Problem 0580/43/O/N/21 Q7

(a) Amir buys 3 cakes that cost c cents each and 2 loaves of bread that cost $(2c - 11)$ cents each.
He spends a total of \$5.87 .

Find the value of c.

$$3c + 2(2c - 11) = 5.87 \times 100$$
$$7c = 587 + 22$$
$$c = \frac{609}{7}$$

$c =$ 87 [3]

(b) A bottle of water costs \$$w$.
A bottle of juice costs \$$(w + 1)$.

Alex spends \$22 on bottles of water and \$42 on bottles of juice.
The number of bottles of water is equal to the number of bottles of juice.

Find the value of w.

$$\frac{22}{w} = \frac{42}{w+1}$$
$$22w + 22 = 42w$$
$$22 = 20w$$

$w =$ 1.1 [3]

(c) Alicia walks a distance of 9 km at a speed of x km/h.
She then runs a distance of 5 km at a speed of $(2x + 1)$ km/h.

The total time Alicia takes is 2.5 hours.

(i) Show that $10x^2 - 41x - 18 = 0$.

$$\frac{9}{x} + \frac{5}{2x+1} = 2.5$$

$$9(2x+1) + 5x = 2.5(x(2x+1))$$

$$18x + 9 + 5x = 5x^2 + 2.5x$$

$$5x^2 + 2.5x - 23x - 9 = 0$$

$$10x^2 - 41x - 18 = 0$$

[4]

(ii) Work out Alicia's running speed.
You must show all your working.

$$10x^2 - 41x - 18 = 0$$

$$a = 10 \quad b = -41 \quad c = -18$$

$$x = \frac{41 \pm \sqrt{(-41)^2 - 4 \times 10 \times -18}}{2 \times 10}$$

$$x = 4.5 \qquad x = -0.4$$

Since speed cannot be negative
hence $x = 4.5$ so running speed

$= 2 \times 4.5 + 1$

10

..... km/h [4]