A-level

Topic : Modulus

May 2013-May 2025

Questions

Question 1

(i) Solve the equation $|4x - 1| = |x - 3|$. [3]

(ii) Hence solve the equation $|4^{y+1} - 1| = |4^y - 3|$ correct to 3 significant figures. [3]

Question 2

Solve the equation $|x - 2| = |\frac{1}{3}x|$. [3]

Question 3

Solve the inequality $|4x + 3| > |x|$. [4]

Question 4

Find the set of values of x satisfying the inequality

$$|x + 2a| > 3|x - a|,$$

where a is a positive constant. [4]

Question 5

Solve the inequality $|3x - 1| < |2x + 5|$. [4]

Question 6

Solve the inequality $|x - 2| > 2x - 3$. [4]

Question 7

Solve the inequality $|2x - 5| > 3|2x + 1|$. [4]

Question 8

Solve the inequality $2|x - 2| > |3x + 1|$. [4]

Question 9

Solve the inequality $|x - 4| < 2|3x + 1|$. [4]

Question 10

Solve the inequality $|2x + 1| < 3|x - 2|$. [4]

Question 11

Solve the inequality $|x - 3| < 3x - 4$. [4]

Question 12

Showing all necessary working, solve the equation $3|2^x - 1| = 2^x$, giving your answers correct to 3 significant figures. [4]

Question 13

Find the set of values of x satisfying the inequality $2|2x - a| < |x + 3a|$, where a is a positive constant. [4]

Question 14

Solve the inequality $3|2x - 1| > |x + 4|$. [4]

Question 15

Solve the inequality $|2x - 3| > 4|x + 1|$. [4]

Question 16

Solve the inequality $2|x + 2| > |3x - 1|$. [4]

Question 17

Solve the inequality $|x - 2| < 3x - 4$. [3]

Question 18

Solve the inequality $|2x - 1| > 3|x + 2|$. [4]

Question 19

Solve the inequality $2 - 5x > 2|x - 3|$. [4]

Question 20

Solve the inequality $2 - 5x > 2|x - 3|$. [4]

Question 21

Solve the inequality $|2x - 1| < 3|x + 1|$. [4]

Question 22

Solve the inequality $2|3x - 1| < |x + 1|$. [4]

Question 23

(a) Sketch the graph of $y = |2x - 3|$. [1]

(b) Solve the inequality $|2x - 3| < 3x + 2$. [3]

Question 24

Solve the inequality $|3x - a| > 2|x + 2a|$, where a is a positive constant. [4]

Question 25

Solve the equation $4|5^x - 1| = 5^x$, giving your answers correct to 3 decimal places. [4]

Question 26

Solve the inequality $|2x + 3| > 3|x + 2|$. [4]

Question 27

Find, in terms of a, the set of values of x satisfying the inequality

$$2|3x + a| < |2x + 3a|,$$

where a is a positive constant. [4]

Question 28

(a) Sketch the graph of $y = |2x + 1|$. [1]

(b) Solve the inequality $3x + 5 < |2x + 1|$. [3]

Question 29

Solve the inequality $|5x - 3| < 2|3x - 7|$. [4]

Question 30

(a) Sketch the graph of $y = |2x + 3|$. [1]

(b) Solve the inequality $3x + 8 > |2x + 3|$. [3]

Question 31

Find the set of values of x satisfying the inequality $\left|2^{x+1} - 2\right| < 0.5$, giving your answer to 3 significant figures. [4]

Question 32

(a) Sketch the graph of $y = |4x - 2|$. [1]

(b) Solve the inequality $1 + 3x < |4x - 2|$. [4]

Question 33

(a) Sketch the graph of $y = \left|x - 2a\right|$, where a is a positive constant. [1]

(b) Solve the inequality $2x - 3a < \left|x - 2a\right|$. [2]

Question 34

(a) Sketch the graph of $y = |3x - 2a|$, where a is a positive constant. [1]

(b) Hence or otherwise solve the inequality $|3x - 2a| < x + 5a$. [3]

Question 35

(a) Sketch the graph of $y = |2x - 3|$. [1]

(b) Solve the inequality $3x - 1 < |2x - 3|$. [2]