CREDIT 2006 – Paper I

1. $56.4 - (1.25 \times 40)$

$56.4 - 50$

6.4

$1.25 \times 4 = 5.00$

$5.00 \times 10 = 50.0$

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2. $1\frac{3}{5} + 2\frac{4}{7}$ *Add whole numbers first*

$3 + \frac{3}{5} + \frac{4}{7}$ *use common denominator of 35*

$\rightarrow \quad 3 + \frac{21}{35} + \frac{20}{35} \quad \rightarrow \quad 3 + \frac{41}{35}$

$\rightarrow \quad 3 + 1\frac{6}{35} \quad \rightarrow \quad 4\frac{6}{35}$

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3. $f(x) = 4 - x^2$ *replace x with –3*

$f(-3) = 4 - (-3)^2 \quad \rightarrow \quad 4 - 9 \quad \rightarrow \quad -5$

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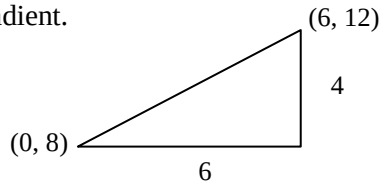
4. Find the gradient.



$m = \frac{rise}{run} = \frac{4}{6} = \frac{2}{3}$

$c = 8$ (y-intercept)

Equation is: $y = mx + c$

Hence equation is: $y = \frac{2}{3}x + 8$

Remove fraction by multiplying throughout by 3.

$\rightarrow \quad 3y = 2x + 24$

5a) Factorise $4x^2 - y^2$

This is the difference of 2 squares.

$4x^2 - y^2$

$\rightarrow \quad (2x)^2 - y^2 \quad \rightarrow \quad (2x + y)(2x - y)$

b) Hence simplify $\frac{4x^2 - y^2}{6x + 3y}$

Note top is as above,
denominator has common factor of 3.

$\frac{4x^2 - y^2}{6x + 3y} \rightarrow \frac{(2x + y)(2x - y)}{3(2x + y)} \rightarrow \frac{(2x - y)}{3}$

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6. Solve: $x - 2(x + 1) = 8$

Remove bracket, simplify, solve

$x - 2x - 2 = 8 \quad \rightarrow \quad -x - 2 = 8$

$\rightarrow \quad -x = 10 \quad \rightarrow \quad x = -10$

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7. This is about similar shapes.

We want the **volume** scale factor.

This is the **length** scale factor **cubed**.

Length scale factor is: $\frac{21}{14} \quad \rightarrow \quad \frac{3}{2}$

Hence volume s.f. = $\frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} \quad \rightarrow \quad \frac{27}{8}$

Volume of larger cup = $\frac{27}{8} \times \frac{160}{1}$

$\rightarrow \quad \frac{27}{\cancel{8}^{1}} \times \frac{\cancel{160}^{20}}{1} \quad \rightarrow \quad 540$ mls

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8. Look for the pattern.

$y = (x - 2)^2 + 3$

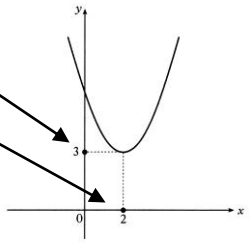


Figure 1

Hence

$y = (x - 1)^2 - 4$

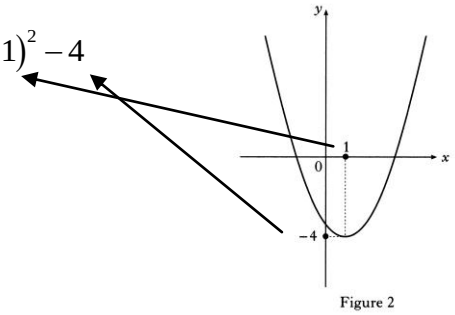


Figure 2

$y = (x - 1)^2 - 4$

is the equation of the graph in figure 2.

9. This is about simultaneous equations.

a) $x + y = 20$

b) $5x + 2y = 79$

c) Now solve by elimination:

$x + y = 20 \quad (1)$

$5x + 2y = 79 \quad (2)$

Multiply (1) by 5

$5x + 5y = 100 \quad (3)$

$5x + 2y = 79 \quad (4)$

Now subtract: (3) – (4)

$3y = 21$

Hence y = 7

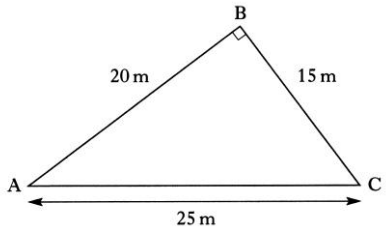
Substitute back into equation (1)

$x + 7 = 20$

So, x = 13

Euan won 13 games.

10a)



Since triangle is right angled.

Area of a triangle is $\frac{1}{2}$ *base* × *height*

Let AB be the base, and BC be the height.

So Area = $\frac{1}{2} \times 20 \times 15 = 150\ m^2$

b) In the second figure, BD is the height and AC is now the base.

Use the formula again.

$150 = \frac{1}{2} \times 25 \times BD$

Remove the fraction, by multiplying by 2

$300 = 25 \times BD$

Divide both sides by 25

$BD = \frac{300}{25} = 12\ m$

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11. One session costs £3

a) So, x sessions cost £ $3x$

b i) Monthly card + 15 sessions

Monthly card £ 20

First 6 sessions £ 0 FREE

Remaining sessions
15 – 6 = 9 sessions
Since first 6 sessions free

at £2 per session £ 18

Total cost = £ 38

ii) Monthly card + x sessions ($x > 6$)

Monthly card £ 20

First 6 sessions £ 0 FREE

Remaining sessions
$x - 6$ sessions
Since first 6 sessions free

at £2 per session £ $2 \times (x-6)$

Total cost = £ $20 + 2(x-6)$

c) Without the card,
x sessions cost £ $3x$

For monthly card to be cheaper:

$20 + 2(x-6) < 3x$

Now solve the inequality

$20 + 2x - 12 < 3x$

Subtract 2x from both sides

$20 - 12 < x$

$8 < x$ i.e. $x > 8$

So minimum number of sessions required for the monthly card to be cheaper is **9**

NOTE: if you did it this way:

$20 + 2x - 12 < 3x \rightarrow 8 + 2x < 3x$

i.e. $\rightarrow 8 - x < 0 \rightarrow -x < -8$

then if you multiply by –1, you MUST change direction of inequality sign. So $x > 8$

END OF QUESTION PAPER (*Rev. March 2007)*