad \frac{43}{201}$ $\quad 2\frac{1}{2}\%$ $\quad 0.2$

Answer ..... $<$ ..... $<$ ..... $<$ ..... [2]

Question 48

Without using your calculator, work out $\frac{5}{6} - \left(\frac{1}{2} \times 1\frac{1}{2}\right)$.

Write down all the steps of your working.

Answer ..... [3]

Question 49

At the beginning of July, Kim had a mass of 63 kg.
At the end of July, his mass was 61 kg.

Calculate the percentage loss in Kim's mass.

Answer ..... % [3]

Question 50

Anita buys a computer for $391 in a sale.
The sale price is 15% less than the original price.

Calculate the original price of the computer.

Answer $ ..... [3]

Question 51

32 25 18 11 4

These are the first 5 terms of a sequence.

Find

(a) the 6th term,

Answer(a) ..... [1]

(b) the nth term,

Answer(b) ..... [2]

(c) which term is equal to –332.

Answer(c) ..... [2]

Question 52

Use your calculator to work out $\sqrt{\frac{3}{4}} + 2^{-1}$.

Give your answer correct to 2 decimal places.

Answer ..... [2]

Question 53

Write the following in order of size, smallest first.

0.5^2 0.5 0.5^3 $\sqrt[3]{0.5}$

Answer ..... < ..... < ..... < ..... [2]

Question 54

Carlo changed 800 euros (€) into dollars for his holiday when the exchange rate was €1 = $1.50 .
His holiday was then cancelled.
He changed all his dollars back into euros and he received €750.

Find the new exchange rate.

Answer €1 = $..... [3]

Question 55

A bus company in Dubai has the following operating times.

Day	Starting time	Finishing time
Saturday	0600	2400
Sunday	0600	2400
Monday	0600	2400
Tuesday	0600	2400
Wednesday	0600	2400
Thursday	0600	2400
Friday	1300	2400

(a) Calculate the total number of hours that the bus company operates in one week.

Answer(a) ..... h [3]

(b) Write the starting time on Friday in the 12-hour clock.

Answer(b) ..... [1]

Question 56

$p = 4 \times 10^5$ $q = 5 \times 10^4$

Find, giving your answer in standard form,

(a) pq,

Answer(a) ..... [2]

(b) $\frac{q}{p}$.

Answer(b) ..... [2]

Question 57

\$1 = 8.2 rand

Change \$350 into rands.

Answer ..... rand [2]

Question 58

Write the following in order of size, smallest first.

0.34 $\sqrt{0.6}$ 0.6^2 0.7^3

Answer ..... < ..... < ..... < ..... [2]

smallest

Question 59

Work out $4 \times 10^{-5} \times 6 \times 10^{12}$.
Give your answer in standard form.

Answer ..... [2]

Question 60

A train takes 65 minutes to travel 52 km.

Calculate the average speed of the train in kilometres per hour.

Answer ..... km/h [2]

Question 61

Maryah borrows \$12 000 to start a business.
The loan is for 3 years at a rate of 5% per year compound interest.
The loan has to be paid back at the end of the 3 years.

Calculate the total amount to be paid back.

Answer \$..... [3]

Question 62

Insert **one pair** of brackets only to make the following statement correct.

$$6 + 5 \times 10 - 8 = 16$$

[1]

Question 63

Calculate $\frac{8.24 + 2.56}{1.26 - 0.72}$.

Answer ..... [1]

Question 64

The length, l metres, of a football pitch is 96 m, correct to the nearest metre.

Complete the statement about the length of this football pitch.

Answer ..... $\leqslant l <$ ..... [2]

Question 65

For her holiday, Alyssa changed 2800 Malaysian Ringgits (MYR) to US dollars ($) when the exchange rate was 1 MYR = $0.325 .

At the end of her holiday she had $210 left.

(a) How many dollars did she spend?

Answer(a) $..... [2]

(b) She changed the $210 for 750 MYR.

What was the exchange rate in dollars for 1 MYR?

Answer(b) 1 MYR = $..... [1]

Question 66

Without using a calculator, work out $1\frac{1}{6} \div \frac{7}{8}$.

Show all your working and give your answer as a fraction in its lowest terms.

Answer ..... [3]

Question 67

(a) Write 90 as a product of prime factors.

Answer(a) ..... [2]

(b) Find the lowest common multiple of 90 and 105.

Answer(b) ..... [2]

Question 68

Alex invests $200 for 2 years at a rate of 2% per year simple interest.
Chris invests $200 for 2 years at a rate of 2% per year compound interest.

Calculate how much more interest Chris has than Alex.

Answer $..... [4]

Question 69

Find the lowest common multiple (LCM) of 24 and 32.

Answer ..... [2]

Question 70

These are the first five terms of a sequence.

13 8 3 –2 –7

Find the nth term of this sequence.

Answer ..... [2]

Question 71

Ahmed, Batuk and Chand share \$1000 in the ratio 8 : 7 : 5.

Calculate the amount each receives.

Answer Ahmed \$ .....

Batuk \$ .....

Chand \$ ..... [3]

Question 72

The population of Olton is decreasing at a rate of 3% per year.
In 2013, the population was 50 000.

Calculate the population after 4 years.
Give your answer correct to the nearest hundred.

Answer ..... [3]

Question 73

Without using your calculator, work out $2\frac{7}{9} \div \frac{5}{6}$.

Give your answer as a fraction in its lowest terms.
You must show each step of your working.

Answer ..... [4]

Question 74

Fritz drives a distance of 381 km in 2 hours and 18 minutes.
He then drives 75 km at a constant speed of 30 km/h.

Calculate his average speed for the whole journey.

Answer ..... km/h [4]

Question 75

Ahmed and Babar share 240 g of sweets in the ratio 7 : 3.

Calculate the amount Ahmed receives.

Answer ..... g [2]

Question 76

An equilateral triangle has sides of length 6.2 cm, correct to the nearest millimetre.

Complete the statement about the perimeter, P cm, of the triangle.

Answer ..... $\leqslant P <$ ..... [2]

Question 77

James buys a drink for 2 euros (€).

Work out the cost of the drink in pounds (£) when £1 = €1.252 .
Give your answer correct to 2 decimal places.

Answer £ ..... [3]

Question 78

Without using a calculator, work out $1\frac{7}{8} \div \frac{5}{9}$.

Show all your working and give your answer as a fraction in its lowest terms.

Answer ..... [3]

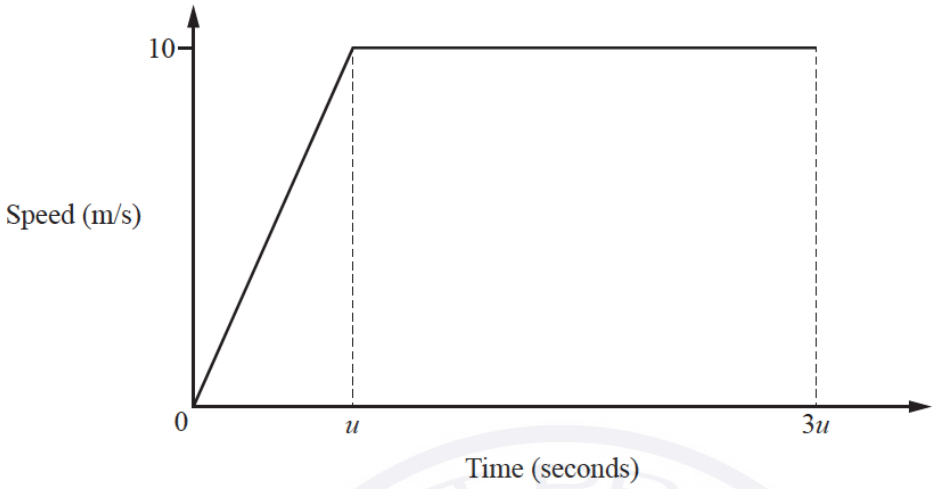
Question 79

In a sale, the cost of a coat is reduced from \$85 to \$67.50 .

Calculate the percentage reduction in the cost of the coat.

Answer ..... % [3]

Question 80



A car starts from rest and accelerates for u seconds until it reaches a speed of 10 m/s.
The car then travels at 10 m/s for $2u$ seconds.
The diagram shows the speed-time graph for this journey.

The distance travelled by the car in the first $3u$ seconds is 125 m.

(a) Find the value of u.

Answer(a) $u =$ ..... [3]

(b) Find the acceleration in the first u seconds.

Answer(b) ..... m/s^2 [1]

Question 81

Write 53 400 000 in standard form.

Answer ..... [1]

Question 82

A doctor starts work at 20 40 and finishes work at 06 10 the next day.

How long is the doctor at work?
Give your answer in hours and minutes.

Answer ..... h ..... min [1]

Question 83

7 9 20 3 9

(a) A number is removed from this list and the median and range do not change.

Write down this number.

Answer(a) ..... [1]

(b) An extra number is included in the original list and the mode does not change.

Write down a possible value for this number.

Answer(b) ..... [1]

Question 84

5, 11, 21, 35, 53, ...

Find the nth term of this sequence.

Answer ..... [2]

Question 85

Write the recurring decimal $0.2\dot{5}$ as a fraction.
[$0.2\dot{5}$ means 0.2555...]

Answer ..... [2]

Question 86

One year ago Ahmed's height was 114 cm.
Today his height is 120 cm.
Both measurements are correct to the nearest centimetre.

Work out the upper bound for the increase in Ahmed's height.

Answer ..... cm [2]

Question 87

Without using a calculator, work out $\frac{4}{5} \div 2\frac{2}{3}$.

Write down all the steps of your working and give your answer as a fraction in its simplest form.

Answer ..... [3]

Question 88

(a) Find the value of

(i) $\left(\frac{1}{4}\right)^{0.5}$,

Answer(a)(i) ..... [1]

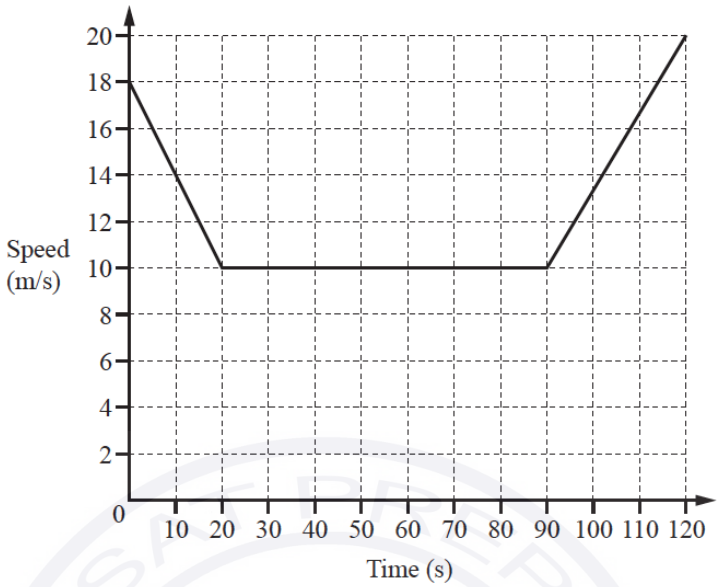
(ii) $(-8)^{\frac{2}{3}}$.

Answer(a)(ii) ..... [1]

(b) Use a calculator to find the decimal value of $\frac{\sqrt{29 - 3 \times 32^{0.4}}}{3}$.

Answer(b) ..... [1]

Question 89



The diagram shows the speed-time graph for 120 seconds of a car journey.

(a) Calculate the deceleration of the car during the first 20 seconds.

Answer(a) ..... m/s^2 [1]

(b) Calculate the total distance travelled by the car during the 120 seconds.

Answer(b) ..... m [3]

(c) Calculate the average speed for this 120 second journey.

Answer(c) ..... m/s [1]

Question 90

At noon the temperature was 4 °C.
At midnight the temperature was –5.5 °C.

Work out the difference in temperature between noon and midnight.

Answer ..... °C [1]

Question 91

Use your calculator to work out $\sqrt{10 + 0.6 \times (8.3^2 + 5)}$.

Answer ..... [1]

Question 92

Write 270 000 in standard form.

Answer ..... [1]

Question 93

Rice is sold in 75 gram packs and 120 gram packs.
The masses of both packs are given correct to the nearest gram.

Calculate the lower bound for the difference in mass between the two packs.

Answer ..... g [2]

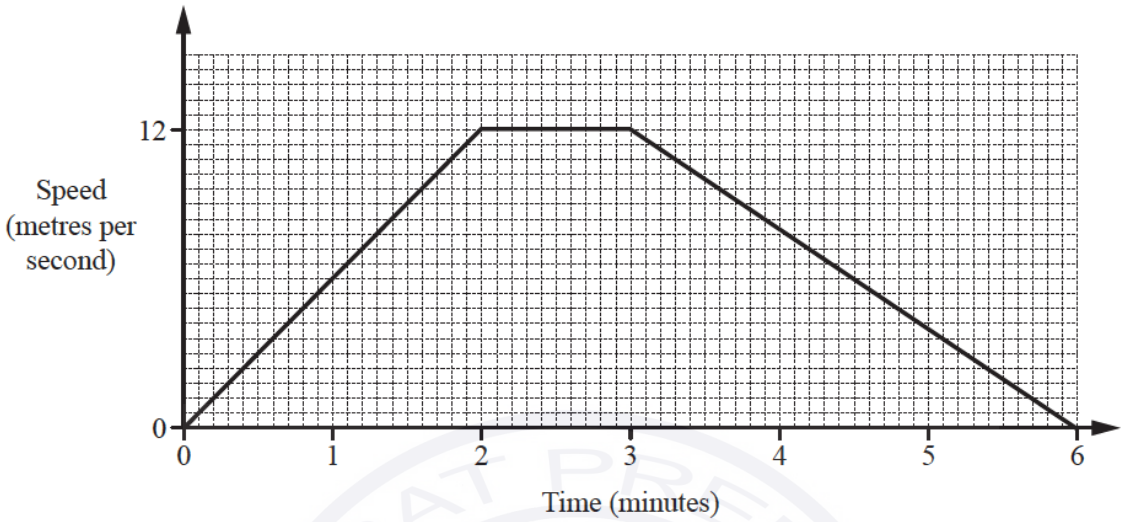
Question 94

Without using a calculator, work out $1\frac{4}{5} \div \frac{3}{7}$.

Show all your working and give your answer as a fraction in its lowest terms.

Answer ..... [3]

Question 95



A tram leaves a station and accelerates for 2 **minutes** until it reaches a speed of 12 metres per second.
It continues at this speed for 1 minute.
It then decelerates for 3 minutes until it stops at the next station.
The diagram shows the speed-time graph for this journey.

Calculate the distance, in metres, between the two stations.

Answer ..... m [3]

Question 96

Find the nth term of each sequence.

(a) 4, 8, 12, 16, 20, ...

Answer(a) ..... [1]

(b) 11, 20, 35, 56, 83, ...

Answer(b) ..... [2]

Question 97

A car travels a distance of 1280 **metres** at an average speed of 64 kilometres per hour.

Calculate the time it takes for the car to travel this distance.
Give your answer in **seconds**.

Answer ..... s [3]

Question 98

Georg invests $5000 for 14 years at a rate of 2% per year compound interest.

Calculate the interest he receives.
Give your answer correct to the nearest dollar.

Answer $ ..... [4]

Question 99

(a) Write 30 as a product of its prime factors.

Answer(a) ..... [2]

(b) Find the lowest common multiple (LCM) of 30 and 45.

Answer(b) ..... [2]

Question 100

Write 168.9 correct to 2 significant figures.

Answer ..... [1]

Question 101

Calculate $\frac{2.07 - 1.89}{5.71 - 3.92}$.

Answer ..... [1]

Question 102

Write 1.7×10^{-4} as an ordinary number.

Answer ..... [1]

Question 103

11 12 13 14 15 16

From the list of numbers, write down

(a) the factors of 60,

Answer(a) ..... [1]

(b) the prime numbers.

Answer(b) ..... [1]

Question 104

Find the value of

(a) $(\sqrt{5})^8$,

Answer(a) ..... [1]

(b) $\left(\frac{1}{27}\right)^{-\frac{2}{3}}$.

Answer(b) ..... [1]

Question 105

Work out $\frac{2}{3} + \frac{1}{6} - \frac{1}{4}$, giving your answer as a fraction in its lowest terms.

Do not use a calculator and show all the steps of your working.

Answer ..... [3]

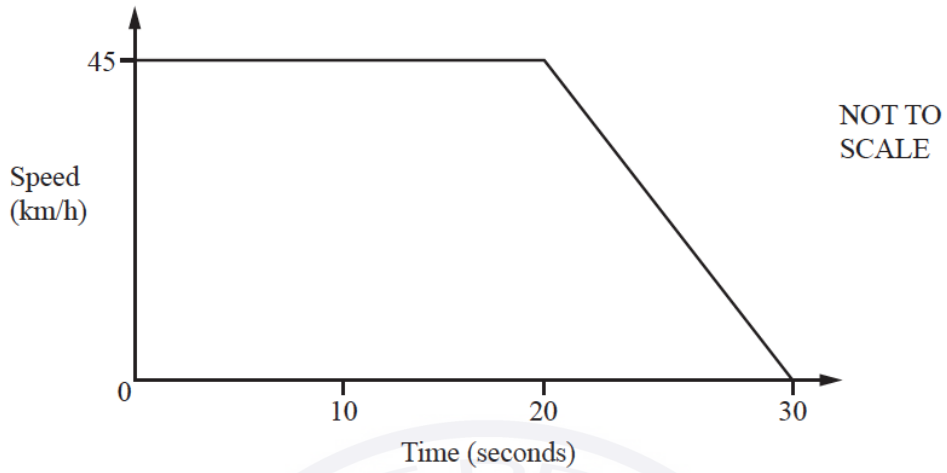
Question 106

The volume of a cuboid is 878 cm^3, correct to the nearest cubic centimetre.
The length of the base of the cuboid is 7 cm, correct to the nearest centimetre.
The width of the base of the cuboid is 6 cm, correct to the nearest centimetre.

Calculate the lower bound for the height of the cuboid.

Answer ..... cm [3]

Question 107



The diagram shows the speed-time graph of a car.
The car travels at 45 km/h for 20 seconds.
The car then decelerates for 10 seconds until it stops.

(a) Change 45 km/h into m/s.

Answer(a) ..... m/s [2]

(b) Find the deceleration of the car, giving your answer in m/s^2.

Answer(b) ..... m/s^2 [1]

(c) Find the distance travelled by the car during the 30 seconds, giving your answer in metres.

Answer(c) ..... m [3]

Question 108

Write down the difference in temperature between 8°C and −9°C.

Answer .....°C [1]

Question 109

Carlos changed $950 into euros (€) when the exchange rate was €1 = $1.368.

Calculate how many euros Carlos received.

Answer €..... [2]

Question 110

Robert buys a car for $8000.
At the end of each year the value of the car has decreased by 10% of its value at the beginning of that year.

Calculate the value of the car at the end of 7 years.

Answer $ ..... [2]

Question 111

Jason receives some money for his birthday.
He spends $\frac{11}{15}$ of the money and has \$14.40 left.

Calculate how much money he received for his birthday.

Answer \$ ..... [3]

Question 112

Without using your calculator, work out $2\frac{1}{4} - \frac{11}{12}$.

You must show all your working and give your answer as a fraction in its lowest terms.

Answer ..... [3]

Question 113

A rectangle has length 5.8 cm and width 2.4 cm, both correct to 1 decimal place.

Calculate the lower bound and the upper bound of the perimeter of this rectangle.

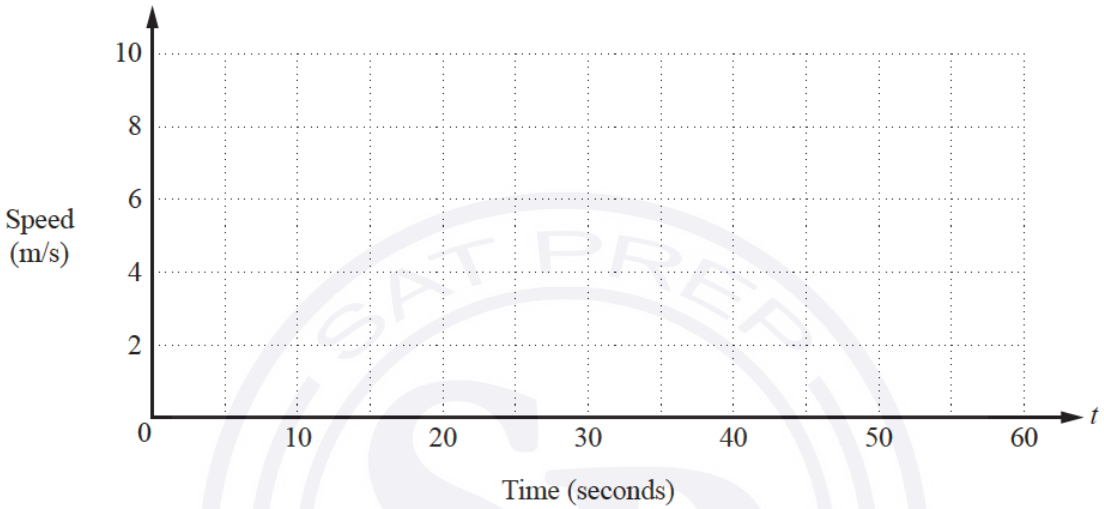
Answer Lower bound ..... cm

Upper bound ..... cm [3]

Question 114

A car passes through a checkpoint at time $t = 0$ seconds, travelling at 8 m/s.
It travels at this speed for 10 seconds.
The car then decelerates at a constant rate until it stops when $t = 55$ seconds.

(a) On the grid, draw the speed-time graph.



[2]

(b) Calculate the total distance travelled by the car after passing through the checkpoint.

Answer(b) ..... m [3]

Question 115

At midnight the temperature in Newtown was –8 °C.
At noon the next day the temperature in Newtown was 9 °C.

Work out the rise in temperature from midnight to noon.

Answer ..... °C [1]

Question 116

Pip and Ali share \$785 in the ratio Pip : Ali = 4 : 1.

Work out Pip's share.

Answer \$ ..... [2]

Question 117

By writing each number correct to 1 significant figure, estimate the value of $\frac{\sqrt{3.9} \times 29.3}{8.9 - 2.7}$.

Show all your working.

Answer ..... [2]

Question 118

Work out the highest common factor (HCF) of 36 and 90.

Answer ..... [2]

Question 119

Write the recurring decimal $0.1\dot{5}$ as a fraction.
[$0.1\dot{5}$ means 0.1555...]

Answer ..... [2]

Question 120

A car travels at 56 km/h.

Find the time it takes to travel 300 metres.
Give your answer in seconds correct to the nearest second.

Answer ..... s [4]

Question 121

Hazel invests $1800 for 7 years at a rate of 1.5% per year compound interest.

Calculate how much interest she will receive after the 7 years.
Give your answer correct to the nearest dollar.

Answer $ ..... [4]

Question 122

Write the recurring decimal $0.\dot{4}$ as a fraction.
[$0.\dot{4}$ means 0.444…]

..... [2]

Question 123

Without using your calculator, work out $1\frac{7}{12}+\frac{13}{20}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 124

A metal pole is 500 cm long, correct to the nearest centimetre.
The pole is cut into rods each of length 5.8 cm, correct to the nearest millimetre.

Calculate the largest number of rods that the pole can be cut into.

..... [3]

Question 125

(a) Write 2016 as the product of prime factors.

..... [3]

(b) Write 2016 in standard form.

..... [1]

Question 126

The nth term of a sequence is $an^2 + bn$.

(a) Write down an expression, in terms of a and b, for the 3rd term.

..... [1]

(b) The 3rd term of this sequence is 21 and the 6th term is 96.

Find the value of a and the value of b.
You must show all your working.

$a =$ .....

$b =$ ..... [4]

Question 127

Find the cube root of 4913.

..... [1]

Question 128

Write 71 496 correct to 2 significant figures.

..... [1]

Question 129

Without using a calculator, work out $\frac{1}{12} \times 1\frac{1}{5}$.

Show all your working and give your answer as a fraction in its lowest terms.

..... [2]

Question 130

Write the recurring decimal $0.3\dot{2}$ as a fraction.
[$0.3\dot{2}$ means 0.3222…]

..... [2]

Question 131

Find the highest common factor (HCF) of 56 and 70.

..... [2]

Question 132

(a) $V = IR$

In an experiment I and R are both measured correct to 1 decimal place.

When $I = 4.0$ and $R = 2.7$, find the **lower** bound for V.

..... [2]

(b) $S = \frac{D}{T}$

In an experiment D and T are both measured correct to 2 significant figures.

When $D = 7.6$ and $T = 0.23$, find the **upper** bound for S.

..... [2]

Question 133

At the start of an experiment there are 20 000 bacteria.
The number of bacteria increases at a rate of 30% per hour.

(a) Work out the number of bacteria after 4 hours.

..... [2]

(b) After how many **whole** hours, from the start of the experiment, will the number of bacteria be greater than one million?

..... hours [2]

Question 134

Write 0.000 057 4 in standard form.

..... [1]

Question 135

Calculate.

$$\frac{3.07 + 2^4}{5.03 - 1.79}$$

..... [1]

Question 136

Write 3.5897 correct to 4 significant figures.

..... [1]

Question 137

8 9 10 11 12 13 14 15 16

From the list of numbers, write down

(a) the square numbers,

..... [1]

(b) a prime factor of 99.

..... [1]

Question 138

Write the recurring decimal $0.3\dot{6}$ as a fraction.
Give your answer in its simplest form.
[$0.3\dot{6}$ means 0.3666…]

..... [3]

Question 139

The base of a triangle is 9 cm correct to the nearest cm.
The area of this triangle is 40 cm^2 correct to the nearest 5 cm^2.

Calculate the upper bound for the perpendicular height of this triangle.

..... cm [3]

Question 140

Without using a calculator, work out $2\frac{5}{8} \times \frac{3}{7}$.
Show all your working and give your answer as a mixed number in its lowest terms.

..... [3]

Question 141

Find the nth term of each of these sequences.

(a) 16, 19, 22, 25, 28, …

..... [2]

(b) 1, 3, 9, 27, 81, …

..... [2]

Question 142

It is estimated that the world's population is growing at a rate of 1.14% per year.
On January 1st 2014 the population was 7.23 billion.

(a) Find the expected population on January 1st 2020.

.....billion [2]

(b) Find the year when the population is expected to reach 10 billion.

..... [2]

Question 143

A train leaves Zurich at 22 40 and arrives in Vienna at 07 32 the next day.

Work out the time taken.

..... h ..... min [1]

Question 144

From a sample of 80 batteries, 3 are faulty.

Work out the percentage of faulty batteries.

..... % [1]

Question 145

Write 1.27×10^{-3} as an ordinary number.

.....[1]

Question 146

Calculate $(2.1 - 0.078)^{17}$, giving your answer correct to 4 significant figures.

.....[2]

Question 147

Omar changes 2000 Saudi Arabian riyals (SAR) into euros (€) when the exchange rate is €1 = 5.087 SAR.

Work out how much Omar receives, giving your answer correct to the nearest euro.

€ .....[2]

Question 148

Find the lowest common multiple (LCM) of 36 and 48.

..... [2]

Question 149

The sides of an equilateral triangle are 9.4 cm, correct to the nearest millimetre.

Work out the upper bound of the perimeter of this triangle.

..... cm [2]

Question 150

7, 5, 3, 1, – 1, …

(a) Find the next term in this sequence.

..... [1]

(b) Find the nth term of the sequence.

..... [2]

Question 151

Without using a calculator, work out $\frac{6}{7} \div 1\frac{2}{3}$.

Show all your working and give your answer as a fraction in its lowest terms.

..... [3]

Question 152

A car of length 4.3 m is travelling at 105 km/h.
It passes over a bridge of length 36 m.

Calculate the time, in seconds, it takes to pass over the bridge **completely**.

..... s [3]

Question 153

Write in standard form.

(a) 2 470 000

..... [1]

(b) 0.0079

..... [1]

Question 154

Without using a calculator, work out $\frac{3}{5}+\frac{1}{6}$.

Write down all the steps of your working and give your answer as a fraction in its simplest form.

..... [2]

Question 155

Write these in order of size, smallest first.

0.6^3 0.22 $\sqrt{0.09}$ 0.4^2

..... < ..... < ..... < .....[2]

smallest

Question 156

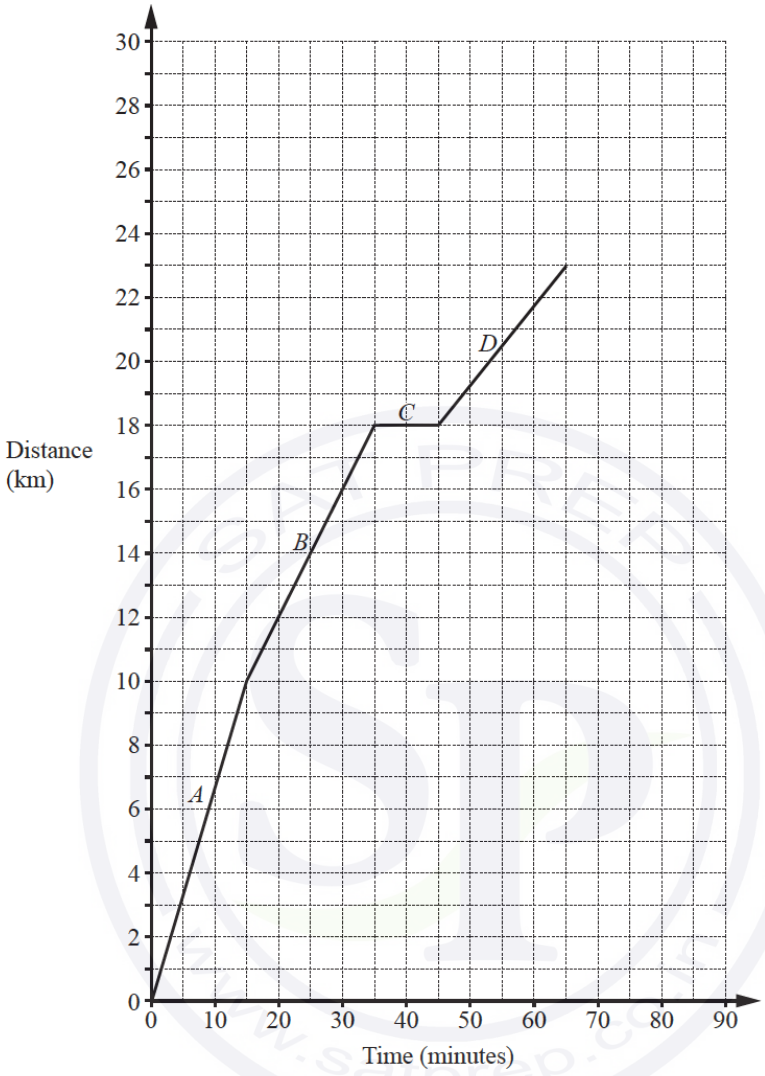
The length of a car is 4.2 m, correct to 1 decimal place.

Write down the upper bound and the lower bound of the length of this car.

Upper bound = ... m

Lower bound = ... m [2]

Question 157



The diagram shows the distance-time graph for the first 65 minutes of a bicycle journey.

(a) There are four different parts to the journey labelled A, B, C and D.

Write down the part of the journey with the fastest speed.

..... [1]

(b) After the first 65 minutes the bicycle travels at a constant speed of 20 km/h for 15 minutes.

Draw this part of the journey on the diagram. [1]

Question 158

Calculate.

(a) $2^3 - \sqrt{10+4^2}$

..... [1]

(b) $\frac{2\sqrt{3} \times \tan 70°}{3}$

..... [1]

Question 159

Ahmed paid $34 000 for a car.
His car decreased in value by 40% at the end of the first year.
The value at the end of the second year was 10% less than the value at the end of the first year.

Calculate the value of Ahmed's car after 2 years.

$ ..... [2]

Question 160

Write the recurring decimal $0.\dot{2}$ as a fraction.
[$0.\dot{2}$ means 0.222…]

..... [2]

Question 161

(a) Write 14 835 correct to the nearest thousand.

..... [1]

(b) Write your answer to **part (a)** in standard form.

..... [1]

Question 162

The sides of a square are 8 cm, correct to the nearest centimetre.

Calculate the upper bound for the area of the square.

..... cm^2 [2]

Question 163

Ralf and Susie share \$57 in the ratio 2 : 1.

(a) Calculate the amount Ralf receives.

\$ ..... [2]

(b) Ralf gives \$2 to Susie.

Calculate the new ratio Ralf's money : Susie's money.
Give your answer in its simplest form.

..... : .....[2]

Question 164

Without using your calculator, work out $\frac{3}{4}+\frac{2}{3}-\frac{1}{8}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [4]

Question 165

Write down the temperature which is 5 °C below –2 °C.

..... °C [1]

Question 166

Write 0.040 190 7 correct to

(a) 3 significant figures,

.....[1]

(b) 3 decimal places.

.....[1]

Question 167

The price of a toy is 12 euros (€) in Germany and 14 Swiss francs in Switzerland.
1 Swiss franc = €0.905

Calculate the difference between these two prices.
Give your answer in euros.

€ .....[2]

Question 168

Work out $\frac{2}{3}-\frac{1}{4}$, giving your answer as a fraction in its lowest terms.

Do not use a calculator and show all the steps of your working.

.....[2]

Question 169

(a) Write 5^{-3} as a fraction.

..... [1]

(b) Write 0.004 56 in standard form.

..... [1]

Question 170

(a) Write \$0.70 as a fraction of \$5.60, giving your answer in its lowest terms.

..... [1]

(b) Write the recurring decimal $0.\dot{1}\dot{8}$ as a fraction in its lowest terms.
[$0.\dot{1}\dot{8}$ means 0.181818…]

..... [2]

Question 171

Find the nth term of each sequence.

(a) 7, 13, 19, 25, 31, …

..... [2]

(b) 9, 16, 25, 36, 49, …

..... [2]

Question 172

A train travels for m minutes at a speed of x metres per second.

(a) Find the distance travelled, in **kilometres**, in terms of m and x.
Give your answer in its simplest form.

..... km [2]

(b) When $m = 5$, the train travels 10.5 km.

Find the value of x.

$x =$ ..... [2]

Question 173

Without using your calculator and by rounding each number correct to 1 significant figure, estimate the value of

$$\frac{10.3 \times 19.5}{88.9 - 43.2}.$$

You must show all your working.

..... [2]

Question 174

The population of the world grows exponentially at a rate of 1.1% per year.

Find the number of years it takes for the population to grow from 7 billion to 7.31 billion.
Give your answer correct to the nearest whole number.

.....years [2]

Question 175

Write the recurring decimal $0.1\dot{7}$ as a fraction.
Show all your working.

..... [2]

Question 176

The length of a rectangle is 9.3 cm, correct to 1 decimal place.
Its width is 7.7 cm, correct to 1 decimal place.

Write down the lower bound and the upper bound for the area of the rectangle.

Lower bound = ... cm^2

Upper bound = ... cm^2 [3]

Question 177

Without using your calculator, work out $3\frac{1}{3} \div 2\frac{1}{2}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 178

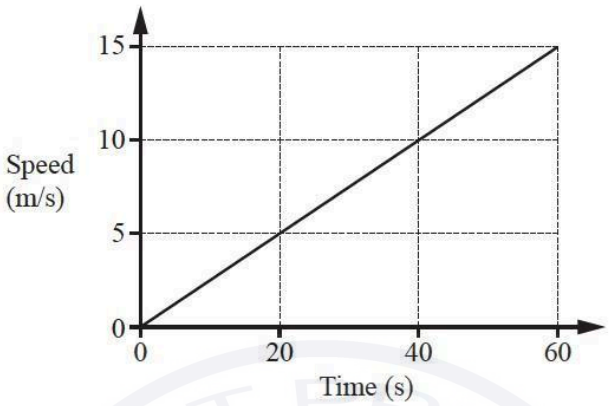
Indira buys a television in a sale for $924.
This was a reduction of 12% on the original price.

Calculate the original price of the television.

$..... [3]

Question 179

The speed-time graph shows the first 60 seconds of a train journey.



(a) Find the acceleration of the train.

.....m/s^2 [1]

(b) Calculate the distance the train has travelled in this time.
Give your answer in kilometres.

.....km [3]

Question 180

Calculate $\sqrt{\frac{1}{2}(1-\cos 48°)}$.

.....[1]

Question 181

Find the lowest common multiple (LCM) of 20 and 24.

..... [2]

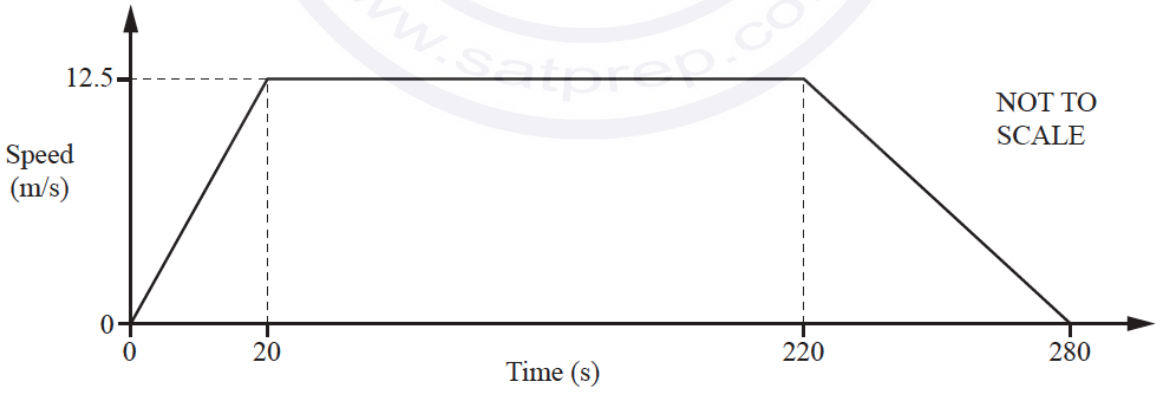
Question 182

Write the recurring decimal $0.\dot{6}\dot{3}$ as a fraction in its lowest terms.
You must show all your working.

..... [3]

Question 183

The diagram shows a speed-time graph for the journey of a car.



Calculate the total distance travelled.

..... m [3]

Question 184

Without using your calculator, work out $\frac{11}{12}-\left(\frac{3}{4}-\frac{2}{3}\right)$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [4]

Question 185

Marcel invests \$2500 for 3 years at a rate of 1.6% per year simple interest.
Jacques invests \$2000 for 3 years at a rate of x% per year compound interest.
At the end of the 3 years Marcel and Jacques receive the same amount of interest.

Calculate the value of x correct to 3 significant figures.

$x =$ ..... [5]

Question 186

Write 0.071 64 correct to 2 significant figures.

..... [1]

Question 187

Change $6200\,cm^2$ into m^2.

..... m^2 [1]

Question 188

Calculate $\sqrt{120}+3.8^2-25$.

..... [1]

Question 189

Work out 85 cents as a percentage of \$2.03 .

..... % [1]

Question 190

Without using a calculator, work out $\frac{5}{6}-\frac{1}{2}$.

Show all the steps of your working and give your answer as a fraction in its simplest form.

..... [2]

Question 191

(a) Write 0.0605 in standard form.

..... [1]

(b) Calculate $0.1 \times 5.1 \times 10^4$, giving your answer in standard form.

..... [1]

Question 192

Work out.

(a) $125^{\frac{2}{3}}$

..... [1]

(b) $\left(\frac{1}{3}\right)^{-2}$

..... [1]

Question 193

A rectangle has length 62 mm and width 47 mm, both correct to the nearest millimetre.
The area of this rectangle is A mm^2.

Complete the statement about the value of A.

..... $\leqslant A <$ ..... [3]

Question 194

The thickness of one sheet of paper is 8×10^{-3} cm.

Work out the thickness of 250 sheets of paper.

..... cm [1]

Question 195

Write 23.4571 correct to

(a) 4 significant figures,

..... [1]

(b) the nearest 10.

..... [1]

Question 196

The table shows the temperatures in five places at 10 am one day in January.

Place	Temperature (°C)
Helsinki	−7
Chicago	−10
London	3
Moscow	−4
Bangkok	26

(a) Which place was the coldest?

..... [1]

(b) At 2 pm the temperature in Helsinki had increased by 4 °C.

Write down the temperature in Helsinki at 2 pm.

..... °C [1]

Question 197

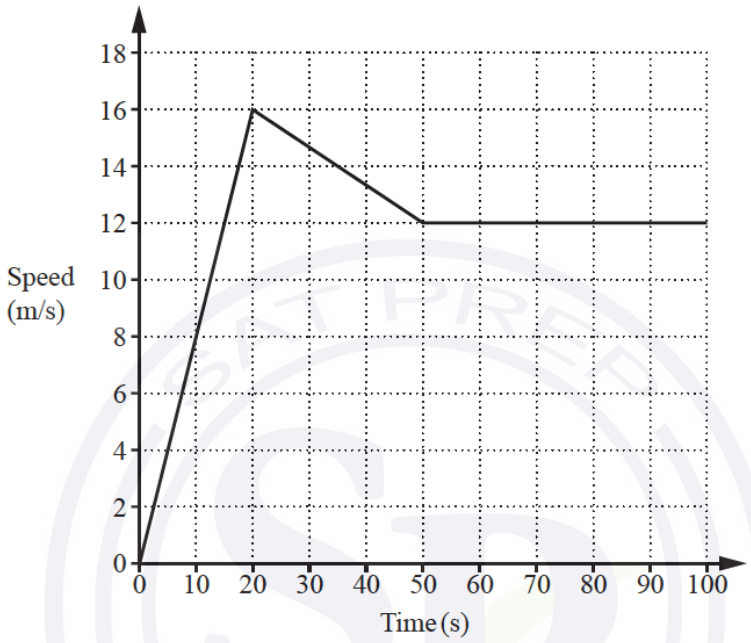
Without using a calculator, work out $1\frac{2}{3}+\frac{5}{7}$.

Write down all the steps of your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 198

The diagram shows information about the first 100 seconds of a car journey.



(a) Calculate the acceleration during the first 20 seconds of the journey.

.....m/s^2 [1]

(b) Work out the total distance travelled by the car in the 100 seconds.

.....m [3]

Question 199

One day, at noon, in Maseru, the temperature was 17 °C.
At midnight the temperature was 20 °C lower.

Work out the temperature at midnight.

..... °C [1]

Question 200

Write 5.17×10^{-3} as an ordinary number.

..... [1]

Question 201

(a) 1 and 12 are factors of 12.

Write down all the other factors of 12.

..... [1]

(b) Write down the multiples of 9 between 20 and 40.

..... [1]

Question 202

Write 55 g as a percentage of 2.2 kg.

..... % [2]

Question 203

Amar cycles at a speed of 18 km/h.
It takes him 55 minutes to cycle between two villages.

Calculate the distance between the two villages.

..... km [2]

Question 204

Work out, giving your answer in standard form.

$$1.2 \times 10^{40} + 1.2 \times 10^{41}$$

..... [2]

Question 205

The sides of a triangle are 5.2 cm, 6.3 cm and 9.4 cm, each correct to the nearest millimetre.

Calculate the lower bound of the perimeter of the triangle.

..... cm [2]

Question 206

Write the recurring decimal $0.\dot{4}\dot{8}$ as a fraction.
Show all your working.

..... [2]

Question 207

(a) Write $\frac{11}{3}$ as a mixed number.

..... [1]

(b) **Without using a calculator**, work out $\frac{1}{4}+\frac{5}{12}$.
Show all the steps of your working and give your answer as a fraction in its lowest terms.

..... [2]

Question 208

Here are the first four terms of a sequence.

23 17 11 5

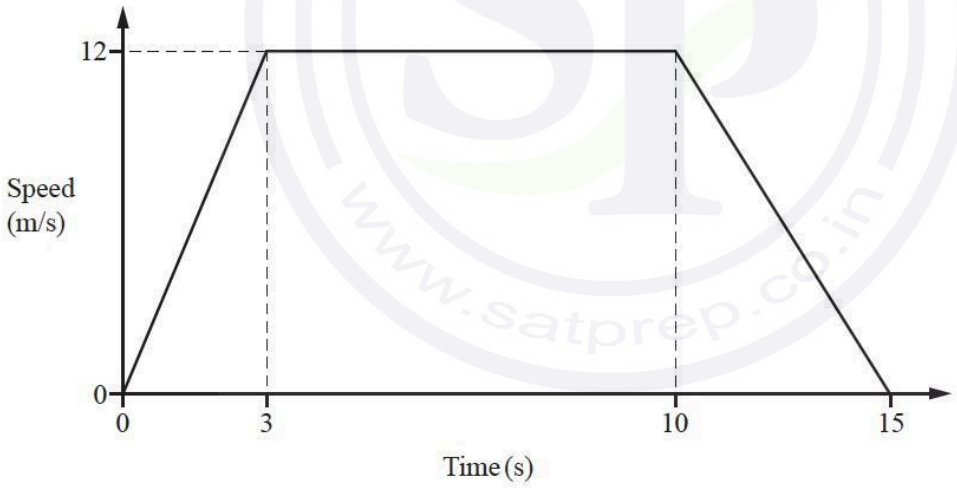
(a) Find the next term.

..... [1]

(b) Find the nth term.

..... [2]

Question 209



The diagram shows a speed-time graph.

Calculate the total distance travelled.

..... m [3]

Question 210

Work out.

$2^{-4} \times 2^{5}$

..... [1]

Question 211

(a) Use a calculator to work out $\frac{5^{0.4} - \sqrt{3}}{0.13 - 0.015}$.

Write down all the digits in your calculator display.

..... [1]

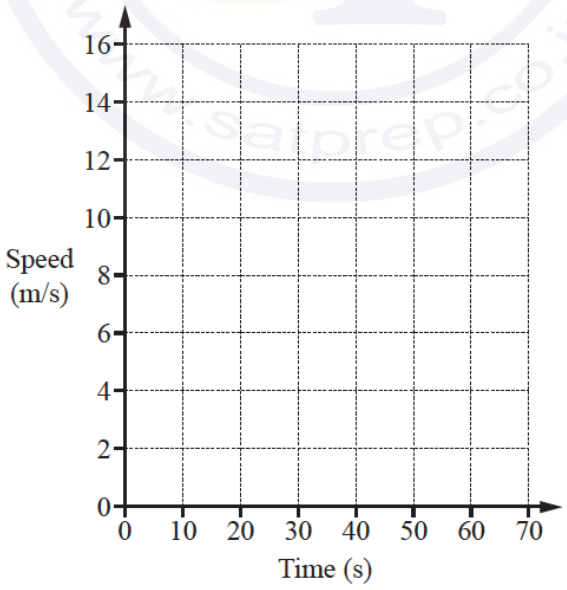
(b) Write your answer to **part (a)** correct to 2 significant figures.

..... [1]

Question 212

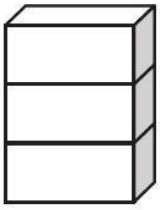
Petra begins a journey in her car.
She accelerates from rest at a constant rate of 0.4 m/s^2 for 30 seconds.
She then travels at a constant speed for 40 seconds.

On the grid, draw the speed-time graph for the first 70 seconds of Petra's journey.



[2]

Question 213



NOT TO SCALE

The diagram shows three identical cuboids in a tower.
The height of one cuboid is 6.5 cm, correct to the nearest millimetre.

Work out the upper bound of the height of the tower.

..... cm [2]

Question 214

The value of a motorbike is $12 400.
Each year, the value of the motorbike decreases exponentially by 15%.

Calculate the value of the motorbike after 3 years.

$..... [2]

Question 215

Without using a calculator, work out $1\frac{2}{3} - \frac{11}{15}$.
Write down all the steps of your working and give your answer as a fraction in its lowest terms.

..... [3]

Question 216

$$\sqrt{5} \quad -7 \quad 343 \quad -11 \quad 0.4 \quad 2.5 \quad \frac{1}{3}$$

From this list of numbers, write down

(a) a cube number,

..... [1]

(b) the smallest number,

..... [1]

(c) a natural number.

..... [1]

Question 217

"We eat more ice cream as the temperature rises."

What type of correlation is this?

..... [1]

Question 218

Write 0.000 052 3 in standard form.

..... [1]

Question 219

Calculate $\sqrt{17.8} - 1.3^{2.5}$.

..... [1]

Question 220

Write the recurring decimal $0.\dot{8}$ as a fraction.

..... [1]

Question 221

Newton has a population of 23 000.
The population decreases exponentially at a rate of 1.4% per year.

Calculate the population of Newton after 5 years.

..... [2]

Question 223

Dev makes 600 cakes.
18% of the 600 cakes go to a hotel and $\frac{2}{3}$ of the 600 cakes go to a supermarket.

Calculate how many cakes he has left.

..... [3]

Question 223

Without using your calculator, work out $\frac{7}{8}+\frac{1}{6}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 224

One day in Chamonix the temperature at noon was 6 °C.
At midnight the temperature was 11 °C lower.

Write down the temperature at midnight.

..... °C [1]

Question 225

Liz takes 65 seconds to run 400 m.

Calculate her average speed.

..... m/s [1]

Question 226

Complete the list of factors of 36.

1, 2, ... , 36 [2]

Question 227

Increase $22 by 15%.

$..... [2]

Question 228

(a) Write 209 802 correct to the nearest thousand.

..... [1]

(b) Write 4123 correct to 3 significant figures.

..... [1]

Question 229

Without using a calculator, work out $\frac{2}{3} \div 1\frac{1}{5}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 230

(a) The length of the side of a square is 12 cm, correct to the nearest centimetre.

Calculate the upper bound for the perimeter of the square.

..... cm [2]

(b) Jo measures the length of a rope and records her measurement correct to the nearest ten centimetres. The upper bound for her measurement is 12.35 m.

Write down the measurement she records.

..... m [1]

Question 231

One morning, Marcia works from 08 20 to 11 15.

Find how long she works for.
Give your answer in hours and minutes.

..... h ..... min [1]

Question 232

Here is a sequence.

a, 13, 9, 3, –5, –15, b, …

Find the value of a and the value of b.

$a =$ .....

$b =$ ..... [2]

Question 233

22 17 25 41 39 4

Work out the difference between the two prime numbers in the list above.

..... [2]

Question 234

Without using your calculator, work out $\frac{2}{3} - \frac{1}{12}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 235

Here are some numbers written in standard form.

3.4×10^{-1} 1.36×10^{6} 7.9×10^{0} 2.4×10^{5} 5.21×10^{-3} 4.3×10^{-2}

From these numbers, write down

(a) the largest number,

..... [1]

(b) the smallest number.

..... [1]

Question 236

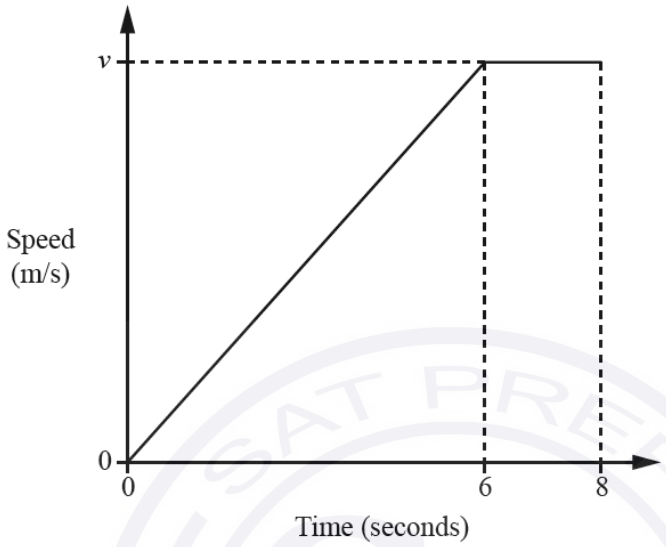
Anna walks 31 km at a speed of 5 km/h.
Both values are correct to the nearest whole number.

Work out the upper bound of the time taken for Anna's walk.

..... hours [2]

Question 237

The diagram shows information about the first 8 seconds of a car journey.



NOT TO SCALE

The car travels with constant acceleration reaching a speed of v m/s after 6 seconds.
The car then travels at a constant speed of v m/s for a further 2 seconds.
The car travels a total distance of 150 metres.

Work out the value of v.

$v =$ ..... [3]

Question 238

Write down a prime number between 20 and 30.

..... [1]

Question 239

Write 0.000 038 7 in standard form.

..... [1]

Question 240

Write the recurring decimal $0.\dot{6}\dot{3}$ as a fraction.

..... [1]

Question 241

(a) Calculate $\sqrt{2.38 + 6.4^2}$, writing down your full calculator display.

..... [1]

(b) Write your answer to **part (a)** correct to 4 decimal places.

..... [1]

Question 242

Find the exact value of $8^{\frac{2}{3}} \times 49^{-\frac{1}{2}}$.

..... [2]

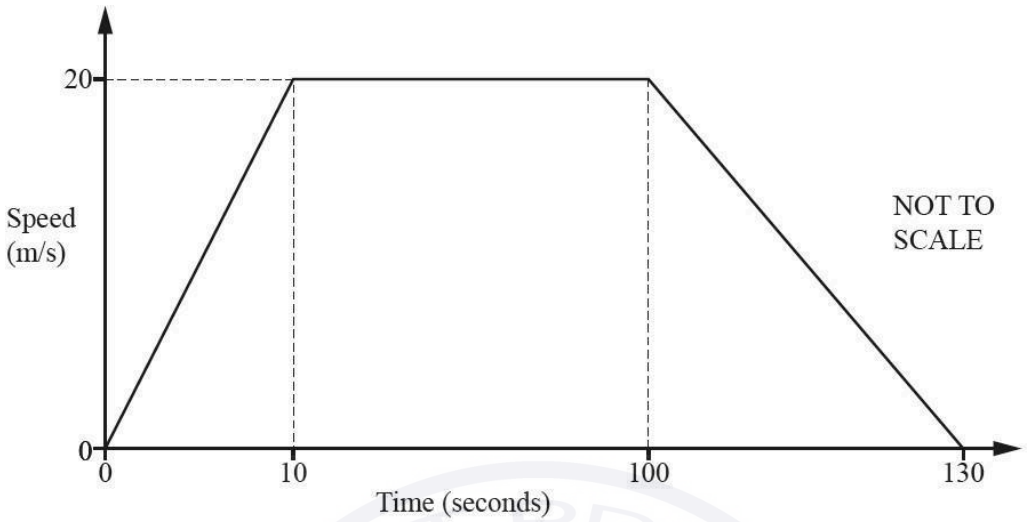
Question 243

Without using your calculator, work out $1\frac{3}{4} \times \frac{6}{35}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 244



The speed–time graph shows information about the journey of a tram between two stations.

(a) Calculate the distance between the two stations.

..... m [3]

(b) Calculate the average speed of the tram for the whole journey.

..... m/s [1]

Question 245

Work out $\frac{7}{11}$ of 198 kg.

..... kg [1]

Question 246

Work out \$1.45 as a percentage of \$72.50.

..... % [1]

Question 247

Calculate. $\dfrac{5.39-0.98}{0.743-0.0743}$

.....[1]

Question 248

Work out. $\left(\dfrac{125}{27}\right)^{-\frac{2}{3}}$

.....[1]

Question 249

(a) Write the number five million, two hundred and seven in figures.

.....[1]

(b) Write 0.008 13 in standard form.

.....[1]

Question 250

Write these numbers correct to 2 significant figures.

(a) 0.076 499

..... [1]

(b) 10 100

..... [1]

Question 251

Without using a calculator, work out $\frac{1}{4} \div \frac{2}{3}$.

You must show all your working and give your answer as a fraction.

..... [2]

Question 252

The area of a square is 42.5 cm^2, correct to the nearest 0.5 cm^2.

Calculate the lower bound of the length of the side of the square.

..... cm [2]

Question 253

Change the recurring decimal $0.1\dot{8}$ to a fraction.
You must show all your working.

..... [2]

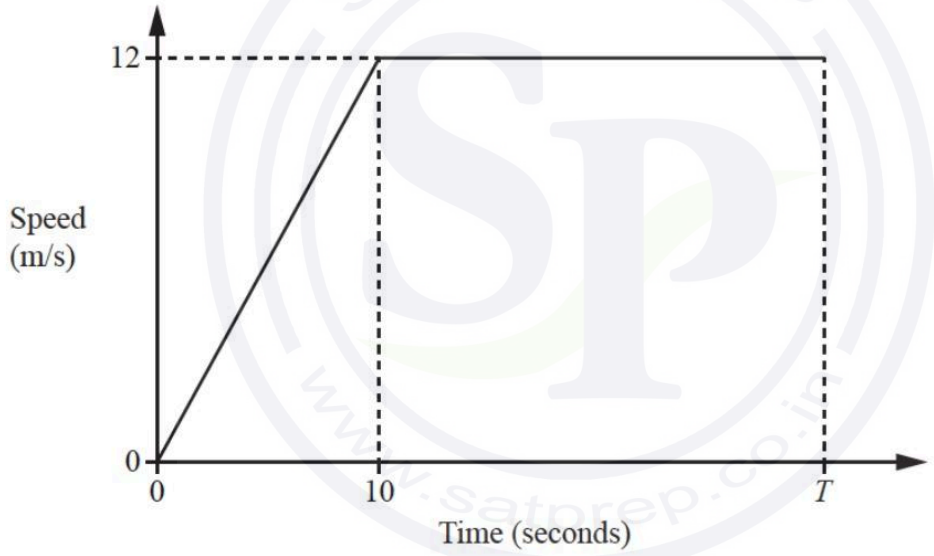
Question 254

A car travels at 108 km/h for 20 seconds.

Calculate the distance the car travels.
Give your answer in metres.

..... m [3]

Question 255



NOT TO SCALE

The diagram shows the speed–time graph for the first T seconds of a car journey.

(a) Find the acceleration during the first 10 seconds.

..... m/s^2 [1]

(b) The total distance travelled during the T seconds is 480 m.

Find the value of T.

$T =$ ..... [3]

Question 256

Write 23 000 in standard form.

..... [1]

Question 257

Calculate $0.125^{-\frac{2}{3}}$.

..... [1]

Question 258

Without using a calculator, work out $\frac{1}{15}+\frac{2}{5}$.
Write down all the steps of your working and give your answer as a fraction in its simplest form.

..... [2]

Question 259

There are 30 000 lions in Africa.
The number of lions in Africa decreases exponentially by 2% each year.

Find the number of lions in Africa after 6 years.
Give your answer correct to the nearest hundred.

..... [2]

Question 260

An equilateral triangle has side length 12 cm, correct to the nearest centimetre.

Find the lower bound and the upper bound of the perimeter of the triangle.

Lower bound = ... cm

Upper bound = ... cm [2]

Question 261

Carlos starts work at 21 20 and finishes at 06 15 the next day.

Calculate how long Carlos is at work.

..... h ..... min [1]

Question 262

Work out $(6.4\times10^{7})+(9.6\times10^{6})$.
Give your answer in standard form.

.....[2]

Question 263

Saafia has a barrel containing 6000 millilitres of oil, correct to the nearest 100 ml.
She uses the oil to fill bottles which each hold exactly 50 ml.

Calculate the upper bound for the number of bottles she can fill.

..... [2]

Question 264

Jan invests $800 at a rate of 3% per year simple interest.

Calculate the value of her investment at the end of 4 years.

$ ..... [3]

Question 265

The temperature at 07 00 is −3 °C.
This temperature is 11 °C higher than the temperature at 01 00.

Find the temperature at 01 00.

..... °C [1]

Question 266

Jodi swims 22 lengths of a swimming pool to raise money for charity.
She receives $15 for each length she swims.

Calculate how much money Jodi raises for charity.

$..... [1]

Question 267

Write the recurring decimal $0.\dot{2}\dot{3}$ as a fraction.

..... [1]

Question 268

(a) Write 0.046 875 correct to 2 significant figures.

..... [1]

(b) Write 2 760 000 in standard form.

..... [1]

Question 269

A tourist changes \$500 to euros (€) when the exchange rate is €1 = \$1.0697 .

Calculate how many euros he receives.

€..... [2]

Question 270

The number of passengers on a train increases from 63 to 77.

Calculate the percentage increase.

.....% [3]

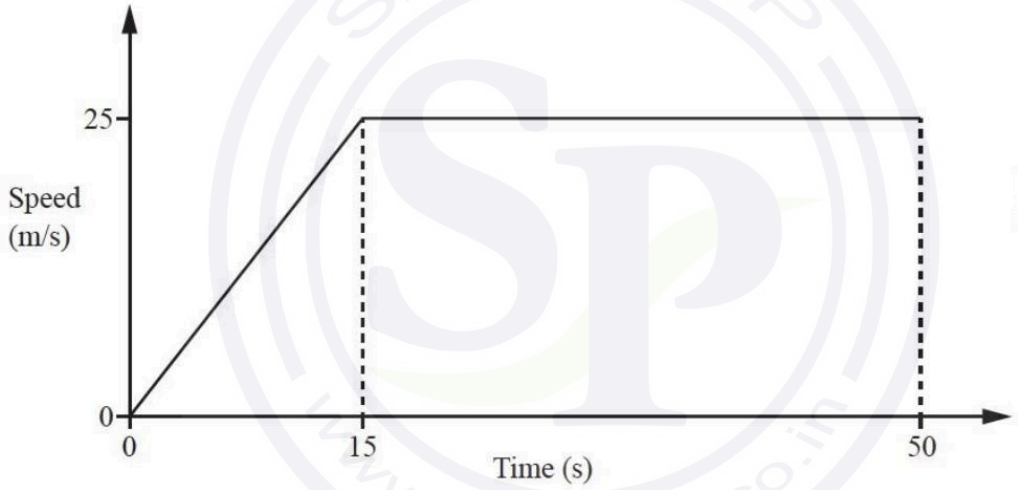
Question 271

Eric invests an amount in a bank that pays compound interest at a rate of 2.16% per year.
At the end of 5 years, the value of his investment is $6999.31 .

Calculate the amount Eric invests.

$..... [3]

Question 272



The speed–time graph shows the first 50 seconds of a journey.

Calculate

(a) the acceleration during the first 15 seconds,

..... m/s^2 [1]

(b) the distance travelled in the 50 seconds.

..... m [3]

Question 273

Without using a calculator, work out $3\frac{1}{8} \div \frac{5}{12}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [4]

Question 274

Write 1.8972 correct to 2 decimal places.

..... [1]

Question 275

Giulio's reaction times are measured in two games.
In the first game his reaction time is $\frac{1}{3}$ of a second.
In the second game his reaction time is $\frac{1}{8}$ of a second.

Find the difference between the two reaction times.

..... s [1]

Question 276

Calculate.

(a) $-12 \div -2$

..... [1]

(b) $\sqrt[3]{2^3+2}$

..... [1]

Question 277

Here is a list of numbers.

21 $\frac{2}{3}$ $\sqrt{13}$ 31 $\sqrt{121}$ 51 0.7

From this list, write down

(a) a prime number,

..... [1]

(b) an irrational number.

..... [1]

Question 278

Without using a calculator, work out $\frac{12}{35} \times \frac{7}{9}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 279

Write down a prime number between 50 and 60.

..... [1]

Question 280

Use your calculator to work out $\sqrt{1-(\sin 33°)^2}$.

..... [1]

Question 281

Write the recurring decimal $0.\dot{7}$ as a fraction.

..... [1]

Question 282

The distance between Prague and Vienna is 254 kilometres.
The local time in Prague is the same as the local time in Vienna.
A train leaves Prague at 15 20 and arrives in Vienna at 19 50 the same day.

Calculate the average speed of the train.

..... km/h [2]

Question 283

(a) Write 0.047 883 correct to 2 significant figures.

..... [1]

(b) Write 0.005 27 in standard form.

..... [1]

Question 284

Find the highest common factor (HCF) of 90 and 48.

..... [2]

Question 285

Without using a calculator, work out $2\frac{1}{4} \div \frac{3}{7}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 286

Shona buys a chair in a sale for \$435.60 .
This is a reduction of 12% on the original price.

Calculate the original price of the chair.

\$..... [3]

Question 287

Work out \$1.20 as a percentage of \$16.

.....% [1]

Question 288

Calculate $\sqrt[3]{8.1^2 - 1.3^{0.8}}$.

..... [1]

Question 289

An equilateral triangle has sides of length 15 cm, correct to the nearest centimetre.

Calculate the upper bound of the perimeter of this triangle.

..... cm [1]

Question 290

Write the recurring decimal $0.4\dot{7}$ as a fraction.
Show all your working.

..... [2]

Question 291

27 28 29 30 31 32 33

From the list of numbers, write down

(a) a multiple of 7,

..... [1]

(b) a cube number,

..... [1]

(c) a prime number.

..... [1]

Question 292

Without using a calculator, work out $\frac{5}{6}+\frac{2}{3}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 293

(a) These are the first four terms of a sequence.

5 8 11 14

(i) Write down the next term.

..... [1]

(ii) Find an expression, in terms of n, for the nth term.

..... [2]

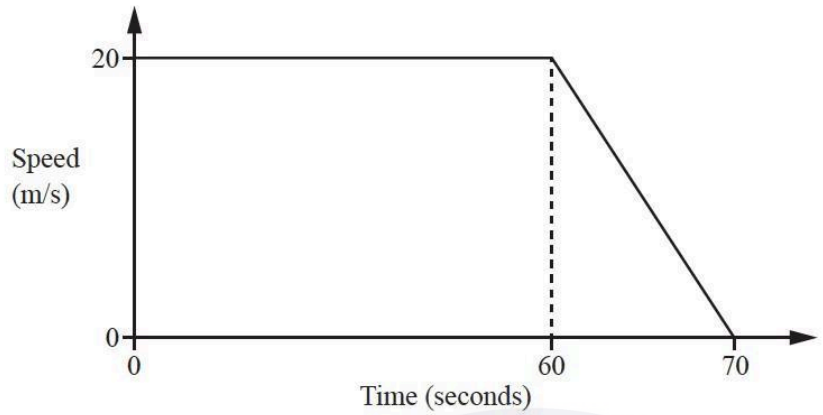
(b) These are the first five terms of another sequence.

$\frac{1}{2}$ $\frac{3}{4}$ $\frac{7}{6}$ $\frac{13}{8}$ $\frac{21}{10}$

Find the next term.

..... [1]

Question 294



NOT TO
SCALE

The diagram shows information about the final 70 seconds of a car journey.

(a) Find the deceleration of the car between 60 and 70 seconds.

.....m/s^2 [1]

(b) Find the distance travelled by the car during the 70 seconds.

.....m [3]

Question 295

Write down the temperature that is 7 °C below −3 °C.

..... °C [1]

Question 296

Calculate $\sqrt{256^{0.25}+4\times 8}$.

..... [1]

Question 297

Here is a list of numbers.

87 77 57 47 27

From this list, write down

(a) a cube number,

..... [1]

(b) a prime number.

..... [1]

Question 298

Find the highest common factor (HCF) of 84 and 105.

..... [2]

Question 299

Write in standard form.

(a) 72000

..... [1]

(b) 0.0018

..... [1]

Question 300

Find the nth term of each sequence.

(a) $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \frac{1}{8}, \frac{1}{10}, \ldots$

..... [1]

(b) 1, 5, 25, 125, 625, ...

..... [2]

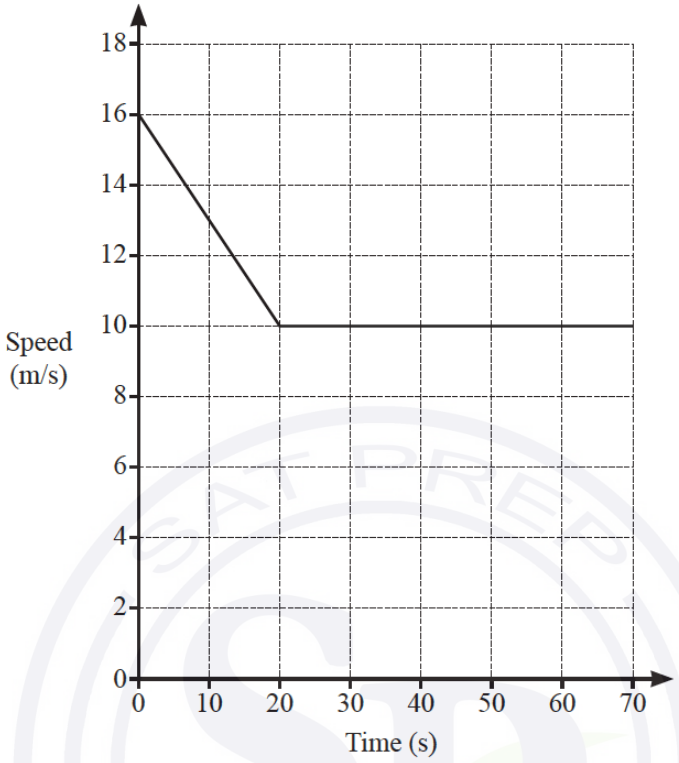
Question 301

Without using a calculator, work out $\frac{2}{3}+\frac{1}{4}\times\frac{2}{3}$.

Write down all the steps of your working and give your answer as a fraction in its simplest form.

..... [4]

Question 302



The diagram shows the speed–time graph for 70 seconds of a car journey.

(a) Calculate the deceleration of the car during the first 20 seconds.

..... m/s^2 [1]

(b) Calculate the total distance travelled by the car during the 70 seconds.

..... m [3]

Question 303

The lowest temperature recorded at Scott Base in Antarctica is −57.0 °C.
The highest temperature recorded at Scott Base is 63.8 °C more than this.

What is the highest temperature recorded at Scott Base?

..... °C [1]

Question 304

Calculate.

$$\frac{5}{8} + \sqrt[3]{340}$$

..... [1]

Question 305

Rashid changes 30 000 rupees to dollars when the exchange rate is \$1 = 68.14 rupees.

How many dollars does he receive?

\$ ..... [2]

Question 306

Write the recurring decimal $0.6\dot{7}$ as a fraction.
Show all your working and give your answer in its simplest form.

..... [2]

Question 307

Without using a calculator, work out $3\frac{5}{8}-1\frac{2}{3}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 308

Work out 5% of \$25.

\$ ..... [1]

Question 309

Calculate.

$$\frac{16.379-0.879}{4.2}\times 1.241$$

Give your answer correct to 2 significant figures.

..... [2]

Question 310

Write 15 060

(a) in words,

..... [1]

(b) in standard form.

..... [1]

Question 311

Without using a calculator, work out $\frac{5}{16} \times 1\frac{1}{7}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 312

Paula invests \$600 at a rate of r% per year simple interest.
At the end of 10 years, the total interest earned is \$90.

Find the value of r.

$r =$ ..... [2]

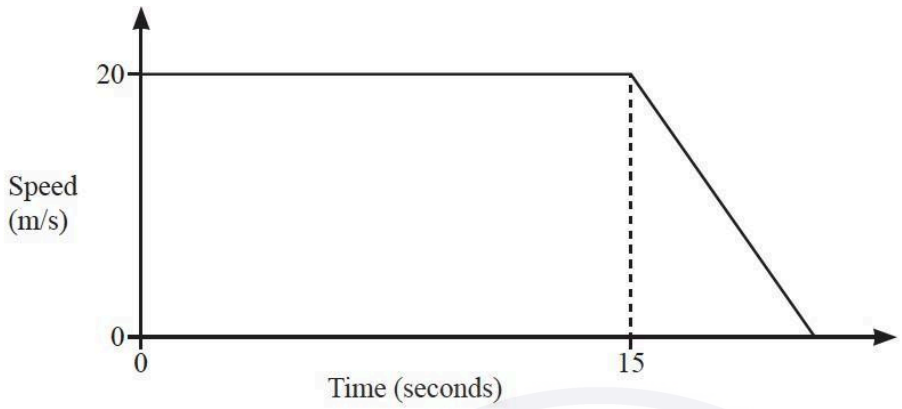
Question 313

The sides of a square are 15.1 cm, correct to 1 decimal place.

Find the upper bound of the area of the square.

..... cm^2 [2]

Question 314



NOT TO SCALE

A car travels at 20 m/s for 15 seconds before it comes to rest by decelerating at 2.5 m/s^2.

Find the total distance travelled.

..... m [5]

Question 315

3.56 5 $\sqrt{196}$ 8 $\sqrt{7}$ 12

From the list, write down a number that is

(a) a multiple of 3,

..... [1]

(b) a cube number,

..... [1]

(c) a prime number,

..... [1]

(d) an irrational number.

..... [1]

Question 316

Without using a calculator, work out $\frac{15}{28} \div \frac{4}{7}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 317

The population of a town decreases exponentially at a rate of 1.7% per year.
The population now is 250 000.

Calculate the population at the end of 5 years.
Give your answer correct to the nearest hundred.

..... [3]

Question 318

Calculate the value of $(2.3 \times 10^{-3}) + (6.8 \times 10^{-4})$.
Give your answer in standard form.

..... [1]

Question 319

Write the recurring decimal $0.2\dot{6}$ as a fraction.
You must show all your working.

..... [2]

Question 320

A car travels at a constant speed.
It travels a distance of 146.2 m, correct to 1 decimal place.
This takes 7 seconds, correct to the nearest second.

Calculate the upper bound for the speed of the car.

..... m/s [3]

Question 321

32 33 34 35 36 37 38 39

From this list of numbers, write down

(a) a multiple of 8,

..... [1]

(b) a square number,

..... [1]

(c) a prime number.

..... [1]

Question 322

A train journey takes 5 hours 54 minutes.

(a) The journey starts at 09 15.

Find the time that the journey ends.

..... [1]

(b) The average speed of the train for this journey is 80 km/h.

Calculate the distance travelled.

Question 323

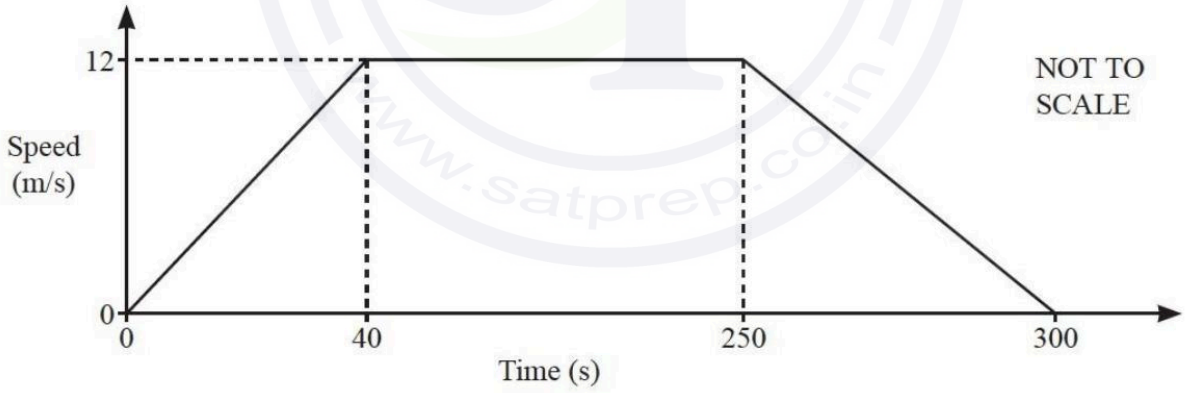
Without using a calculator, work out $3\frac{1}{4} - 2\frac{2}{3}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 324

The diagram shows the speed–time graph of a train journey between two stations.



(a) Find the acceleration of the train during the first 40 seconds.

..... m/s^2 [1]

(b) Calculate the distance between the two stations.

..... m [3]

Question 325

Paddy and Anna each invest $2000 for 5 years.
Paddy earns simple interest at a rate of 1.25% per year.
Anna earns compound interest at a rate of r% per year.
At the end of 5 years, Paddy's investment is worth the same as Anna's investment.

Calculate the value of r.

$r =$ ..... [5]

Question 326

At noon the temperature in Maseru was 21 °C.
At midnight the temperature had fallen by 26 °C.

Work out the temperature at midnight.

..... °C [1]

Question 327

Write down

(a) a square number greater than 10,

..... [1]

(b) an irrational number.

..... [1]

Question 328

Write 2^{-4} as a decimal.

..... [1]

Question 329

Without using a calculator, work out $1\frac{3}{4} - \frac{11}{12}$.
You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 330

Roberto buys a toy for \$5.00 .
He then sells it for \$4.60 .

Calculate his percentage loss.

..... % [2]

Question 331

Ella's height is 175 cm, correct to the nearest 5 cm.

Write down the upper bound of Ella's height.

..... cm [1]

Question 332

Calculate $(3 \times 10^{-3})^3$.
Give your answer in standard form.

..... [1]

Question 333

A train of length 105 m takes 11 seconds to pass completely through a station of length 225 m.

Calculate the speed of the train in km/h.

..... km/h [3]

Question 334

Find the highest **odd** number that is a factor of 60 and a factor of 90.

..... [1]

Question 335

(a) The nth term of a sequence is $60-8n$.

Find the largest number in this sequence.

..... [1]

(b) Here are the first five terms of a different sequence.

12 19 26 33 40

Find an expression for the nth term of this sequence.

..... [2]

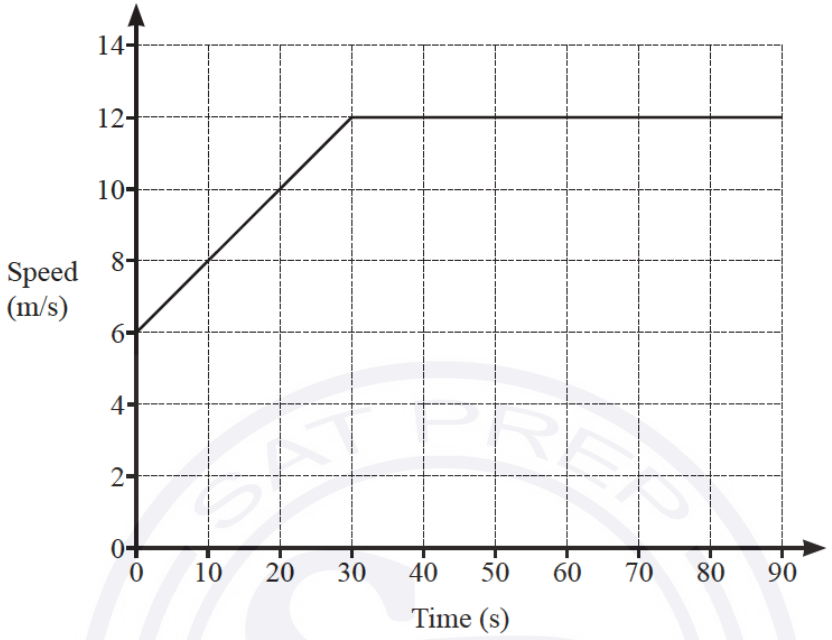
Question 336

Without using a calculator, work out $\left(2\frac{1}{3}-\frac{7}{8}\right)\times\frac{6}{25}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [4]

Question 337



The diagram shows the speed–time graph for 90 seconds of a journey.

Calculate the total distance travelled during the 90 seconds.

..... m [3]

Question 338

$P = 2(w + h)$

$w = 12$ correct to the nearest whole number.
$h = 4$ correct to the nearest whole number.

Work out the upper bound for the value of P.

..... [2]

Question 339

$234 = 2 \times 3^2 \times 13$ $1872 = 2^4 \times 3^2 \times 13$ $234 \times 1872 = 438\,048$

Use this information to write 438 048 as a product of its prime factors.

..... [1]

Question 340

Adil and Brian are paid the same wage.
Adil is given a 7% pay decrease and his new wage is \$427.80 .
Brian is given a 7% pay increase.

Work out Brian's new wage.

\$ ..... [3]

Question 341

$N = 2^4 \times 3 \times 7^5$

$PN = K$, where P is an integer and K is a square number.

Find the smallest value of P.

$P =$ ..... [2]

Question 342

Without using a calculator, work out $1\frac{1}{7} \times 2\frac{1}{10}$.
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 343

The length, l cm, of a line is 18.3 cm, correct to the nearest millimetre.

Complete this statement about the value of l.

..... $\leqslant l <$ ..... [2]

Question 344

Change 457 000 cm^2 into m^2.

..... m^2 [1]

Question 345

Thor changes 40 000 Icelandic Krona into dollars when the exchange rate is 1 krona = \$0.0099 .

Work out how many dollars he receives.

\$ ..... [1]

Question 346

Calculate. $\frac{4}{\sqrt{0.0025}}$

..... [1]

Question 347

Write down the cube number that is greater than 50 but less than 100.

..... [1]

Question 348

The sides of an isosceles triangle are measured correct to the nearest millimetre.
One side has a length of 8.2 cm and another has a length of 9.4 cm.

Find the largest possible value of the perimeter of this triangle.

..... cm [3]

Question 349

The selling price of a shirt is $26.50 .
This includes a tax of 6%.

Calculate the price of the shirt before the tax was added.

$ ..... [2]

Question 350

Work out $(3 \times 10^{199}) + (2 \times 10^{201})$.
Give your answer in standard form.

..... [2]

Question 351

Alex and Chris share sweets in the ratio Alex : Chris = 7 : 3.
Alex receives 20 more sweets than Chris.

Work out the number of sweets Chris receives.

..... [2]

Question 352

Without using a calculator, work out $\frac{5}{6} \div 1\frac{1}{3}$.
You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 353

Increase 42 by 16%.

..... [2]

Question 354

Insert one pair of brackets to make this calculation correct.

$$7 - 5 - 3 + 4 = 9$$ [1]

Question 355

Write two hundred thousand and seventeen in figures.

..... [1]

Question 356

Write the recurring decimal $0.1\dot{7}$ as a fraction in its simplest form.
You must show all your working.

..... [3]

Question 357

A town has a population of 45 000.
This population increases exponentially at a rate of 1.6% per year.

Find the population of the town at the end of 5 years.
Give your answer correct to the nearest hundred.

..... [3]

Question 358

Ahmed increases 40 by 300%.

From this list, put a ring around the correct calculation.

40×1.300 40×3 40×400 40×4 40×300

[1]

Question 359

(a) 1, 2, 3, 5 and 7 are all common factors of two numbers.

Write down the digit that the two numbers must end in.

..... [1]

(b) Write 84 as a product of its prime factors.

..... [2]

Question 360

Without using a calculator, work out $2\frac{2}{3} \times 2\frac{3}{4}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 361

$$T = \frac{49.2 - 9.59}{4.085 \times 2.35}$$

By writing each number correct to 1 significant figure, work out an estimate for T.
You must show all your working.

..... [2]

Question 362

Rangan buys 3.6 kg of potatoes and 2.8 kg of leeks.
The total cost is $13.72 .
Leeks cost $2.65 per kilogram.

Find the cost of 1 kg of potatoes.

$ ..... [3]

Question 363

(a) A bag of rice has a mass of 25 kg, correct to the nearest kilogram.

Calculate the lower bound of the total mass of 10 of these bags.

..... kg [1]

(b) Virat has 200 metres of wire, correct to the nearest metre.
He cuts the wire into n pieces of length 3 metres, correct to the nearest 20 centimetres.

Calculate the largest possible value of n.

$n =$ ..... [3]

Question 364

(a) These are the first four terms of a sequence.

29 22 15 8

Write down the next two terms.

..... , ... [2]

(b) These are the first five terms of another sequence.

4 7 12 19 28

Find the nth term.

..... [2]

Question 365

The population of one variety of butterfly is decreasing exponentially at a rate of 34% per year.
At the end of 2014, the population was 125.9 million.

Calculate the population at the end of 2019.

..... million [2]

Question 366

Find the highest common factor (HCF) of 36 and 84.

..... [2]

Question 367

Calculate $4.8 \times 10^6 + 3.7 \times 10^7$.
Give your answer in standard form.

..... [1]

Question 368

Write $0.\dot{3}\dot{7}$ as a fraction.

Question 369

Without using a calculator, work out $2\frac{1}{4} \times 3\frac{2}{3}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 370

Joseph spends $\frac{5}{24}$ of one week's earnings to buy a jacket.
The cost of the jacket is \$56.50 .

Calculate the amount Joseph earns in a week.

\$ ..... [2]

Question 371

By writing each number correct to 1 significant figure, find an estimate for the value of

$$\frac{2.8 \times 82.6}{27.8 - 13.9}.$$

..... [2]

Question 372

Sahil and Anika share \$78 in the ratio 5 : 8.

Calculate the amount each receives.

Sahil \$ .....

Anika \$ ..... [2]

Question 373

A triangle has sides of length 11 cm, 10 cm and 9 cm.

Calculate the largest angle in the triangle.

..... [4]

Question 374

Simplify $2.1 \times 10^{p} + 2.1 \times 10^{p-1}$.
Give your answer in standard form.

..... [2]

Question 375

The interior angle of a regular polygon is 175°.

Calculate the number of sides.

..... [2]

Question 376

The sides of a regular hexagon are 80 mm, correct to the nearest millimetre.

Calculate the lower bound of the perimeter of the hexagon.

..... mm [2]

Question 377

Without using a calculator, work out $1\frac{2}{3} \div 7\frac{1}{2}$.
You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 378

Alex changes 190 euros (€) into pounds (£) when £1 = €1.1723 .

Calculate the amount Alex receives.
Give your answer correct to 2 decimal places.

£ ..... [2]

Question 379

12 18 29 49 91 125

From the list of numbers, write down

(a) a cube number,

..... [1]

(b) a prime number.

..... [1]

Question 380

Maria buys n pencils that cost p cents each.
She pays with a $\$y$ note.

Find, in terms of n, p and y, the amount of change Maria receives.
Give your answer in cents.

..... cents [2]

Question 381

Jo invests \$600 for 7 years at a rate of 1.5% per year simple interest.

Calculate the total interest earned during the 7 years.

\$ ..... [2]

Question 382

Write as a fraction in its simplest form.

(a) 72%

..... [1]

(b) 0.004

..... [1]

Question 383

Write down the number that is 23 less than -1.6 .

..... [1]

Question 384

Write $0.\dot{0}\dot{4}$ as a fraction in its simplest form.

..... [1]

Question 385

(a) Write 0.006 54 in standard form.

..... [1]

(b) The number 1.467×10^{102} is written as an ordinary number.

Write down the number of zeros that follow the digit 7.

..... [1]

Question 386

Without using a calculator, work out $\frac{2}{3} \div 1\frac{3}{7}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 387

(a) Complete these statements.

The reciprocal of 0.2 is .....

A prime number between 90 and 100 is ..... [2]

(b)

$\frac{7}{5}$ 0.6 $\sqrt{7}$ 8 $\sqrt{9}$

From this list, write down an irrational number.

..... [1]

Question 388

Write down an expression for the range of k consecutive integers.

..... [1]

Question 389

Calculate $\sqrt[4]{0.0256}$.

..... [1]

Question 390

The distance between two towns is 600 km, correct to the nearest 10 km.
A car takes 8 hours 40 minutes, correct to the nearest 10 minutes, to travel this distance.

Calculate the lower bound for the average speed of the car in km/h.

..... km/h [3]

Question 391

On a map, a lake has an area of 32 cm^2.
The scale of the map is 1 : 24 000.

Calculate the actual area of the lake.
Give your answer in km^2.

..... km^2 [2]

Question 392

The profit a company makes decreases exponentially at a rate of 0.9% per year.
In 2014, the profit was \$9500.

Calculate the profit in 2019.

\$ ..... [2]

Question 393

Without using a calculator, work out $1\frac{3}{8} - \frac{5}{6}$.
You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 394

(a) The nth term of a sequence is n^2+3n.

Find the first three terms of this sequence.

....., ..., ... [2]

(b) These are the first five terms of a different sequence.

25 18 11 4 −3

Find the nth term of this sequence.

..... [2]

Question 395

Work out.

(a) $\begin{pmatrix} 6 \\ -5 \end{pmatrix} + \begin{pmatrix} 8 \\ -1 \end{pmatrix}$

( ) [1]

(b) $3\begin{pmatrix} -4 \\ 7 \end{pmatrix}$

( ) [1]

Question 396

Jo and Mo share $26.
Jo receives $5 more than Mo.

Find the ratio Jo's money : Mo's money.
Give your answer in its simplest form.

..... : ..... [3]

Question 397

The cost of a train journey is increased by 6% to a new cost of \$153.70 .

Calculate the original cost of the train journey.

\$ ..... [2]

Question 398

Calculate $0.04^2 + 0.03 \times 0.28$.
Give your answer in standard form.

..... [2]

Question 399

Without using a calculator, work out $\frac{11}{12} + \frac{3}{4}$.
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 400

These are the first four terms of a sequence.

3 −1 −5 −9

(a) Find the next term in this sequence.

..... [1]

(b) Find the *n*th term.

..... [2]

Question 401

Write the recurring decimal $0.\dot{2}\dot{7}$ as a fraction.

Question 402

Beatrice walks 1 km at a speed of 4 km/h and then 2 km at a speed of 4.5 km/h.

Work out Beatrice's average speed for the whole journey.

..... km/h [3]

Question 403

Marek buys a computer for $420.
He sells it at a loss of 15%.

Calculate the selling price of this computer.

$ ..... [2]

Question 404

Nina changes 153 euros into dollars when the exchange rate is $1 = 0.9 euros.

Calculate the amount Nina receives.

$ ..... [1]

Question 405

(a) $=$ $\neq$ $>$ $<$

Put a ring around each of the symbols that make this statement correct.

0.5 ..... 5% [1]

(b) Insert one pair of brackets to make this statement correct.

$7 - 3 - 1 + 2 = 7$ [1]

Question 406

11 13 15 17 19

From this list, write down the number that is both a prime number and a factor of 195.

..... [1]

Question 407

Write 26 g as a percentage of 208 g.

..... % [1]

Question 408

The table shows the first five terms of sequences A, B and C.

	1st term	2nd term	3rd term	4th term	5th term	nth term
Sequence A	8	3	-2	-7	-12	
Sequence B	2	$\frac{3}{2}$	$\frac{4}{3}$	$\frac{5}{4}$	$\frac{6}{5}$	
Sequence C	$\frac{1}{2}$	1	2	4	8	

Complete the table to show the nth term of each sequence.

[5]

Question 409

The interior angle of a regular polygon is 156°.

Work out the number of sides of this polygon.

..... [2]

Question 410

2.1×10^{-1} $0.\dot{2}$ 22% $\sqrt{0.2}$ $\frac{24}{1000}$

Write these values in order of size, starting with the smallest.

..... < ..... < ..... < ..... < ..... [2]

smallest

Question 411

Calculate $\sqrt[4]{39\frac{1}{16}}$.

..... [1]

Question 412

Without using a calculator, work out $\frac{1}{3} \div \frac{7}{6} + \frac{1}{5}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [4]

Question 413

Angelique rents a room for a party.
The cost of renting the room is \$15.50 for the first hour and then \$7.25 for each additional hour.
She pays \$95.25 in total.

Work out the total number of hours she rents the room for.

..... hours [3]

Question 414

Change 2.15 hours into minutes.

..... min [1]

Question 415

The temperature at midnight is −8.5 °C.
The temperature at 11 am is −1 °C.

Work out the difference between the temperature at midnight and the temperature at 11 am.

..... °C [1]

Question 416

Find the *n*th term of each sequence.

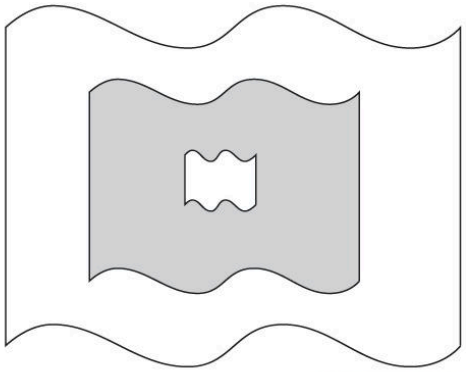
(a) 8, 15, 34, 71, 132, ...

..... [2]

(b) $\frac{2}{1}$, $\frac{3}{4}$, $\frac{4}{16}$, $\frac{5}{64}$, $\frac{6}{256}$, ...

..... [3]

Question 417



NOT TO SCALE

The diagram shows three shapes that are mathematically similar.
The heights of the shapes are in the ratio small : medium : large = 1 : 5 : 8.

Find the ratio shaded area : total unshaded area.
Give your answer in its simplest form.

..... : ..... [4]

Question 418

Chai invests some money.
By the end of the first year, the value of the investment has decreased by 35%.
By the end of the second year, the value of the investment has increased by 40% of its value at the end of the first year.

Find the overall percentage change in the value of the investment.

..... % [3]

Question 419

A regular polygon has an interior angle of 174°.

Find the number of sides of this polygon.

..... [2]

Question 420

Without using a calculator, work out $1\frac{5}{6}+\frac{2}{5}$.
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 421

Calculate.

$$\frac{4.87-2.7}{-0.2+\sqrt[3]{0.729}}$$

..... [1]

Question 422

Hank flies from Los Angeles to Shanghai.

(a) The flight departs on Friday 22 July at 21 40.
The flight takes 13 hours 35 minutes.
The local time in Shanghai is 15 hours ahead of the local time in Los Angeles.

Find the day, date and time in Shanghai when Hank's flight arrives.

Day ....., Date ....., Time ..... [3]

(b) The cost of the flight is \$920.
The exchange rate is \$1 = 6.87 Chinese yuan.

Find the cost of the flight in yuan.

..... yuan [1]

Question 423

P is a prime number where $60 < P < 80$.
P is 2 less than a square number.

Find the value of P.

$P =$ ..... [2]

Question 424

Without using a calculator, work out $2\frac{1}{3} \times \frac{11}{14}$.
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 425

(a) Sanjay invests \$700 in an account paying simple interest at a rate of 2.5% per year.

Calculate the value of his investment at the end of 6 years.

\$ ..... [3]

(b) Meera invests \$700 in an account paying compound interest at a rate of r% per year.
At the end of 17 years the value of her investment is \$1030.35 .

Find the value of r.

$r =$ ..... [3]

Question 426

(a) The nth term of a sequence is $n^2 + 7$.

Find the first three terms of this sequence.

....., ..., ... [2]

(b) These are the first four terms of a different sequence.

15 7 −1 −9

Find the nth term of this sequence.

..... [2]

Question 427

A journey starts at 21 15 one day and ends at 04 33 the next day.

Calculate the time taken, in hours and minutes.

..... h ..... min [1]

Question 428

Work out $\sqrt{5} \times 6^2$.
Give your answer correct to 2 decimal places.

..... [2]

Question 429

Neha has a piece of ribbon of length 23 cm, correct to the nearest cm.
From this ribbon she cuts off a piece with length 87 mm, correct to the nearest mm.

Work out the lower bound and the upper bound for the length of the remaining ribbon.
Give your answer in centimetres.

Lower bound = ... cm

Upper bound = ...cm [3]

Question 430

Find the nth term of this sequence.

8, 17, 32, 53, 80, ...

..... [2]

Question 431

f is a common factor of 14 and 28.
m is a common multiple of 10 and 25.
p is a prime number.

Work out the largest possible value of $\frac{f}{mp}$.

..... [4]

Question 432

Change 300 m/min to km/h.

..... km/h [2]

Question 433

Without using a calculator, work out $\frac{2}{9} \div \frac{5}{6}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 434

The nth term of a sequence is $n^2 - 1$.

Find the first three terms of this sequence.

..... , ... , ... [2]

Question 435

Find the highest common factor (HCF) of $12a^3b$ and $20a^2b^2$.

..... [2]

Question 436

Carlos invests \$4540 at a rate of r% per year compound interest.
At the end of 10 years he has earned \$1328.54 in interest.

Calculate the value of r.

$r =$ ..... [3]

Question 437

Without using a calculator, work out $4\frac{1}{8} - 2\frac{5}{6}$.
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 438

The nth term of a sequence is $n^2 + 12$.

Find the first three terms of this sequence.

..... , ... , ... [2]

Question 439

The price of a coat is \$126.
In a sale, this price is reduced by 18%.

Find the sale price of the coat.

\$ ..... [2]

Question 440

Find the value of $\sqrt{68} \times \sqrt{153}$.

..... [1]

Question 441

Figs cost 43 cents each.
Lyra has \$5 to buy some figs.

Calculate the largest number of figs Lyra can buy and the amount of change, in cents, she receives.

..... figs and ..... cents change [3]

Question 442

At noon, the temperature is 4 °C.
At midnight, the temperature is −9 °C.

Work out the difference in temperature between noon and midnight.

..... °C [1]

Question 443

A train passes through a station at a speed of 108 km/h.
The length of the station is 120 m.
The train takes 7 seconds to completely pass through the station.

Work out the length of the train.

..... m [3]

Question 444

Work out $2 \times 10^{100} - 2 \times 10^{98}$, giving your answer in standard form.

..... [2]

Question 445

22, 17, 12, 7, 2, …

(a) Find the next term of the sequence.

..... [1]

(b) Find the nth term of the sequence.

..... [2]

Question 446

Without using a calculator, work out $\frac{3}{7}-\frac{2}{21}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 447

Write 180 as a product of its prime factors.

..... [2]

Question 448

Kirsty changes \$380.80 into pounds (£) when £1 = \$1.19.

Calculate the amount Kirsty receives.

£ ..... [2]

Question 449

Calculate $\frac{1-0.7}{0.45-0.38}$, giving your answer correct to 4 significant figures.

..... [2]

Question 450

Jason starts a run at 10.05 am and finishes at 1.02 pm.

Work out the time Jason takes to complete the run.

..... h ..... min [1]

Question 451

Calculate 4^5-5^4.

..... [1]

Question 452

Write down a prime number between 30 and 40.

..... [1]

Question 453

A map has a scale of $1 : 200\,000$.

Find the area, in square kilometres, of a lake that has an area of $12.4\,\text{cm}^2$ on the map.

..... km^2 [2]

Question 454

Convert $0.2\dot{4}$ to a fraction.
You must show all your working and give your answer in its simplest form.

..... [2]

Question 455

Keita invests \$4000 at a rate of 2.6% per year compound interest.

Work out the interest earned on the investment at the end of 3 years.

\$ ..... [3]

Question 456

Find the lowest common multiple (LCM) of 36 and 60.

..... [2]

Question 457

Without using a calculator, work out $\frac{5}{7} - \frac{2}{3}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 458

The mean mass of four men in a rowing team is 97.5 kg.
The modal mass is 101 kg.
The range of the masses is 8 kg.

Find the mass of each of the four men.

..... kg , ... kg , ... kg, ... kg [3]

Question 459

Calculate.

$$\sqrt{15}+\frac{4.8}{2.2}$$

..... [1]

Question 460

120 121 149 164 216

From this list, write down

(a) a square number

..... [1]

(b) a cube number.

..... [1]

Question 461

Marco starts work at 20 45 and finishes at 02 08 the next day.

Find the length of time, in hours and minutes, he works.

..... h ..... min [1]

Question 462

Write $0.4\dot{1}\dot{9}$ as a fraction in its simplest form.
You must show all your working.

..... [3]

Question 463

$x = 3^2 \times 5^2 \times 7 \times 199^{57}$ when written as a product of its prime factors.

Write $x \div 315$ as a product of its prime factors.

..... [2]

Question 464

Calculate.

(a) 2000×1.2^3

..... [1]

(b) $2\frac{1}{8} \times \frac{6}{17}$

..... [1]

(c) $\frac{4.5(\cos 30°)}{\sqrt{3}} - 2$

..... [1]

Question 465

Without using a calculator, work out $\frac{5}{9} - \frac{1}{6}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 466

(a) These are the first five terms of a sequence.

27 26 23 18 11

Find the next two terms in the sequence.

....., ... [2]

(b) The table shows information about two different sequences.

	First five terms of sequence					*n*th term
Sequence A	3	10	17	24	31	
Sequence B	2	11	26	47	74	

Complete the table.

[4]

Question 467

Jenna buys 2.4 m of ribbon and 4.8 m of fabric.
The total cost is $33.48 .
Ribbon costs $0.85 per metre.

Find the cost of 1 m of fabric.

$ ..... [3]

Question 468

Find the sum of 3^2 and -3^2.

..... [1]

Question 469

Violet and Wilfred recorded their times to run 200 m, correct to the nearest second.
Violet took 36 seconds and Wilfred took 39 seconds.

Work out the upper bound of the difference between their times.

..... s [2]

Question 470

Without using a calculator, work out $\frac{1}{3}+\frac{5}{6}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [2]

Question 471

(a) 3, 9, 27, 81, …

Write down the next term in this sequence.

..... [1]

(b) 13, 17, 21, 25, …

Find the nth term of this sequence.

..... [2]

Question 472

The price of a computer is $520.
This price is reduced by 15% in a sale.

Work out the sale price.

$ ..... [2]

Question 473

Divide $200 in the ratio 7 : 3.

$ ..... , $ ..... [2]

Question 474

Write 32 cm as a fraction of 2 m.
Give your answer in its simplest form.

..... [2]

Question 475

A train journey starts at 23 40 and finishes at 06 50.

Work out the time taken for this journey.

..... h ..... min [1]

Question 476

Write down a common multiple of 18 and 24.

..... [1]

Question 477

A car travels 14 km, correct to the nearest kilometre.
This takes 12 minutes, correct to the nearest minute.

Calculate the lower bound of the speed of the car.
Give your answer in kilometres per minute.

..... km/min [3]

Question 478

Find the nth term of each sequence.

(a) –1, 0, 7, 26, 63, …

..... [2]

(b) 24, 12, 6, 3, 1.5, …

..... [2]

Question 479

Find the highest common factor (HCF) of $12x^{12}$ and $16x^{16}$.

..... [2]

Question 480

Calculate 0.3^2.
Give your answer in standard form.

..... [2]

Question 481

Without using a calculator, work out $\frac{4}{7} \div 8$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 482

23, 17, 11, 5, ...

(a) Write down the next number in this sequence.

..... [1]

(b) Find the *n*th term of this sequence.

..... [2]

Question 483

12	15	27	29	91	93

From the list of numbers, write down

(a) a cube number

..... [1]

(b) a prime number.

..... [1]

Question 484

A train travels between two stations.
The distance between the stations is 220 km, correct to the nearest kilometre.
The speed of the train is 125 km/h, correct to the nearest 5 km/h.

Calculate the upper bound for the time the journey takes.
Give your answer in hours and minutes.

..... h ..... min [4]

Question 485

These are the first four terms of a sequence.

2.75 6 11.25 20

The nth term of this sequence is $\frac{1}{4}n^3 + an^2 + bn$.

Calculate the value of a and the value of b.

$a =$ .....

$b =$ ..... [5]

Question 486

The number of trees in a forest is decreasing exponentially at a rate of 1.75% per year.
Eleven years ago there were 980 trees.

Calculate the number of trees in the forest now.
Give your answer correct to the nearest integer.

..... [2]

Question 487

Write $0.5\dot{8}\dot{1}$ as a fraction.
You must show all your working and give your answer in its simplest form.

..... [3]

Question 488

Calculate $\sqrt{42} + 3^{0.4}$.

..... [1]

Question 489

Without using a calculator, work out $5\frac{11}{12} + 2\frac{1}{4}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 490

At the end of the day, a shopkeeper has 12 tins of cat food left.
This is $\frac{3}{13}$ of the number he had at the beginning of the day.

Calculate the number of tins he had at the beginning of the day.

…… [2]

Question 491

A film lasts for 2 hours 50 minutes.
The film ends at 23 05.
Find the time the film starts.

..... [1]

Question 492

Write $0.6\dot{2}\dot{1}$ as a fraction in its simplest form.
You must show all your working.

..... [3]

Question 493

Without using a calculator, work out $\frac{4}{7} \div 1\frac{5}{21}$.
You must show all your working and give your answer as a fraction in its simplest form.

…… [3]

Question 494

The distance from town *A* to town *B* on a map is 3.5 cm.
The scale on the map is 1 : 250 000.

Find the actual distance, in kilometres, from town *A* to town *B*.

..... km [2]

Question 495

There are two prime numbers in this list.

27 47 57 61 75 93

Work out the sum of these two prime numbers.

..... [2]

Question 496

Find the temperature that is 8 °C colder than −5 °C.

..... °C [1]

Question 497

Anya invests $6000 in an account that pays compound interest at a rate of r% per year.
At the end of 8 years, the account has earned $621.70 in interest.

Calculate the value of r.

$r =$ ..... [3]

Question 498

Without using a calculator, work out $2\frac{1}{7} \div \frac{5}{9}$.

You must show all your working and give your answer as a mixed number in its simplest form.

…….. [3]

Question 499

(a) The nth term of a sequence is $10 - n^2$.

Write down the first three terms of this sequence.

……., ……., …… [2]

(b) These are the first four terms of another sequence.

7 10 13 16

Find an expression for the nth term of this sequence.

…….. [2]

Question 500

The scale of a map is 1 : 125 000.
On a map, the length of an island is 9.4 cm.

Calculate the actual length of the island, giving your answer in kilometres.

……...km [2]

Question 501

By writing each number in the calculation correct to 1 significant figure, work out an estimate for the value of

$$\frac{6.7\times2.1}{18-5.9}.$$

You must show all your working.

.....[2]

Question 502

A train journey starts at 21 43.

It takes 8 hours and 32 minutes.

Find the time the journey finishes.

..... [1]

Question 503

F is proportional to the product of m and a.

Calculate the percentage change in F when m is increased by 40% and a is decreased by 15%.

..... % [3]

Question 504

Oliver sent 22% more messages in June than in May.
He sent 305 messages in June.

Find how many more messages he sent in June than in May.

..... [3]

Question 505

Find the highest common factor (HCF) of 48 and 80.

..... [2]

Question 506

Without using a calculator, work out $1\frac{5}{6}\div\frac{11}{15}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 507

Shubhu invests $750 in a savings account for 5 years.
The account pays simple interest at a rate of 1.8% per year.

Calculate the total interest she earns during the 5 years.

$ ..... [2]

Question 508

Tara goes on a journey by train.
The train leaves at 06 48.
The journey takes 12 hours and 35 minutes.

Find the time when Tara arrives.

.....[1]

Question 509

61	63	64	66	68	69

From this list, write down

(a) a cube number

..... [1]

(b) a prime number.

..... [1]

Question 510

The area of a rectangle is 55.2 cm^2, correct to 1 decimal place.
The length of the rectangle is 9 cm, correct to the nearest cm.

Calculate the upper bound of the width of the rectangle.

..... cm [3]

Question 511

Find the nth term of each sequence.

(a) 11, 8, 5, 2, −1, …

..... [2]

(b) 1, 5, 25, 125, 625, …

..... [2]

Question 512

Find the lowest common multiple (LCM) of $12x^8$ and $8x^{12}$.

..... [2]

Question 513

Write 90 as a product of its prime factors.

..... [2]

Question 514

Without using a calculator, work out $3\frac{1}{8} - 1\frac{3}{4}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 515

(a) Explain why 111 is not a prime number.

..... [1]

(b) Find a prime number between 110 and 120.

..... [1]

Question 516

Change 62 000 millimetres into kilometres.

..... km [1]

Question 517

Write down the number that is 9 greater than −23.

..... [1]

Question 518

Write 24.07839

(a) correct to 2 decimal places

..... [1]

(b) correct to the nearest 10.

..... [1]

Question 519

$P = 2w + 2h$

$w = 11$ and $h = 9.5$, both correct to 2 significant figures.

Find the lower bound and the upper bound for P.

Lower bound = ...

Upper bound = ... [3]

Question 520

At the end of 2021 there were 27 000 rhinos living in the wild.
The number of rhinos is expected to decrease exponentially by 3% each year.

Work out the number of rhinos expected to be living in the wild 4 years later, at the end of 2025.
Give your answer correct to the nearest whole number.

..... [3]

Question 521

Write $0.4\dot{2}$ as a fraction in its simplest form.
You must show all your working.

..... [3]

Question 522

Find the highest common factor (HCF) of 140 and 126.

..... [2]

Question 523

Calculate.

$$7\frac{3}{11} \times 3\frac{3}{10}$$

..... [1]

Question 524

The exchange rate between Singapore dollars and euros is 1 Singapore dollar = 0.62 euros.

Find the value of 161.20 euros in Singapore dollars.

..... Singapore dollars [1]

Question 525

The table shows some information about Amir's shopping.

Fruit	Cost per kilogram	Number of kilograms Amir buys	Cost
Oranges	$2.35	3.2	$.....
Bananas	$.....	2.8	$.....
		Total	$13.54

Complete the table.

[3]

Question 526

Find the highest common factor (HCF) of $28x^5$ and $98x^3$.

.....[2]

Question 527

A train, 1750 metres long, is travelling at 55 km/h.

Calculate how long it will take for the whole train to completely cross a bridge that is 480 metres long. Give your answer in seconds, correct to the nearest second.

..... s [3]

Question 528

Without using a calculator, work out $1\frac{1}{4} - \frac{5}{6}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

Question 529

(a) The nth term of a sequence is $n^2 - 3$.

Find the first three terms of this sequence.

....., ..., ... [2]

(b) These are the first five terms of a different sequence.

1 3 9 27 81

Find the nth term of this sequence.

..... [2]

Question 530

Calculate $\sqrt{5.76} + 2.8^3$.

..... [1]

Question 531

A night bus runs from 21 50 to 05 18 the next day.

Work out the number of hours and minutes that the night bus runs.

..... h ..... min [1]

Question 532

Write the recurring decimal $0.4\dot{1}$ as a fraction in its simplest form.
You must show all your working.

..... [2]

Question 533

Work out, giving each answer in standard form.

(a) $\left(2.1 \times 10^{101}\right) \times \left(8 \times 10^{101}\right)$

..... [2]

(b) $\left(2.1 \times 10^{101}\right) + \left(2.1 \times 10^{100}\right)$

..... [2]

Question 534

Without using a calculator, work out $\frac{3}{7} - \frac{1}{14}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

Question 535

The scale of a map is 1 : 40 000.
On the map the distance between two villages is 37 cm.

Calculate the actual distance between the two villages.
Give your answer in kilometres.

..... km [2]

Question 536

Put one pair of brackets into this calculation to make it correct.

$$5 - 4 \times 3 - 9 - 2 = 0$$

[1]

Question 537

Write the number two million two thousand and two in figures.

..... [1]

Question 538

Without using a calculator, work out $2\frac{1}{4} \div 1\frac{7}{8}$.

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

Question 539

Write 174 000 in standard form.

..... [1]

Question 540

Kai invests $5000 in an account paying simple interest at a rate of r% per year.
At the end of 8 years, the value of his investment is $5700.

Find the value of r.

$r =$ ..... [3]

Question 541

Write 0.04628 correct to 2 significant figures.

..... [1]

Question 542

The table shows part of a tram timetable.

Newpoint	Westhill
10 30	11 17
12 18	
13 30	14 17

All the trams take the same number of minutes to complete the journey from Newpoint to Westhill.

Complete the table.

[2]

Question 543

Jonah has \$750.
He spends $\frac{1}{4}$ of this money on travel and some of this money on food.
He now has \$437.50 .

Work out the fraction of the \$750 he spends on food.

..... [3]

Question 544

A gardener charges \$6.55 for each hour he works plus a fixed charge of \$15.50 .

Calculate the total amount he charges when he works for 4 hours.

\$ ..... [2]

Question 545

The temperature at midnight is $-4\,°C$.
The temperature at noon is $25\,°C$.

Work out the difference between these two temperatures.

.....^{0}C [1]

Question 546

Write $0.1\dot{4}\dot{6}$ as a fraction in its simplest form.
You must show all your working.

..... [3]

Question 547

Amir invests \$1500 in an account.
The account pays compound interest at a rate of r % per year.
At the end of 8 years the value of his investment is \$1656.73 .

Find the value of r.

$r =$ ..... [3]

Question 548

The value of a car is \$8000.
Each year the value of the car decreases exponentially by 25%.

Calculate the value of this car after 3 years.

\$ ..... [2]

Question 549

These are the first five terms of a sequence.

11 18 25 32 39

Find an expression for the nth term of the sequence.

..... [2]

Question 550

Calculate.

(a) $\sqrt[3]{343} - \sqrt{40.96}$

..... [1]

(b) $(192 + 4 \times 16)^{1.25}$

..... [1]

Question 551

Find the greatest **odd** number that is a factor of 140 and a factor of 210.

..... [2]

Question 552

The table shows some information about two sequences.

	nth term	5th term
Sequence A	$60 - 4n$	
Sequence B	$n^2 - 300$	

(a) Complete the table.

[2]

(b) Find the smallest **positive** number in sequence B.

..... [2]