CREDIT 2008 – Paper I

1. 24.7 − 0.63 × 30
   24.7 − 18.9
   5.8

$$\begin{array}{r}0.63\\ \times\ \ 3\\ \hline 1.89\end{array}\quad \begin{array}{r}1.89\\ \times 10\\ \hline 18.9\end{array}\quad \begin{array}{r}24.7\\ -18.9\\ \hline 5.8\end{array}$$

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2. $5x^2 - 45 \rightarrow 5(x^2 - 9) \rightarrow 5(x+3)(x-3)$

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3. $W = BH^2$ Change subject to H.

$$\frac{W}{B} = H^2 \rightarrow H = \sqrt{\frac{W}{B}}$$

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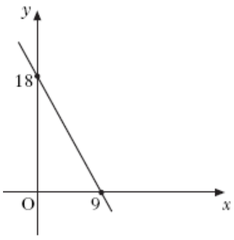
4. Use: $y = mx + c$



y-intercept is 18
so $c = 18$

gradient $m = \frac{rise}{run} = -\frac{18}{9}$

$m = -2$ Hence: $y = -2x + 18$

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5. $\frac{1}{p} + \frac{2}{p+5}$ Use a common denominator

We need both p and $(p + 5)$ in denominator.

$$\frac{1}{p} \times \frac{(p+5)}{(p+5)} + \frac{2}{p+5} \times \frac{p}{p}$$

$$\rightarrow \frac{p+5}{p(p+5)} + \frac{2p}{p(p+5)}$$

$$\rightarrow \frac{p+5+2p}{p(p+5)} \rightarrow \frac{3p+5}{p(p+5)}$$

6a) Distance = speed × time (DST triangle)

Dist. cycled = $(x+8) \times 2 \rightarrow 2(x+8)$ km

6b) Dist. run = $x \times 0.5 \rightarrow 0.5x$ km

6c) Total Distance = 46 km

So, $2(x+8) + 0.5x = 46$

$2x + 16 + 0.5x = 46$

(now subtract 16 from each side and simplify)

$2.5x = 30$ *(double each side)*

$5x = 60 \rightarrow x = 12$

Jane's running speed is 12 km per hour.

7a) 4th term of each number pattern is the **mean** of the previous three terms.

1 + 6 + 8 = 15 Mean = 15 ÷ 3 = 5

Hence 4th term is 5

7b) $x + (x+7) + (x+11)$

$\rightarrow 3x + 18 \rightarrow 3(x+6)$

Divide by 3 to get mean = $x + 6$

Hence 4th term is $x + 6$

7c) Let missing term be t

Then: $-2x + x + 5 + t$ is the total

But the total must be the mean (4th term) × 3

i.e. $3(2x+4) \rightarrow 6x + 12$

Hence: $-2x + x + 5 + t = 6x + 12$

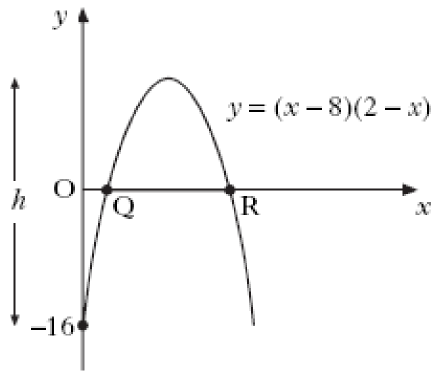
Simplify and solve

$-x + 5 + t = 6x + 12$

$t = 6x + 12 + x - 5$

$t = 7x + 7$

8a)



Coordinates of Q and R are where curve cuts the x-axis. i.e. when y = 0 (roots)

$y = (x-8)(2-x)$ now put $y = 0$

$(x-8)(2-x) = 0$

Hence $x = 8$ or $x = 2$

By inspection: Q(2, 0) and R(8, 0)

8b) Maximum height on line of symmetry.

Midway between roots i.e. when x = 5

So: $y = (5-8)(2-5) = (-3)\times(-3) = 9$

This is distance above x-axis.

So height h of letter A is: 9 + 16 = 25 units.

9. Simplify $m^3 \times \sqrt{m}$

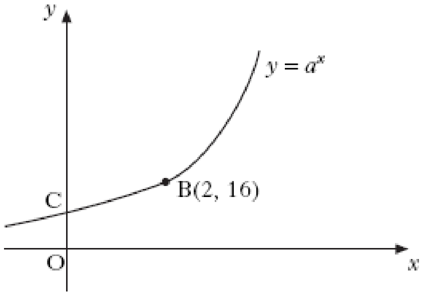
Put into index form:

$m^3 \times m^{\frac{1}{2}} \rightarrow m^{\frac{6}{2}} \times m^{\frac{1}{2}}$

add the indices

$\rightarrow m^{\frac{7}{2}}$

10a)



Coordinates of C are when $x = 0$.

If : $y = a^x$ then when $x = 0$

$y = a^0 \rightarrow y = 1$ hence

C is C(0, 1)

10b) If B is B(2, 16)

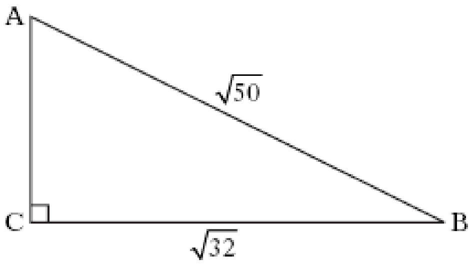
Then if this lies on the curve,
it must satisfy the equation.

Put the point into the equation:

$16 = a^2$

We can see that $a = 4$

11.



By Pythagoras

$\left(\sqrt{50}\right)^2 = AC^2 + \left(\sqrt{32}\right)^2$

Simplify

$50 = AC^2 + 32$

$50 - 32 = AC^2 \rightarrow AC^2 = 18$

$AC = \sqrt{18} = \sqrt{9 \times 2} = \sqrt{9} \times \sqrt{2} = 3\sqrt{2}$

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12. $x^2 - 10x + 18 = (x - a)^2 + b$

Remove the brackets
and compare the coefficients.

$x^2 - 10x + 18 = (x - a)(x - a) + b$

$x^2 - 10x + 18 = x^2 - ax - ax + a^2 + b$

$x^2 - 10x + 18 = x^2 - 2ax + a^2 + b$

By inspection:

$-2ax = -10x \rightarrow a = 5$

Also: $a^2 + b = 18$

Since we know that $a = 5$

Then: $5^2 + b = 18 \rightarrow 25 + b = 18 \rightarrow b = -7$

So, $a = 5,\ b = -7$

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13. New fraction is: $\dfrac{17 + x}{24 + x}$

This is equivalent to $\dfrac{2}{3}$

So: $\dfrac{17 + x}{24 + x} = \dfrac{2}{3}$

Cross multiply to get rid of the fractions.

$3(17 + x) = 2(24 + x)$

Remove the brackets

$51 + 3x = 48 + 2x$

Simplify by rearranging

$3x - 2x = 48 - 51$

$\rightarrow x = -3$

END OF QUESTION PAPER