# BUMPER "BETWEEN PAPERS (2 & 3)" PRACTICE

## SUITABLE FOR BOTH FOUNDATION & HIGHER TIERS

ANSWERS Thanks to Sally McMillan & Joe Fisher. x.

## SUMMER 2019

# QUESTIONS

## NOT A "BEST" GUESS PAPER.

NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT! YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 OR 2 IT MAY STILL COME UP ON PAPER 3 ...

WE KNOW HOW IMPORTANT IT IS TO PRACTISE, PRACTISE, PRACTISE .... SO WE'VE COLLATED A LOAD OF QUESTIONS THAT WEREN'T EXAMINED IN THE AQA 9-1 GCSE MATHS PAPER 1 OR 2 BUT WE CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPER ...

ENJOY!
MEL & SEAGER

Q1. How many minutes are there in $4\frac{1}{2}$ hours? Circle your answer.

450 290 270 425

(1)

Q2. Put brackets in these calculations to make them correct.

(i) $5 - 3 \times 12 \div 4 = 6$

(1)

(ii) $6 \times 4 + 3^2 - 5 = 289$

(1)

Q3. By rounding each number to the nearest 10, estimate the answer to $\frac{102 \times 67}{5.42}$

You must show your working.

$\approx \frac{100 \times 70}{5} = \frac{7000}{5} = 1400$

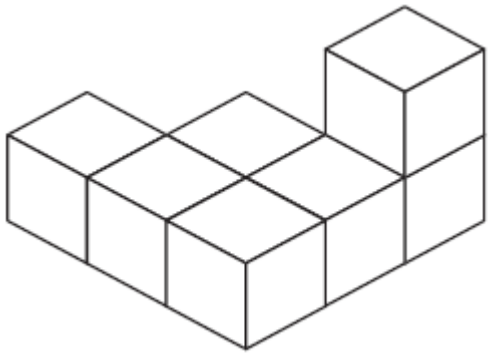
(2)

Q4. Circle the expression which does not simplify to $y^3$

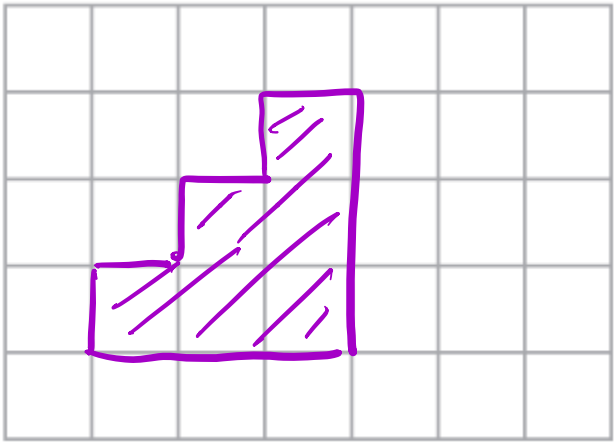
$y \times y \times y$ $y^3$ $y^4 \div y$ $y^3$ $y^2 \times y$ $y^3$ $y^6 \div y^2$ $y^4$

(1)

Q5. The diagram represents a solid made from seven centimetre cubes.



On the centimetre grid below, draw a plan of the solid.

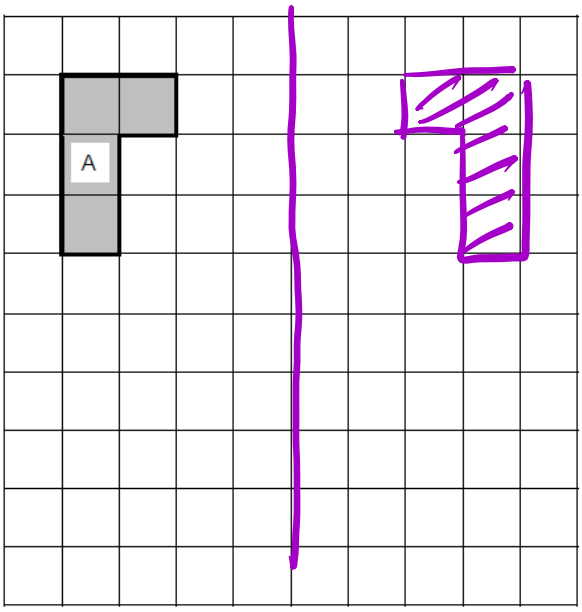


(2)

Q6. On the grid draw a shape that is a reflection of shape A.

Show your mirror line.

you could draw your mirror line anywhere




(1)

Q7. a = $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ and b = $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$

Circle the vector a – b

$5 - -2 = 7$
$-2 - 3 = -5$

(1)

$\begin{pmatrix} -3 \\ -5 \end{pmatrix}$ $\begin{pmatrix} 7 \\ 1 \end{pmatrix}$

$\begin{pmatrix} 3 \\ 1 \end{pmatrix}$ $\begin{pmatrix} 7 \\ -5 \end{pmatrix}$

Q8. The diagram shows three points *P*, *Q* and *R* on a 1 cm grid.

(a) Write down the coordinates of *P*.

(2,4)

(1)

(b) Write down the coordinates of *Q*.

(-1, 3)

(1)

(c) On the grid, mark the point *S* so that *PQRS* is a rhombus.

(1)

(d) Work out the area of the rhombus *PQRS*.

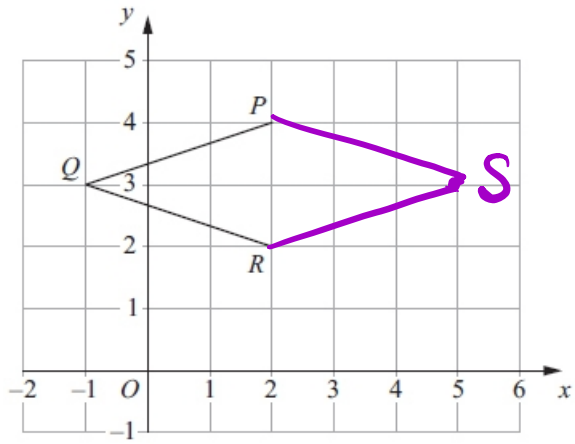
$6cm^2$

(2)

(e) Write down the equation of the line *PR*.

$x = 2$

(1)

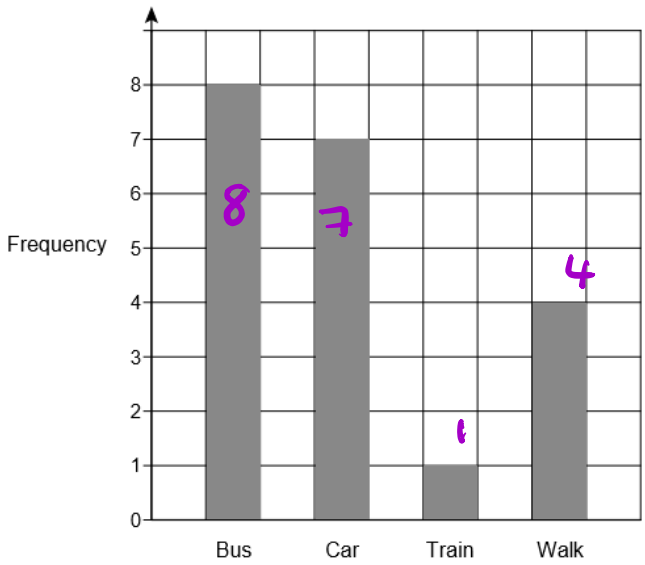


Q9. The bar chart shows information about how 20 students travel to school.

Show the information in a pictogram.

Use the key given.

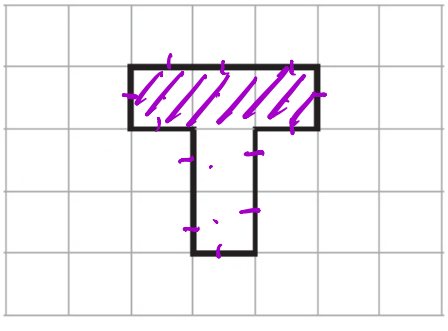
[3]




**Key :** ○ represents 2 students

| | |
|---|---|
| Bus | ○ ○ ○ ○ |
| Car | ○ ○ ○ ◔ |
| Train | ◔ |
| Walk | ○ ○ |

Q10. The diagram shows a shape on a centimetre grid.



(a) Find the area of the shape.

5cm²

(1)

(b) Find the perimeter of the shape.

12cm

(1)

(c) Shade 60% of the shape.

60% = 5 squares

(1)

Q11. Circle the equation of a line that is parallel to $y = 5x - 2$

gradient = 5

[1]

$y = 2x - 5$ ✗

$y = 5x + 2$ ✓

$y = 3x - 2$ ✗

$y = -\frac{1}{5}x - 2$ ✗

Q12 Point $A$ has coordinates $(-4, 9)$ Point $B$ has coordinates $(1, 5)$

Find the coordinates of the midpoint of $AB$.

$\frac{-4+1}{2}, \frac{9+5}{2} = (-1.5, 7)$

(2)

Q13. Express 825 as a product of its prime factors.

or use 'FACT' button on your calculator

825

5 / \ 165

5 / \ 33

3 11

$3 \times 5^2 \times 11$

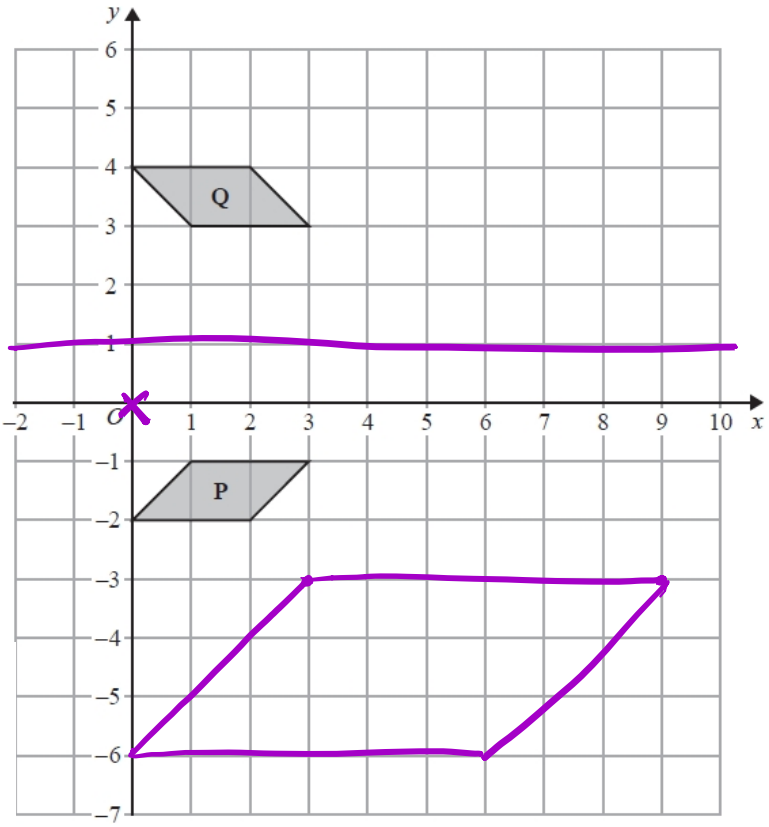
(3)

Q14

(a) Describe fully the single transformation that maps shape P onto shape Q.

Reflection in the line $y = 1$

(2)

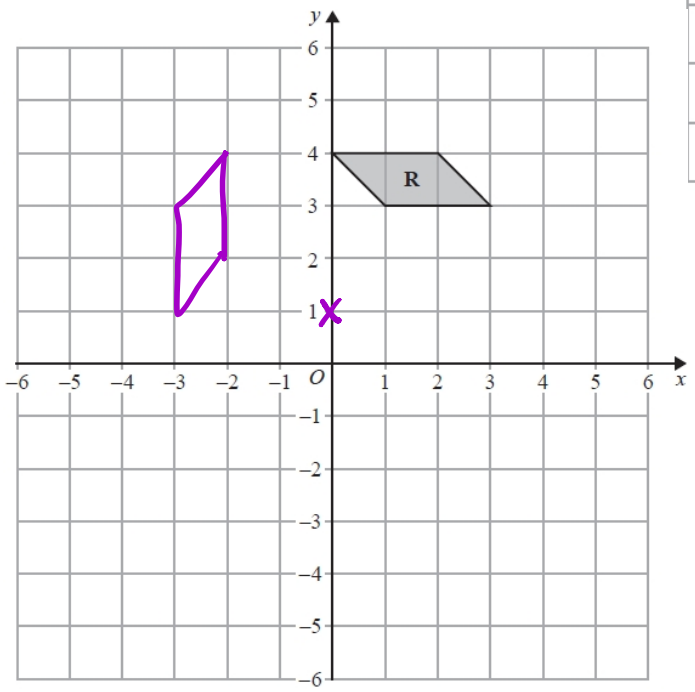



b) On the grid, enlarge shape P with scale factor 3 and centre $O$.

(2)

(c) On the grid below, rotate shape R 90° anticlockwise with centre (0, 1)

(2)



Q15. Lisa sees a dress in a sale. The normal price of the dress is $45

The price of the dress is reduced by 12% in the sale.

(a) Work out the price of the dress in the sale.

100
88 | 12

$45 \times 0.88 = \$39.60$

(3)

Lisa's weekly pay increases from $525 to $546

(b) Calculate her percentage pay increase.

$546 - 525 = 21 \qquad \frac{21}{525} \times 100 = 4\%$

(3)

Q16. The cost of a litre of petrol in Hong Kong is 17.50 Hong Kong dollars ($).

Chen buys 25 litres of petrol in Hong Kong.

The only money he has to pay with are $50 notes.

(a) What is the smallest number of $50 notes he needs?

$25 \times 17.5 = 437.50$ 9 notes.

(3)

He pays with the smallest number of $50 notes.

(b) Work out how much change he should get.

$9 \times 50 = 450$

$450 - 437.50 = £12.50$

(2)

Q17. Amit invests 15000 rupees.

At the end of one year, his investment has increased by $7\frac{1}{2}\%$

(a) Work out the value of Amit's investment at the end of one year.

$15000 \times 1.075 = 16125$ rupees.

(2)

Priya invests a sum of money at an interest rate of 8% per year. 108%

At the end of one year, the interest she receives is 1800 rupees.

(b) Work out the value of Priya's investment at the end of one year.

$1800 \times 1.08 = 24300$ rupees

Q18. (a) Simplify $8d \times 7d$ $56d^2$

(1)

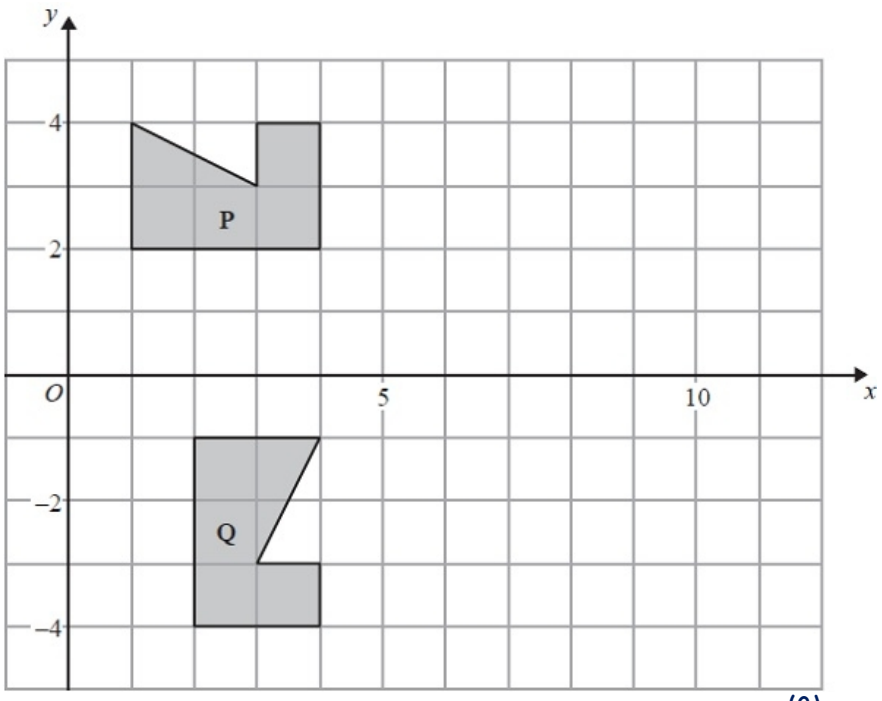
(b) Expand $4(3e - 5)$ $12e - 20$

(c) Factorise $f^2 - 2f$ $f(f-2)$ (1)

(d) $H = g^3 + 6g$ Work out the value of $H$ when $g = 2$ (2)

$8 + 12$ $H = 20$

Q19. The diagram shows a shape P, and a shape Q. (2)




Describe fully the single transformation which maps shape P onto shape Q.

rotation
90° clockwise
centre (0,0)

(3)

Q20. The mean of four numbers is 2.6 One of the four numbers is 5

Total = $2.6 \times 4 = 10.4$

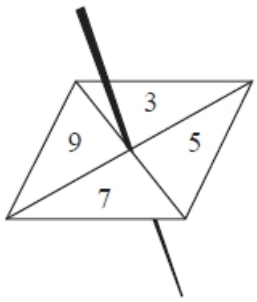
Find the mean of the other three numbers.

$10.4 - 5 = 5.4$ (the other 3)

$5.4 \div 3 = 1.8$

(3)

Q21. Rayna has a fair 4-sided spinner. The spinner can land on 3, 5, 7 or 9




Rayna spins the spinner 20 times. She records the score for each spin.
Here are her scores.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 9 | 5 | 7 | 9 | 5 | 3 | 3 | 5 | 9 |
| 9 | 9 | 7 | 5 | 9 | 7 | 5 | 9 | 3 | 7 |

(a) Complete the frequency table for these results.

| Score | Tally | Frequency |
|---|---|---|
| 3 | IIII | 4 |
| 5 | 𝍸 | 5 |
| 7 | IIII | 4 |
| 9 | 𝍸 II | 7 |

(2)

(b) Write down the mode of her scores.

9

(1)

(c) Find the range of her scores.

9 - 3 = 6

(1)

Rayna says that 3, 5, 7 and 9 are all prime numbers.

(d) Explain why Rayna is wrong.

9 is not prime ... it is divisible by 3

(1)

Rayna now spins her spinner twice. She adds the two numbers together to get the total.

(e) Complete the table to show the total for each possible outcome. Five of the totals have been done for you.

| | | 1st spin | | | |
|---|---|---|---|---|---|
| | | 3 | 5 | 7 | 9 |
| 2nd spin | 3 | 6 | 8 | 10 | 12 |
| | 5 | 8 | 10 | 12 | 14 |
| | 7 | 10 | 12 | 14 | 16 |
| | 9 | 12 | 14 | 16 | 18 |

(2)

Rayna spins the spinner twice.

(f) (i) Write down the probability that she will get a total of 10

3/16

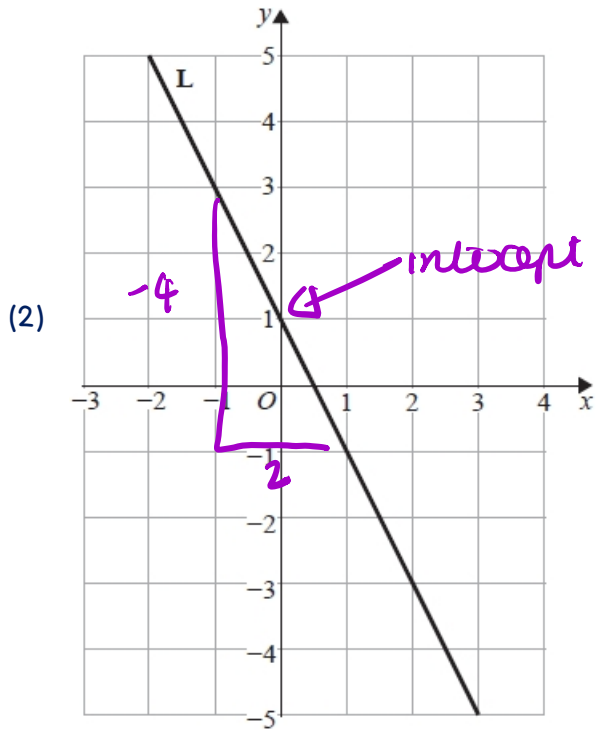
(ii) Write down the probability that she will get a total greater than 12

$\frac{6}{16}$ or $\frac{3}{8}$

(3)

Q22. Here is the straight line L drawn on a grid.

Find an equation for L.

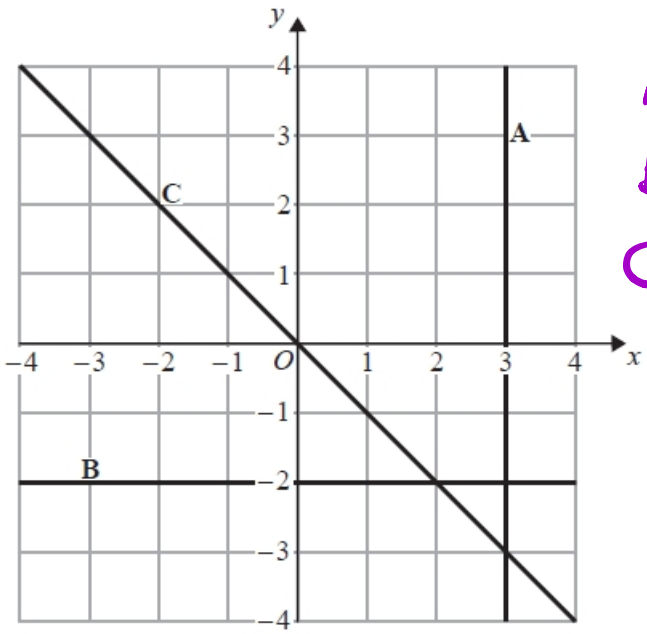



gradient $= \frac{-4}{2} = -2$

$y = -2x + 1$

(2)

Q23. Here are three straight lines A, B and C drawn on a grid.




A → $x = 3$

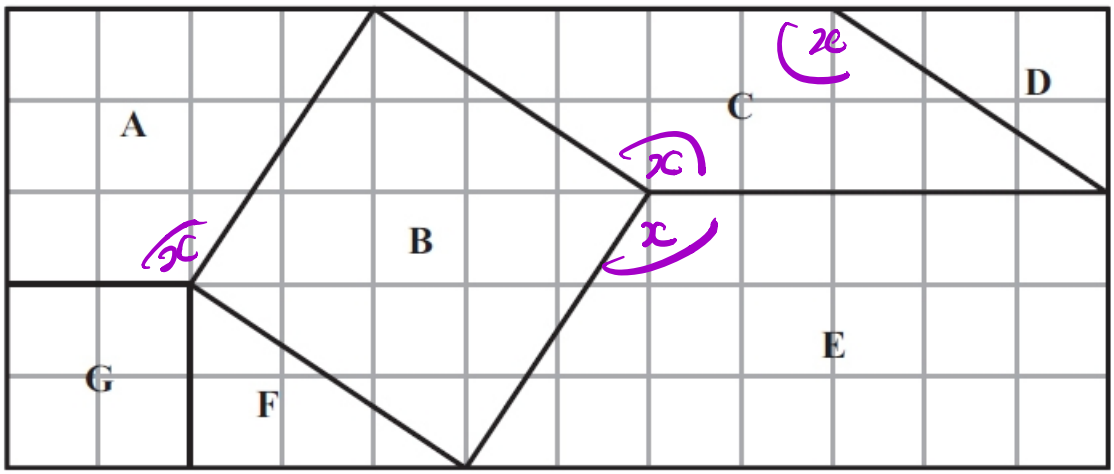
B → $y = -2$

C → $y = -x$

Write down an equation for each of these three straight lines.

(3)

Q24. The diagram shows 7 shapes, A, B, C, D, E, F and G, on a centimetre square grid.




(a) What is the mathematical name of shape E? trapezium

(1)

(b) Write down the letters of the two shapes which are congruent.

D and F

(1)

(c) Mark an obtuse angle on one of the shapes. Label your angle $x$. (lots to choose)

(1)

(d) How many lines of symmetry has shape B? 4

(1)

(e) Work out the area of shape C. 10

(2)

Q25.

The diagram shows a pentagon $ABCDE$.
$DC$ is parallel to $AB$.
The size of an exterior angle at $A$ is 67°
The size of an exterior angle at $B$ is 112°
The size of an exterior angle at $C$ is $x$°
The size of an exterior angle at $D$ is 74°
The size of an exterior angle at $E$ is $y$°

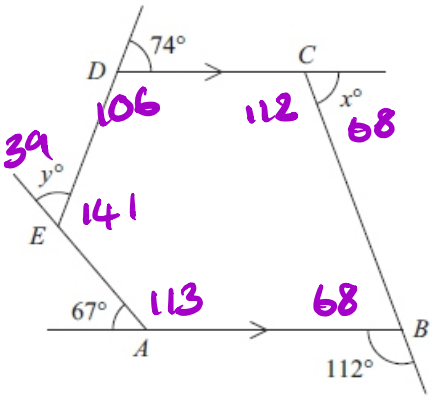



Diagram NOT accurately drawn

(a) (i) Work out the value of $x$.

68

(ii) Work out the value of $y$.

360 - (74 + 68 + 112 + 67) = 39°

(4)

(b) Work out the sum of the interior angles of the pentagon $ABCDE$.

540°

(2)

Q26

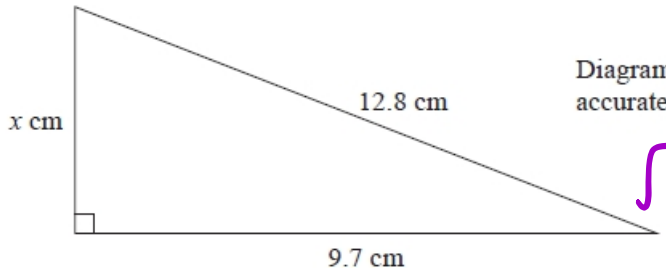



Diagram **NOT** accurately drawn

$\sqrt{12.8^2 - 9.7^2}$

$= 8.35$ (3 s.f)

Work out the value of $x$.
Give your answer correct to 3 significant figures.

(3)

Q27.

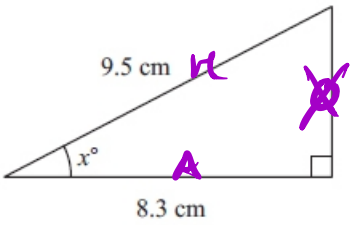



Diagram **NOT** accurately drawn

$x = \cos^{-1}\frac{8.3}{9.5}$

$= 29.1^\circ$

Work out the value of $x$.
Give your answer correct to 1 decimal place.

(3)

Q28. Work out the size of each exterior angle of a regular polygon with 15 sides.

$360 \div 15 = 24$

(2)

Q29(a) Expand and simplify $3(2x - 5) - 4(x + 3)$

$6x - 15 - 4x - 12 = 2x - 27$

(2)

(b) Expand and simplify $(y + 7)(y + 2)$

$y^2 + 9x + 14$

(2)

Q47. Work out the size of an exterior angle of a regular polygon with 8 sides.

$360 \div 8 = 45^\circ$

(2)

Q30.

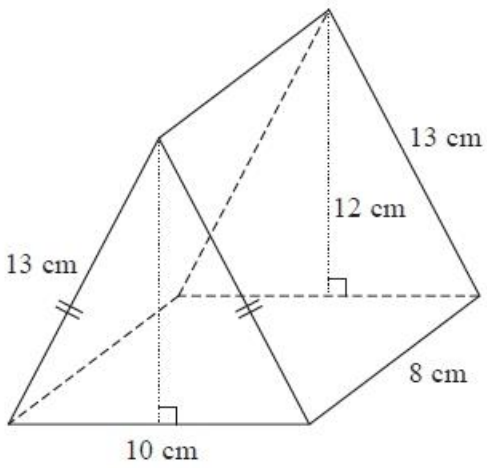



Diagram **NOT** accurately drawn

The diagram shows a prism.
The cross-section of the prism is an isosceles triangle.
The lengths of the sides of the triangle are 13 cm, 13 cm and 10 cm.
The perpendicular height of the triangle is 12 cm.
The length of the prism is 8 cm.

Work out the total surface area of the prism.

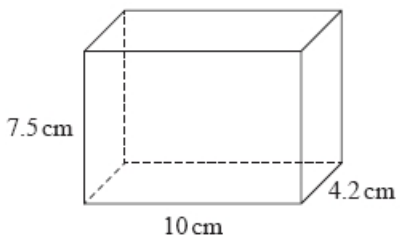
2 triangle: $2 \times (\frac{1}{2} \times 10 \times 12) = 2 \times 60 = 120$

Base $10 \times 8 = 80\ cm^2$

2 side $\square$ $2 \times 13 \times 8 = 208\ cm^2$

$120 + 80 + 208 = 408\ cm^2$ (3)

Q31. The diagram shows a cuboid and a triangular prism.



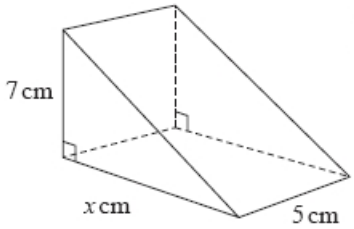




Diagram **NOT** accurately drawn

The volume of the cuboid is equal to the volume of the triangular prism.

Work out the value of $x$.

cuboid $10 \times 4.2 \times 7.5 = 315\ cm^3$

Prism: $\frac{1}{2} \times x \times 7 \times 5 = 17.5x$

$17.5x = 315$ so $x = \frac{315}{17.5} = 18\ cm$ (4)

Q32. (a) Multiply out $6(n - 2)$

$6n - 12$ (1)

(b) Factorise $p^2 - 5p$

$p(p - 5)$ (2)

(c) Solve $\frac{7x-3}{2} = x$

$7x - 3 = 2x$ $\quad 5x = 3$ $\quad x = \frac{3}{5} = 0.6$

(3)

Q33. (a) Show that $\frac{4}{5}+\frac{2}{3}=1\frac{7}{15}$

$\frac{4}{5}+\frac{2}{3}$

$\times 3\ \frac{12}{15}+\frac{10}{15}\ \times 5 = \frac{22}{15}$ $\quad \frac{22}{15} = 1\frac{7}{15}$

(2)

(b) Show that $2\frac{1}{4}\div 3\frac{1}{2}=\frac{9}{14}$

$\frac{9}{4}\div\frac{7}{2} \rightarrow \frac{9}{4}\times\frac{2}{7} = \frac{18}{28}$ $\quad \frac{18}{28} = \frac{9}{14}$

(3)

Q34. Solve the simultaneous equations

$$y-2x=6$$
$$+\ y+2x=6$$
$$2y=12$$
$$y=6$$

$6-2x=6$

$x=0$

$x=0\ \ y=6$

(5)

Q35. (a) Factorise $2t^2-7t+3$

$(2t-1)(t-3)$

(2)

(b) Rearrange the formula $y=a-bx^2$ to make $x$ the subject.

(3)

$bx^2 = a-y$

$x^2 = \frac{a-y}{b}$

$x = \sqrt{\frac{a-y}{b}}$