SECTION A (Paper 2)

1. (a) Factorise fully $4x^2 - 6xy$

$x(4x - 6y) \rightarrow$ (1) mark only
$2(2x^2 - 3xy) \rightarrow$ (1) " "
$2x(2x - 3y) \rightarrow$ (2)

(2)

(b) Factorise $x^2 + 5x - 6$

allow sign errors. (1) mark only

$(x - 6)(x + 1) \Rightarrow (x^2 - 5x - 6)$
$(x + 3)(x + 2) \Rightarrow (x^2 + 5x + 6)$

$(x - 1)(x + 6) \rightarrow$ (2)

(2)

(c) Factorise $x^2 - 9$

~~$(x - 3)$~~

→ The most problematic !

$(x - 3)(x + 3)$

(1)
(Total 5 marks)

2. (a) Simplify $a^3 \times a^4$

a^7 (1)

(b) Simplify $3x^2y \times 5xy^3$

$15x^3y^4$
(1) (1)

(2)

(c) Simplify $\dfrac{(x-1)^2}{x-1}$

$(x - 1) \rightarrow$ (1)

(1)
(Total 4 marks)

9

3. Bill recorded the times, in minutes, taken to complete his last 40 homeworks.

This table shows information about the times.

Time (t minutes)	Frequency	x
$20 \leq t < 25$	8	22.5
$25 \leq t < 30$	3	27.5
$30 \leq t < 35$	7	32.5
$35 \leq t < 40$	7	37.5
$40 \leq t < 45$	15	42.5

(1) mark indep
allow 1 error.

(a) Find the class interval in which the median lies.

$35 \leq t < 40$ R (1)

(b) Calculate an estimate of the mean time it took Bill to complete each homework.

$$\text{Mean} = \frac{22.5 \times 8 + 27.5 \times 3 + 32.5 \times 7 + 37.5 \times 7 + 42.5 \times 15}{40}$$

(180, 82.5, 227.5, 262.5, 637.5)

(1) mark for structure

$\frac{1390}{40}$

34.75 (1) minutes

(3)

(Total 4 marks)

[do not allow. rounded answer le 35 X But allow 34.8]

~~Mean~~

4

4. Sandra carries out a survey of 90 Year 10 students.
She asks them their favourite snack.

She draws this ACCURATE pie chart.

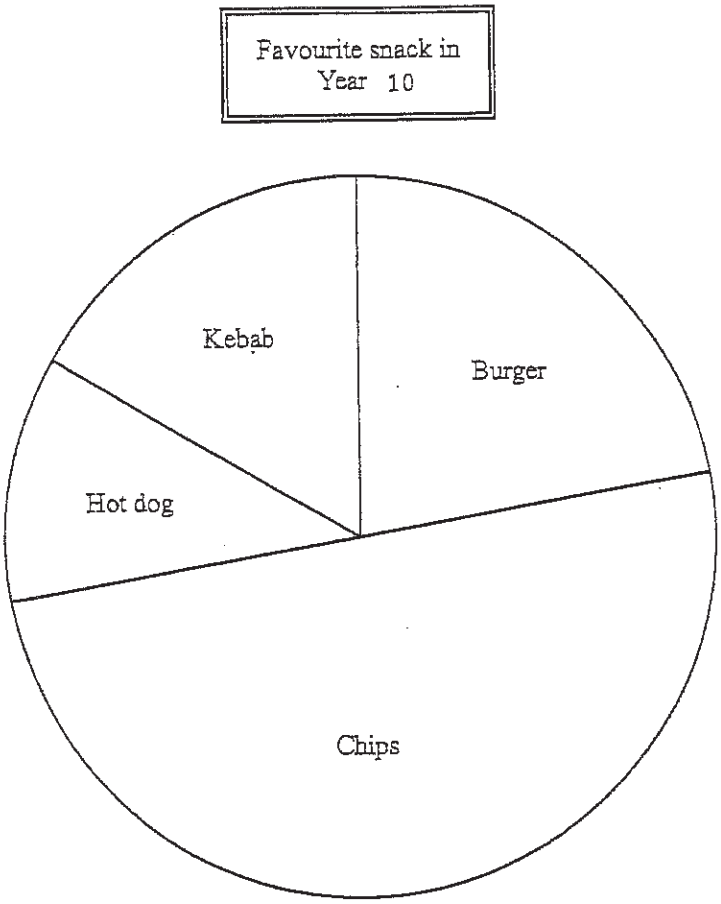


Diagram accurately drawn

Use the pie chart to complete the table.

Favourite snack in Year 10	Frequency	Angle
Burger	20	80°
Chips	45	180°
Hot dog	10	40°
Kebab	15	60°
Total	90	

(Total 3 marks)

3

Many chose "e" instead

5. The weight of a suitcase is 14 kg correct to the nearest kilogram.

What is the greatest possible weight of the suitcase?

14.04 kg	14.05 kg	14.4 kg	14.5 kg	14.9 kg
A	B	C	D	E

(Total 1 mark)

6.

Cinema Ticket Prices	
Adults	£4
Child	£3

An adult ticket costs £4.
A child ticket costs £3.

(a) Write down a formula for the total cost, £T, for n adult tickets and c child tickets.

$T = 4n + 3c$ (1) (1)

$T = 4n + 3c$

(2)

Hina spends £47 on cinema tickets.
She buys 8 adult tickets.

(b) Work out how many child tickets she buys.

(1) $47 = 4 \times 8 + 3c$

(1) $47 = 32 + 3c$

$15 = 3c$

$c = 5$

$c = 5$

(2)
(Total 4 marks)

$c = 5$ (1)

5

7.

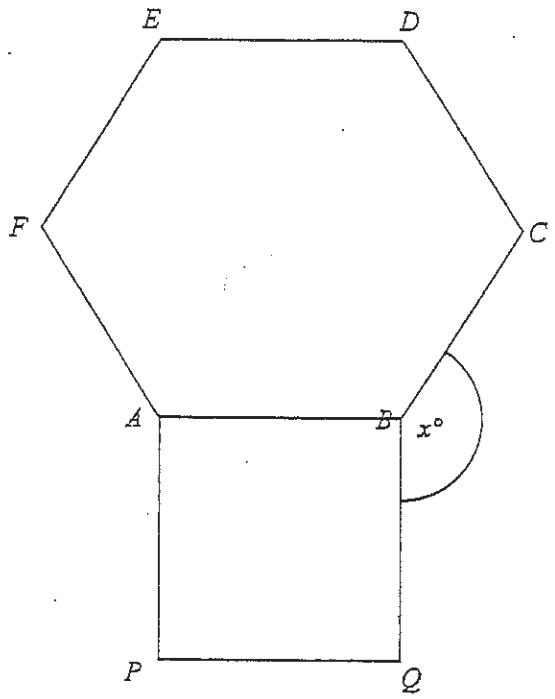


Diagram NOT accurately drawn

ABCDEF is a regular hexagon and *ABQP* is a square.
Angle *CBQ* = *x*°.

Work out the value of *x*.

or equivalent method

Int. angle $= \frac{4 \times 180}{6} = 120^\circ$ (1)

$x = 360 - (90 + 120)$ (1)

$x = 150^\circ$ (1)

x = 150°

(Total 3 marks)

3

8. (a) Solve $7x + 18 = 74$

$7x = 56$

$x = \frac{56}{7} = 8$

$x =$ 8 (1)

(b) Solve $4(2y - 5) = 32$

$2y - 5 = 8$

$2y = 13$

$y = 6.5$ (1)

[-1 for one error then ft]

$y =$ 6.5 (1)

(2)

r

$8y - 20 = 32$

$8y = 52$

$y = 6.5$

(c) Solve $5p + 7 = 3(4 - p)$

$5p + 7 = 12 - 3p$

$8p = 5$

$p = \frac{5}{8}$ (1)

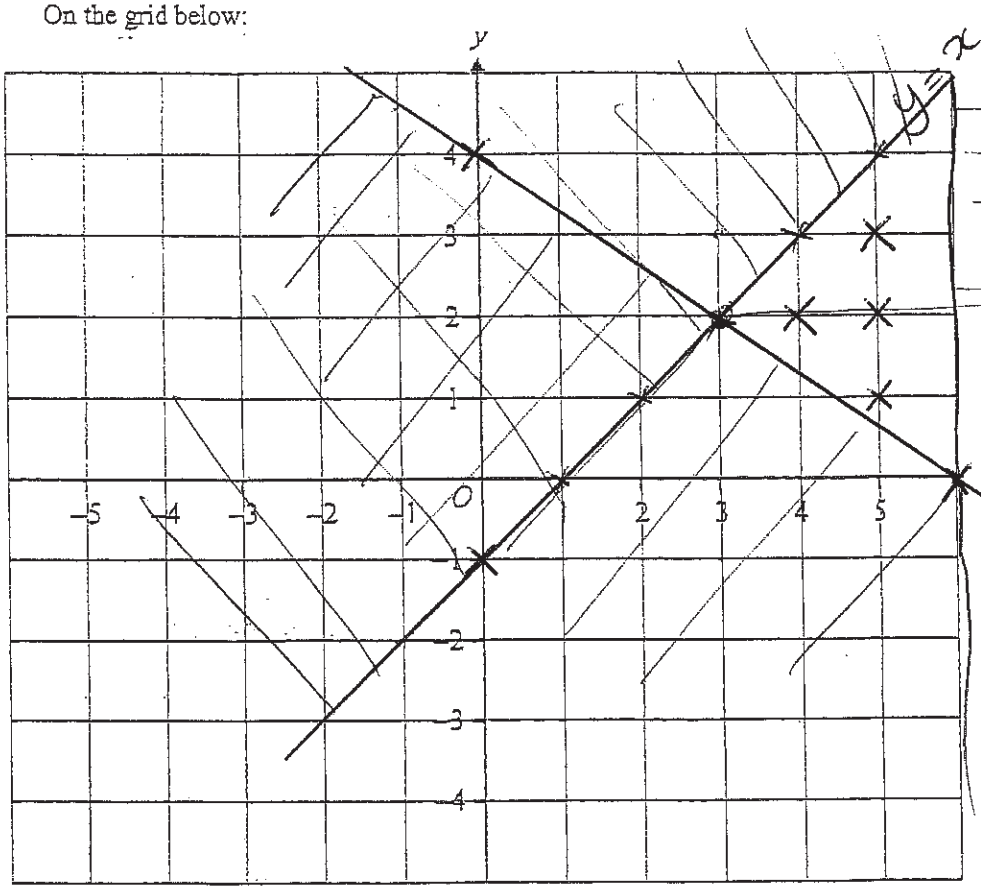
[-1 for one error then ft].

$p =$ $\frac{5}{8}$ (1) $= [0.625]$ (2)

(Total 5 marks)

5

9. On the grid below:



(a) Draw the two straight lines with equations $3y + 2x = 12$ and $y = x - 1$.

(2)

(0, 4)
(6, 0)

(b) Use the graphs to solve the simultaneous equations

$3y + 2x = 12$
$y = x - 1$

$x =$ 3 } or ft

$y =$ 2 }

(1)

(b) $3y + 2x > 12$ $y < x - 1$ $x < 6$

x and y are integers.

On the grid, mark with a cross (×) each of the four points which satisfies all these 3 inequalities.

(2)
(Total 5 marks)

(2) marks for all 4

(1) mark for 3 or 2

[(1) mark for correct 4?! 等. for ft of incorrect lines?!]

5

Many said because the 2 triangles are similar! D

10.

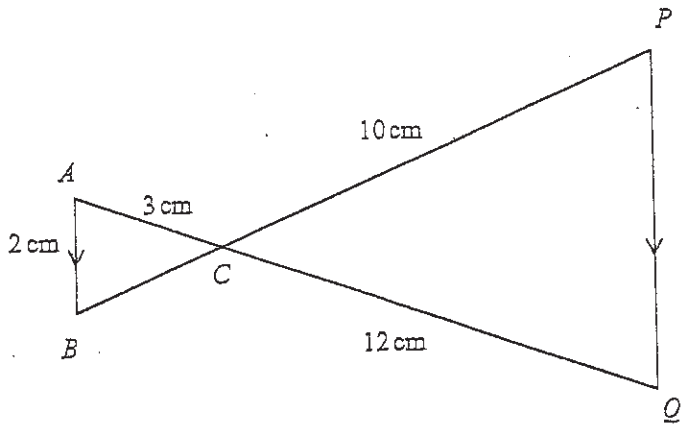


Diagram **NOT** accurately drawn

ACQ and BCP are straight lines.
AB is parallel to PQ.
$AB = 2$ cm. $AC = 3$ cm. $CQ = 12$ cm. $CP = 10$ cm.

(a) The two triangles ACB and QCP are similar. Angle ACB and angle QCP are equal since they are opposite angles. State another pair of equal angles giving the reason for their equality:

$\widehat{ABC} = \widehat{QPC}$ } because they are alternate angles on 2 parallel lines (1)
or $\widehat{BAC} = \widehat{PQC}$ } [allow Z angles]
(1)

(2)

(b) Work out the length of PQ.

$\frac{PQ}{2} = \frac{12}{3}$ (1)

$PQ = 2 \times \frac{12}{3}$

8 (1) cm

(2)

(c) Work out the length of BP. $= BC + CP$

(1) $\left[\frac{BC}{10} = \frac{3}{12} \Rightarrow BC = 10 \times \frac{3}{12}\right]$

$BC = 2.5$

12.5 cm

(2)

(Total 6 marks)

or ft (1) ← $BP = 10 + 2.5 = 12.5$

OR $\left[\frac{BP}{10} = \frac{15}{12}\right.$

$\left. BP = 10 \times \frac{15}{12} = 12.5\right]$

6

11.

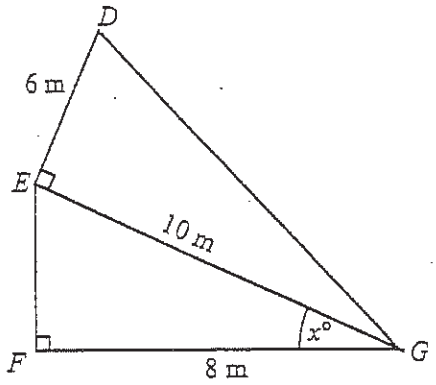


Diagram NOT accurately drawn

$DE = 6$m.
$EG = 10$ m.
$FG = 8$ m.
Angle $DEG = 90°$. Angle $EFG = 90°$.

(a) Calculate the length of DG.
Give your answer correct to 3 significant figures.

$DG^2 = 10^2 + 6^2$ (1)

$DG^2 = 136$ } (1)
$DG = \sqrt{136}$ }

[1 error ft]. [if structure correct!].

11.7 (1) m

or ft but 3sf

(3)

(b) Calculate the size of the angle marked $x°$.
Give your answer correct to one decimal place.

$\cos x = \frac{8}{10}$ (1)

$x = \cos^{-1}\left(\frac{8}{10}\right)$ (1)

$x = 36.9$ (1) °

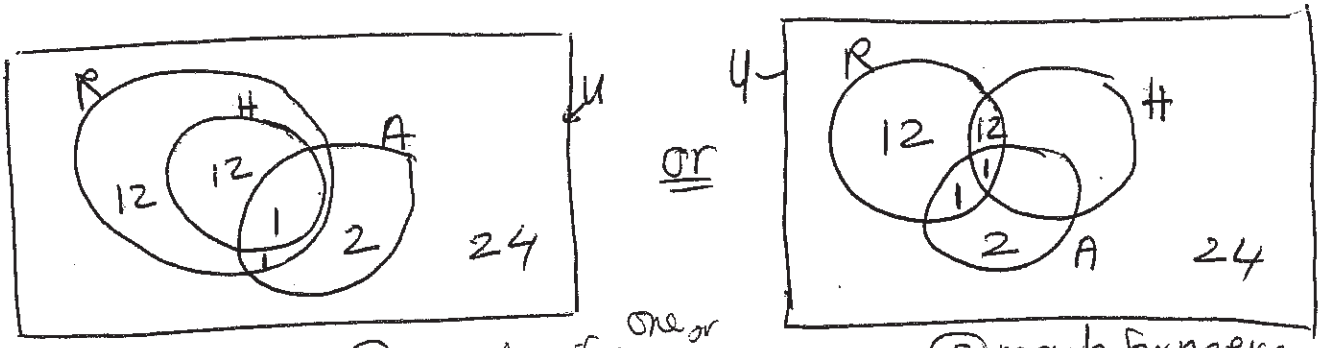
(3)
(Total 6 marks)

6

The most problematic question in this section

12. U={pack of 52 playing cards}, R={Red Cards}, H={hearts}, A={Aces}.

a) Draw a Venn Diagram to show the Universal set which includes the three other sets. Show on your Venn diagram the number of elements that belongs to each part of the diagram.



① mark if one or more error. ② mark for no error.

(2 marks)

b) Describe in words the set $H' \cap A$

None heart Aces. [all aces except the heart one]
[diamond, club & spade aces]

(1 mark)

c) Describe in word the set $R' \cap A$

~~None~~ · Black Aces.

(1 mark)

d) Specify whether the following statements are True (T) or False (F):

(i) $\emptyset \in R$ F

(ii) $H \subset R$ T

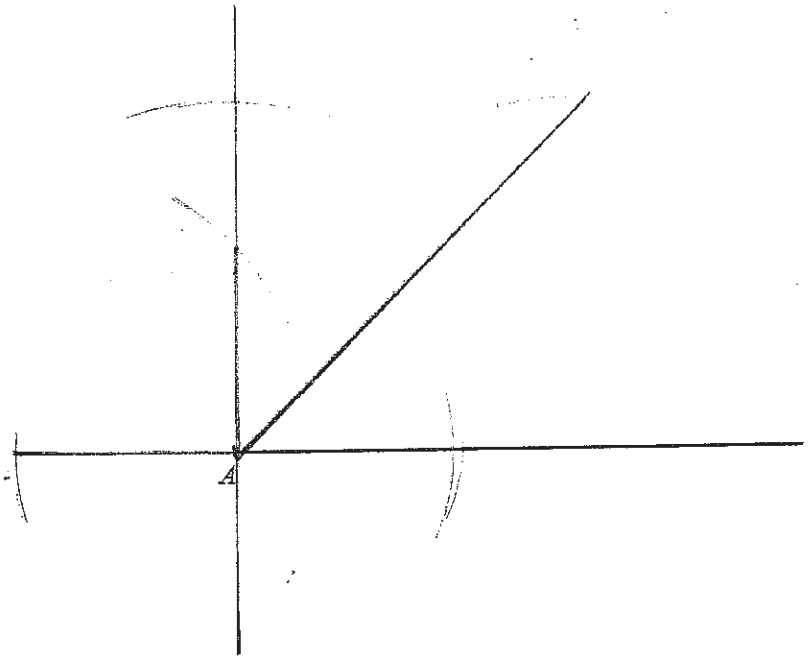
(2 mark)

(Total 6 marks)

6

13. Use ruler and compasses to construct an angle of 45° at A.
You must show all construction lines.

(1) → Many could not remember construction all together & very few could do it through A.



(Total 2 marks)

indep.
(1) mark for 90° through A. ~~upper & lower~~ ~~construction arcs needed~~.
(1) mark for bisecting ~~the~~ a 90° [does not have to be through A].

(2)

(1) mark for correct execution of (A) or (B)
(1) mark for finding one variable or (C)
(1) mark for substituting & finding second (fb)

14. Solve the simultaneous equations

$6x - 2y = 33$ (1)

$4x + 3y = 9$ (2)

(A) (1) x3, (2) x2

$$\begin{array}{r} 18x - 6y = 99 \\ +\ 8x + 6y = 18 \\ \hline 26x = 117 \end{array}$$

$x = \frac{117}{26}$

$x = 4.5$

so $6(4.5) - 2y = 33$

$27 - 2y = 33$

$-2y = 6$

$y = -3$

or (B) (4) 4x(1), 6x(2)

$$\begin{array}{r} 24x - 8y = 132 \\ -\ 24x + 18y = 54 \\ \hline -26y = 78 \end{array}$$

$y = -3$

or (C) 2x(1), 3x(2)

$$\begin{array}{r} 12x - 4y = 66 \\ -\ 12x + 9y = 27 \\ \hline -13y = 39 \end{array}$$

$y = -3$

$6x - 2(-3) = 33$

$6x + 6 = 33$

$6x = 27$

$x = 4.5$

$x =$ 4.5

$y =$ −3

(Total 3 marks)

15. Katy drove for 238 miles, correct to the nearest mile.
She used 27.3 litres of petrol, to the nearest tenth of a litre.

$$\text{Petrol consumption} = \frac{\text{Number of miles travelled}}{\text{Number of litres of petrol used}}$$

a) Work out the **lower and upper** bound for the number of miles that Katy has drove:

237.5 and 238.5 miles (1)

b) Work out the **lower and upper** bound for the number of litres that Katy has used:

27.25 and 27.35 litres (1)

c) Work out the **upper** bound for the petrol consumption for Katy's journey.
(Give your answer correct to 2 decimal places.)

Most Reasonable

(1) R $\frac{238.5}{27.25} = 8.75$ ..... miles per litre (1)

(Total 4 marks)

Correct answer only.

7

16.

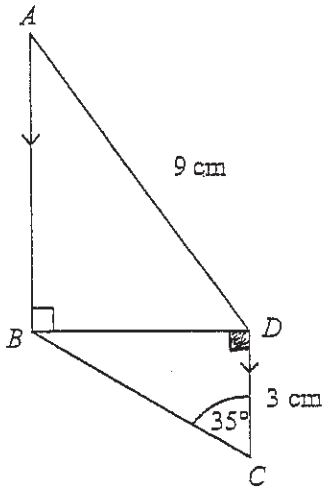


Diagram NOT accurately drawn

AB is parallel to *DC*.

AD = 9 cm, *DC* = 3 cm.

Angle *BCD* = 35°.

Angle *ABD* = 90°.

Give your answer correct to one decimal place.

a) Calculate the length of side *BD*.

$\tan 35 = \frac{BD}{3}$

$BD = 3 \times \tan 35$ (1)

2.1 (1) cm

b) Calculate the size of angle *BAD*.

$\sin \widehat{BAD} = \frac{BD}{9}$

$\widehat{BAD} = \sin^{-1}\left(\frac{BD}{9}\right)$ (1)

13.5 (1)

(Total 4 marks)

4

Many good attempts at this.
It is my marking scheme that was not good!!.

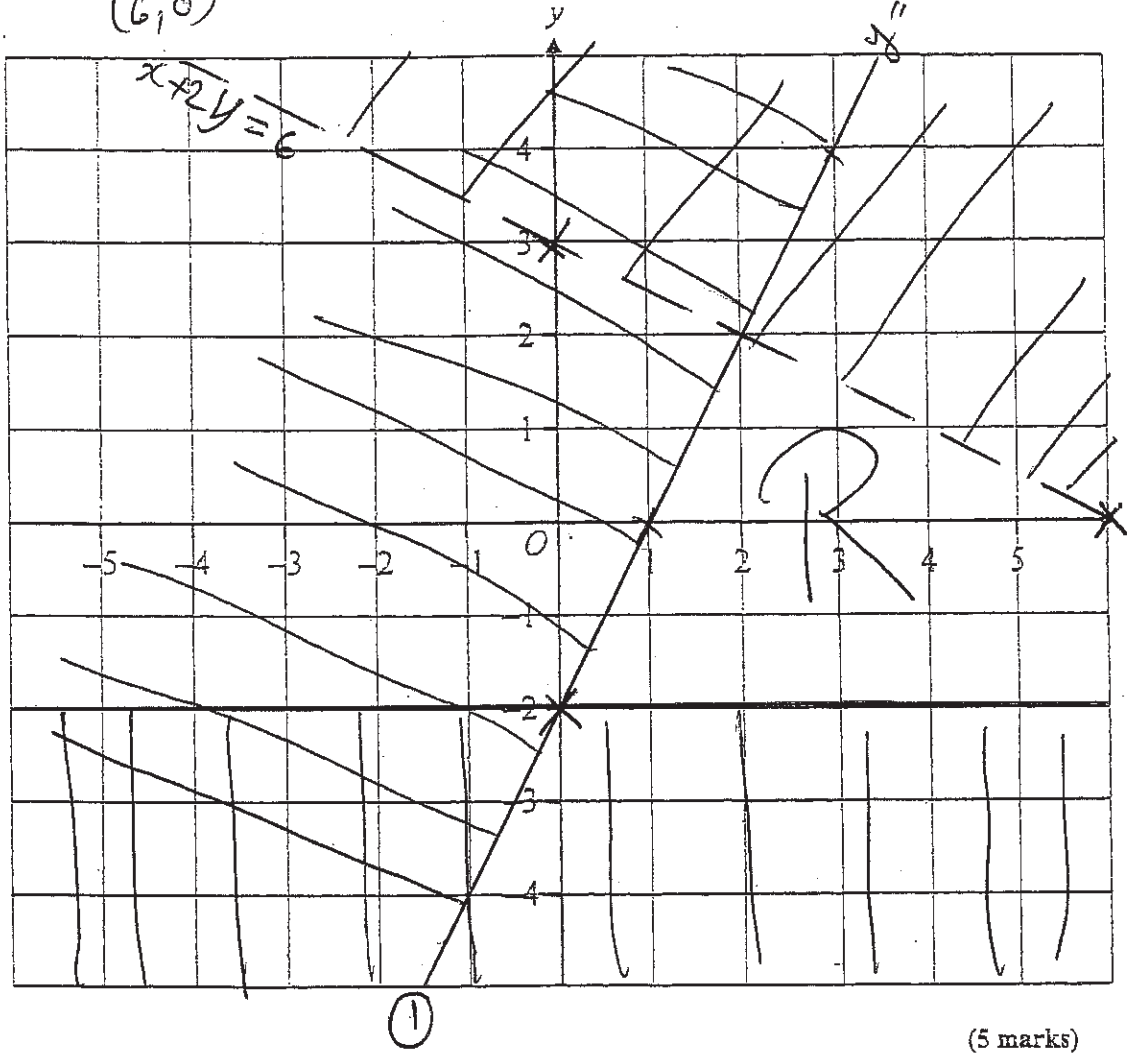
17. Illustrate each of the following inequalities on the grid below. Mark the region that satisfies all three inequalities with the letter R:

$y \geq -2$

$y \leq 2x - 2$

$x + 2y < 6$

(0, 3)
(6, 0)



(5 marks)

1 correct shading + R.

All then Gained R.

5

ANSWERS (Year 10 A/B)

Section B (2)

1) (a) What is the exterior angle of a regular pentagon?

$\frac{360}{5} =$

Answer: 72° .....(2)

(b) Another regular shape has interior angle of 144°. How many sides does it have?

Exterior $= 180 - 144 = 36^\circ$ or $\frac{(n-2)\times 180}{n} = 144$

$\frac{360}{36} = 10$

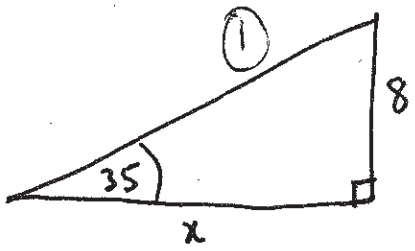
$180n - 360 = 144n$

$36n = 360$

$n = 10$

Answer: 10 .....(2)

2) From a point on the ground, Dave measures the angle of elevation to the top of a tree as 35°. If the height of the tree is 8m, draw a diagram to illustrate the situation, and use it to calculate the distance of Dave from the tree.



$\tan 35 = \frac{8}{x}$ (1)

$\therefore x = \frac{8}{\tan 35}$ (1)

$= 11.425\ldots$

This step proved difficult.

(1)

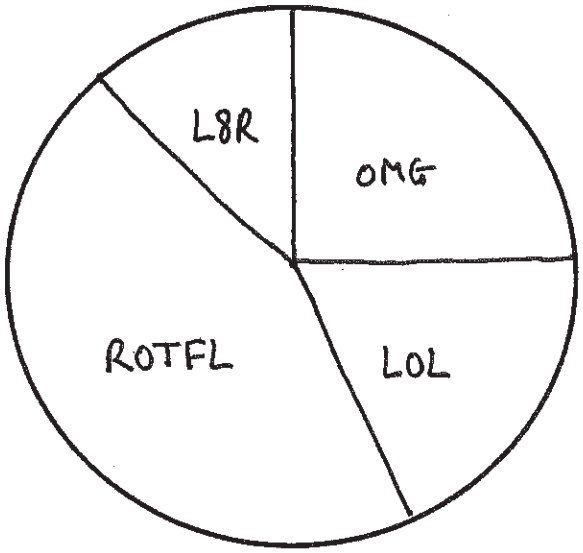
Answer: 11.4 m .....(4)

8

3) The following table shows the number of students who use different abbreviations in their text messages. Draw a pie chart representing the data.

Abbreviation	Frequency	
OMG	6	×15 = 90
LOL	4	" 60
ROTFL	11	" 165
L8R	3	" 45

$\frac{360}{24} = 15$



v. easy!

Answer:.....(4)

4) The perfect scone is made with flour, eggs and sugar, with their weights in the ratio 5:2:4. If a scone must weigh 242g, how much sugar do you need?

$\frac{242}{11} = 22$

$4 \times 22 = 88g$

v. easy!

Answer: 88g .....(3)

7

5) Solve the following equations:

(a) $3x - 4 = 2x - 3$

$x - 4 = -3$

$x = 1$

Answer: $x = 1$ .....(2)

(b) $\frac{1}{3} + \frac{x}{4} = \frac{1}{2}$

$\frac{x}{4} = \frac{1}{2} - \frac{1}{3} = \frac{1}{6}$

$x = \frac{4}{6}$

Answer: $x = \frac{2}{3}$ .....(2)

(c) $\frac{3}{x-2} + 1 = 4$

$\frac{3}{x-2} = 3$

$3 = 3x - 6$

$3x = 9$

$x = 3$

Answer: $x = 3$ .....(2)

Most students struggled with (b) and (c).
Some got the answer to (c) with an incorrect method and scored 0.

eg. $\frac{3}{x-2} + 1 = 4$

$\therefore 3 + 1 = 4(x-2)$ ← wrong step.

$\therefore 4 = 4x - 8$

$\therefore 4x = 12 \quad \therefore x = 3.$

6

6) This rectangle has been measured correct to the nearest cm.

Length = 11cm

Width = 4cm

(a) What is the Upper Bound of the length?

Answer: 11.5 cm .....(1)

(b) What is the Lower Bound of the width?

Answer: 3.5 cm .....(1)

(c) What is the Upper Bound of the area of the rectangle?

$11.5 \times 4.5 =$

(Lots did $11 \times 4 = 44$, then claimed 44.5 was the U.B.)

Answer: 51.75 .....(2)

7) For this question, a = 3, b = -5 and c = 0.4

(a) Calculate $ab + c$

Answer: -14.6 .....(1)

(b) Calculate $ac - b^2$

$1.2 - 25$

Answer: -23.8 .....(2) ← hard. few got it.

(c) Calculate $\sqrt{10c - b} + a$

$\sqrt{4+5} + 3$

Answer: 6 .....(2)

Many thought the square root sign went over the a and wrote $\sqrt{12}$ as their answer.