

1 $V = 4p^2$

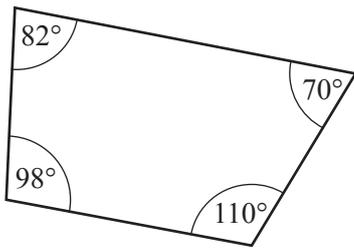
Find V when $p = 3$.

$V = \dots\dots\dots$ [1]

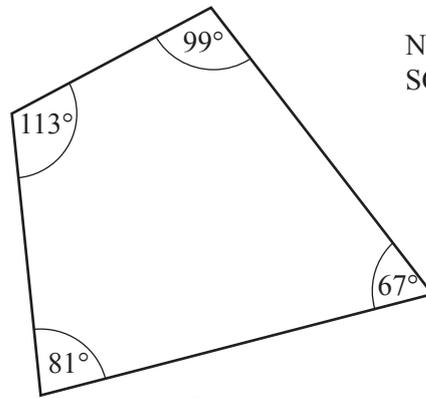
2 Simplify.
 $n^2 \times n^5$

$\dots\dots\dots$ [1]

3

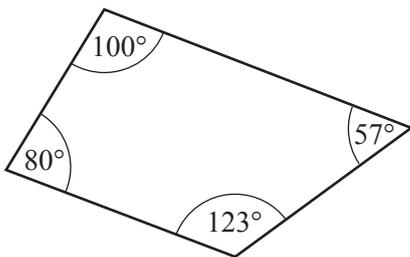


A

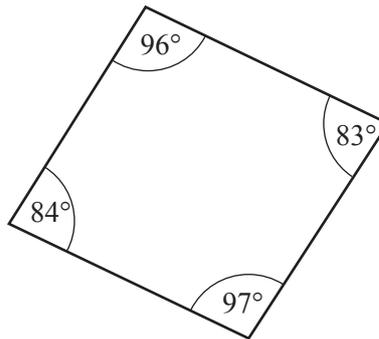


B

NOT TO SCALE



C



D

The diagram shows four quadrilaterals A , B , C and D .

Which one of these could be a cyclic quadrilateral?

$\dots\dots\dots$ [1]

4 Write in standard form.

(a) 2 470 000

..... [1]

(b) 0.0079

..... [1]

5 Without using a calculator, work out $\frac{3}{5} + \frac{1}{6}$.

Write down all the steps of your working and give your answer as a fraction in its simplest form.

..... [2]

6 James is an animal doctor.

The table shows some information about the cats he saw in one week.

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Number of cats seen	2	4	1	3	2
Mean mass of a cat (kg)	1.9	0.9	2.1	1.8	2

One of the cats James saw had a mass of 4 kg.

On which day did he see this cat?

..... [2]

7 Write these in order of size, smallest first.

0.6^3

0.22

$\sqrt{0.09}$

0.4^2

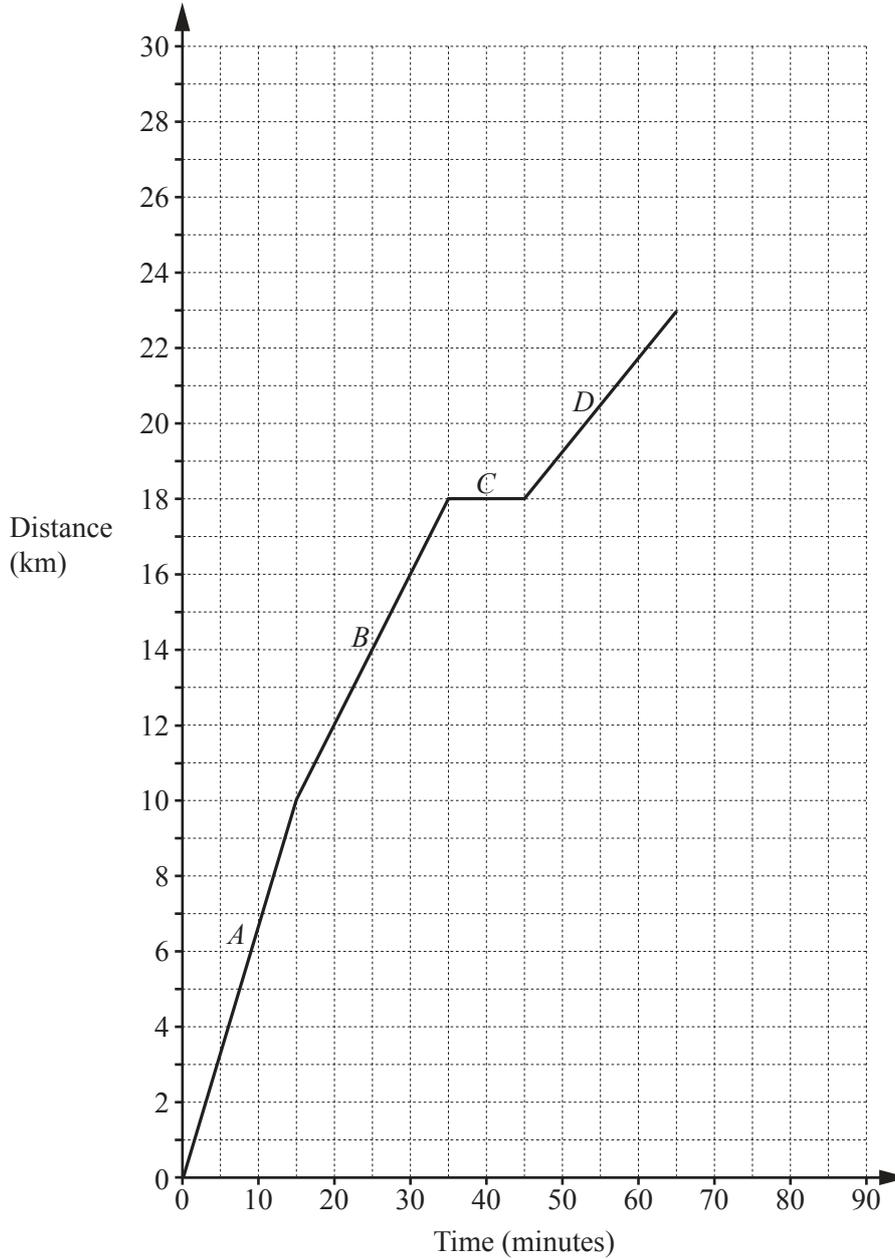
..... < < < [2]
smallest

8 The length of a car is 4.2 m, correct to 1 decimal place.

Write down the upper bound and the lower bound of the length of this car.

Upper bound = m

Lower bound = m [2]



The diagram shows the distance-time graph for the first 65 minutes of a bicycle journey.

- (a) There are four different parts to the journey labelled *A*, *B*, *C* and *D*.

Write down the part of the journey with the fastest speed.

..... [1]

- (b) After the first 65 minutes the bicycle travels at a constant speed of 20 km/h for 15 minutes.

Draw this part of the journey on the diagram.

[1]

10 Calculate.

(a) $2^3 - \sqrt{10+4^2}$

..... [1]

(b) $\frac{2\sqrt{3} \times \tan 70^\circ}{3}$

..... [1]

11 Ahmed paid \$34 000 for a car.

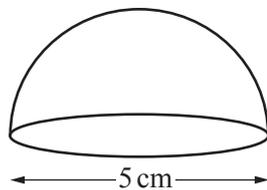
His car decreased in value by 40% at the end of the first year.

The value at the end of the second year was 10% less than the value at the end of the first year.

Calculate the value of Ahmed's car after 2 years.

\$ [2]

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The diagram shows a hemisphere with diameter 5 cm.

Calculate the volume of this hemisphere.

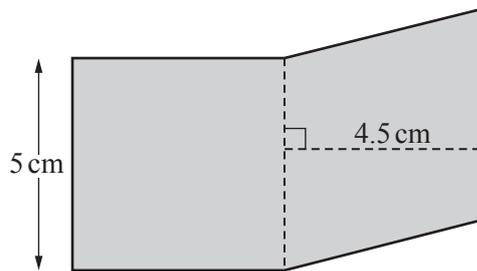
[The volume, V , of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

..... cm³ [2]

- 13 Write the recurring decimal $0.\dot{2}$ as a fraction.
 [$0.\dot{2}$ means $0.222\dots$]

..... [2]

- 14 The shaded shape is made by joining a square and a rhombus.



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Work out

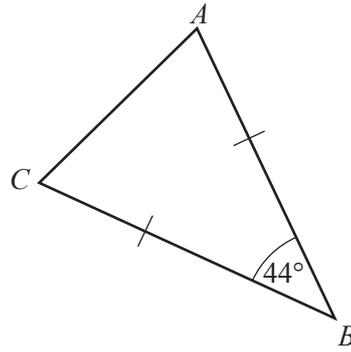
- (a) the perimeter of the shaded shape,

..... cm [1]

- (b) the area of the shaded shape.

..... cm^2 [2]

15 (a)

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Triangle ABC is an isosceles triangle with $AB = CB$.
Angle $ABC = 44^\circ$.

Find angle ACB .

Angle $ACB = \dots\dots\dots$ [1]

(b) A regular polygon has an exterior angle of 40° .

Work out the number of sides of this polygon.

$\dots\dots\dots$ [2]

16 d is inversely proportional to $(w + 1)^2$.

$d = 3.2$ when $w = 4$.

Find d when $w = 7$.

$d = \dots\dots\dots$ [3]

17 A is the point $(8, 3)$ and B is the point $(12, 1)$.

Find the equation of the line, perpendicular to the line AB , which passes through the point $(0, 0)$.

..... [3]

18 $f(x) = x^2$ $g(x) = \frac{x-3}{2}$

Find

(a) $f(-5)$,

..... [1]

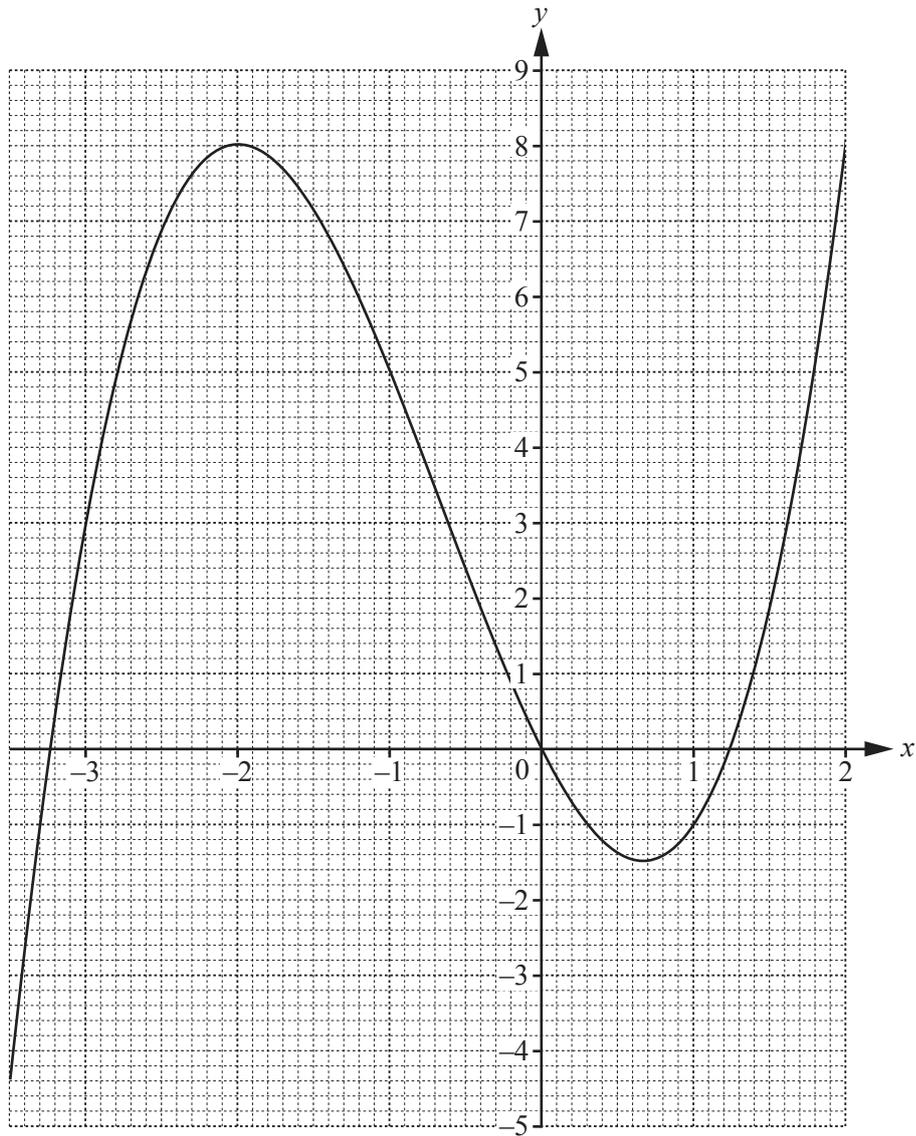
(b) $gf(x)$,

..... [1]

(c) $g^{-1}(x)$.

$g^{-1}(x) =$ [2]

19 The curve $y = x^3 + 2x^2 - 4x$ is shown on the grid.



(a) By drawing a suitable tangent, find an estimate of the gradient of the curve when $x = 1$.

..... [3]

(b) A point D lies on the curve.
 The x co-ordinate of D is negative.
 The gradient of the tangent at D is 0.

Write down the co-ordinates of D .

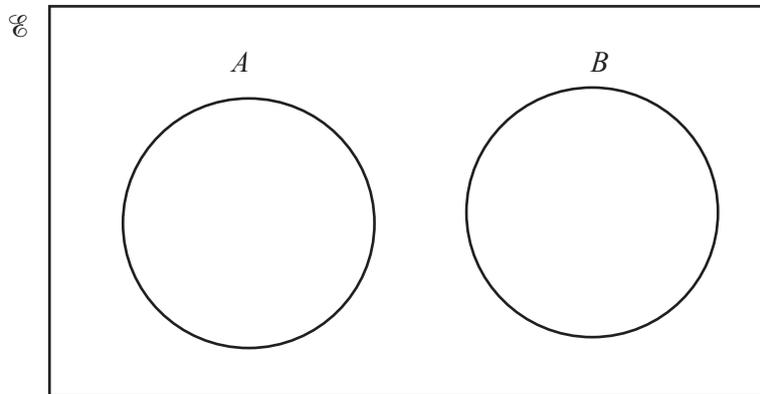
(..... ,) [1]

20 (a) $\mathcal{E} = \left\{ 7, 9.3, \pi, \frac{5}{9}, 2\sqrt{8} \right\}$

$A = \{\text{integers}\}$

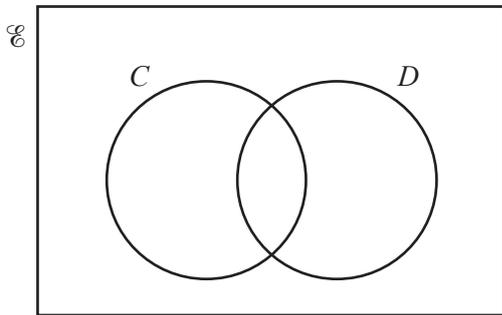
$B = \{\text{irrational numbers}\}$

Write all the elements of \mathcal{E} in their correct place on the Venn diagram.

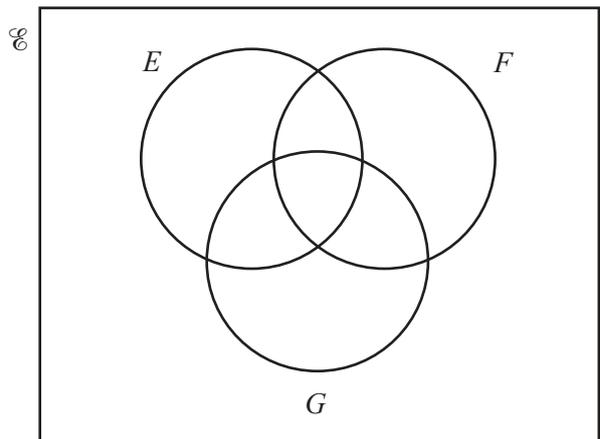


[2]

(b) Shade the region in each of the Venn diagrams below.



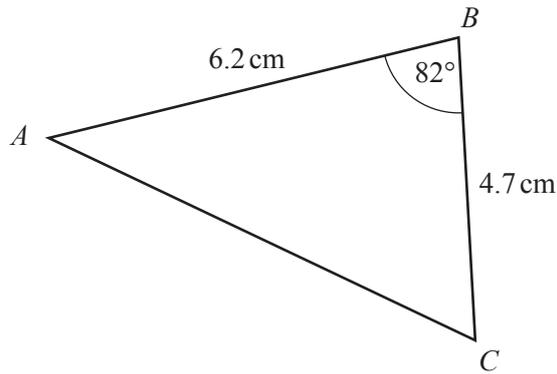
$C' \cup D$



$E \cap F' \cap G$

[2]

21 (a)

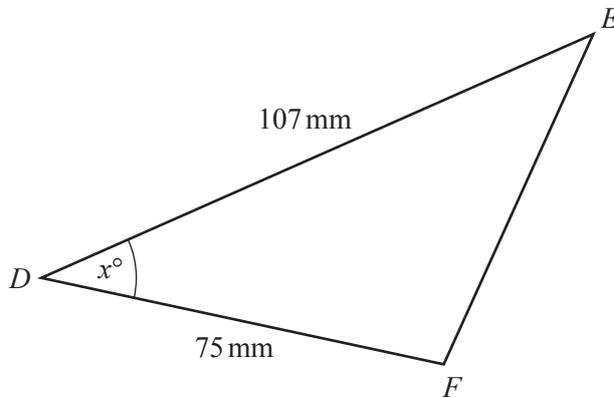


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Calculate the area of triangle *ABC*.

.....cm² [2]

(b)



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The area of triangle *DEF* is 2050 mm².

Work out the value of *x*.

$x =$ [2]

- 22 The table shows some information about the mass, m grams, of 200 bananas.

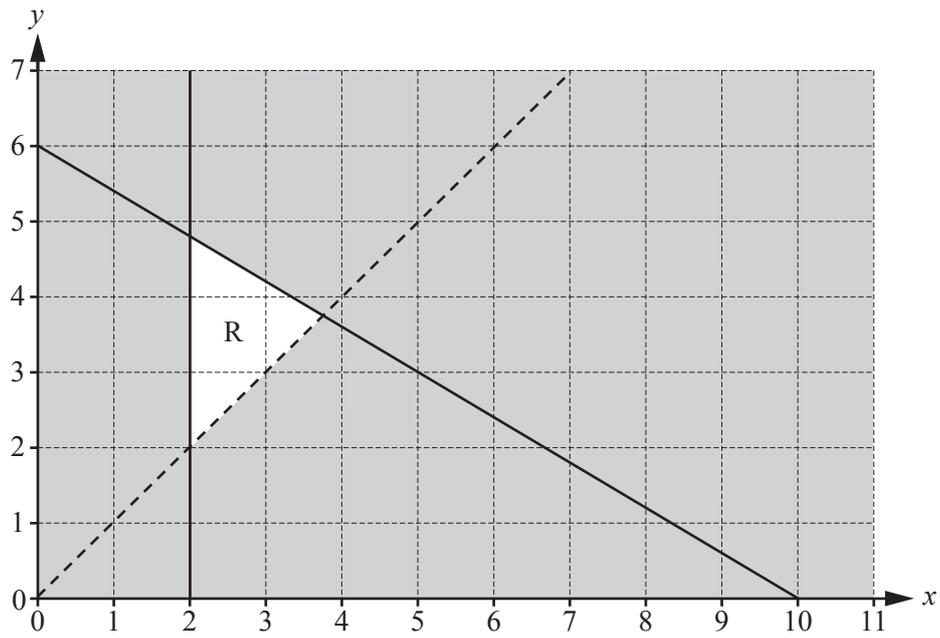
Mass (m grams)	$90 < m \leq 110$	$110 < m \leq 120$	$120 < m \leq 125$	$125 < m \leq 140$
Frequency	40	70	60	30
Height of column in histogram (cm)			6	

Complete the table.

[4]

- 23 Simplify.
$$\frac{42np - 7n}{12pt - 2t + 18mp - 3m}$$

..... [4]



Find the three inequalities that define the unshaded region, R.

.....

.....

..... [5]

25 $\mathbf{A} = \begin{pmatrix} 4 & 2 \\ 2 & 1 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 7 & -3 \\ 4 & 5 \end{pmatrix}$ $\mathbf{C} = \begin{pmatrix} -2 & 3 & 1 \\ 4 & 5 & -1 \end{pmatrix}$ $\mathbf{D} = \begin{pmatrix} -9 \\ 0 \end{pmatrix}$

(a) Which of these four matrix calculations is **not** possible?

$\mathbf{A} + \mathbf{B}$

$3\mathbf{C}$

\mathbf{CB}

\mathbf{AD}

..... [1]

(b) Calculate \mathbf{AB} .

$\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

(c) Work out \mathbf{B}^{-1} , the inverse of \mathbf{B} .

$\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

(d) Explain why matrix \mathbf{A} does not have an inverse.

..... [1]

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