a

Find the lowest common multiple of 54 and 84.

b

Increase £98 by 23%.

c

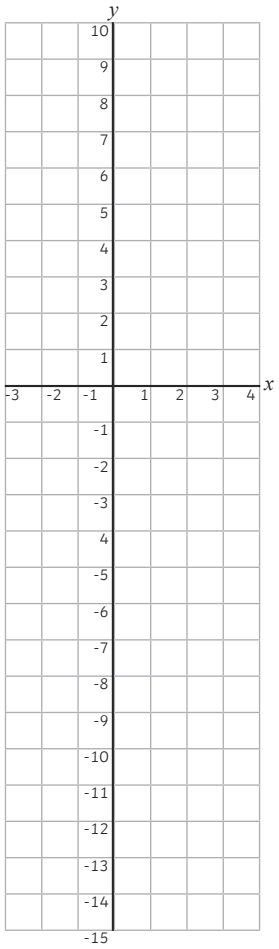
Simplify $(3a^4b^2)^3$

d

i) Complete the table of values for $y = x^3 - 3x^2 + 4$

x	-2	-1	0	1	2	3
y						

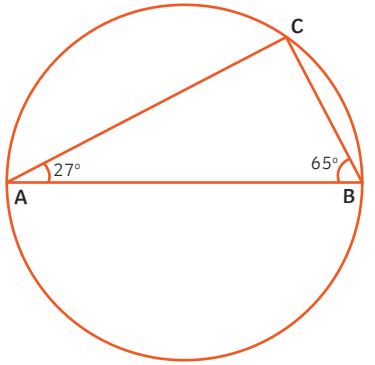
ii) Hence draw the graph of $y = x^3 - 3x^2 + 6$ for the values $-2 \leq x \leq 3$.



e

The diagram shows a circle. Angle BAC is 27° and angle ABC is 65°.

Is the line AB the diameter of the circle? Give a reason for your answer.



f

The list shows the ages of 11 children.

Find the lower quartile of the ages.

9, 7, 11, 13, 10, 15, 13, 17, 12, 10, 8

a

Work out $(3.1 \times 10^6) - (2.4 \times 10^5)$, leaving your answer in standard form.

b

Write $0.\dot{2}\dot{5}$ as a fraction. Show all your working.

c

The function $f(x)$ is given by the following:

$f(x) = 3x + 2$

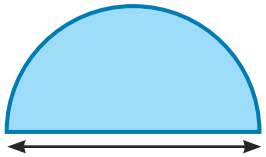
Find the value of f(2).

d

For any integer n, 2n + 1 is always an odd number. Explain why.

e

The diagram shows a semi-circle. Find the area of the semi-circle, giving your answer correct to 3 significant figures.



f

Two fair six-sided dice are rolled. The numbers are added together.

Complete the sample space diagram to show all possible outcomes.

		Dice 1					
	+	1	2	3	4	5	6
Dice 2	1						
	2						
	3						
	4						
	5						
	6						

Find the probability of scoring a prime number.

a

Write the following numbers in order of size, starting with the smallest.

62%, 0.65, $\frac{11}{25}$, $\frac{5}{9}$

b

Solve

$3(a - 5) = 5a - 3$

c

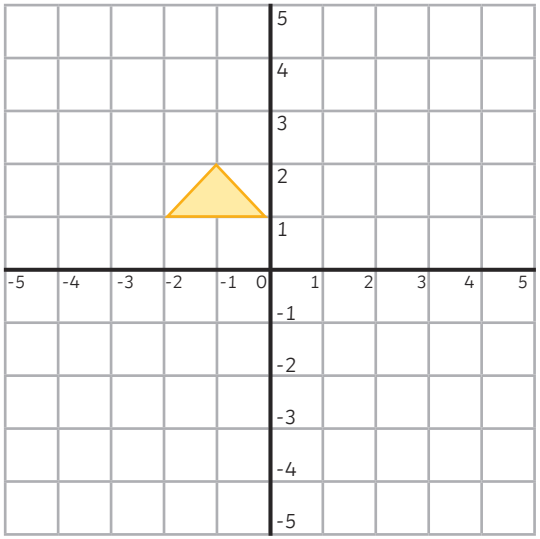
Solve the simultaneous equations:

$3x + 2y = 4$

$x + y = 1$

d

Rotate the shape 180° clockwise about the point (1,0).



e

Claire played 15 netball matches for her school. The number of goals she scored in the matches are shown in the frequency table.

Number of Goals	Frequency
0	3
1	4
2	7
3	1

i) Find the mean number of goals scored.

ii) Find the median number of goals scored.

f

The table shows the probabilities of picking a chocolate at random from a bag.

Fairy Milk	Sneakers	Snars Bar	Kit Kit
x	$2x$	$6x$	x

Form and solve an equation to find the probabilities of picking each of the chocolate bars.

a

Work out, without using a calculator:

i) -7.5 ÷ 1.5

ii) -0.3 × -0.7

iii) –(-3 + 7)

b

Eleanor thinks of a number, x, multiplies it by 3 and then adds 4.

Given that her answer is -2, form and solve an equation to find the value of x.

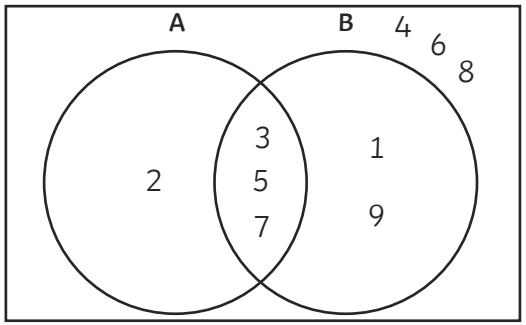
c

Look at the Venn diagram.

Write down the numbers that are in set:

i) A∩B

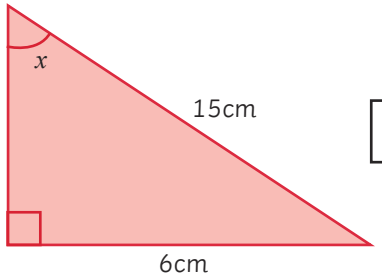
ii) A'



d

Below is a right-angled triangle.

Calculate the size of angle x.



e

A piece of iron has a density of 8g/cm³ and mass of 1700g.

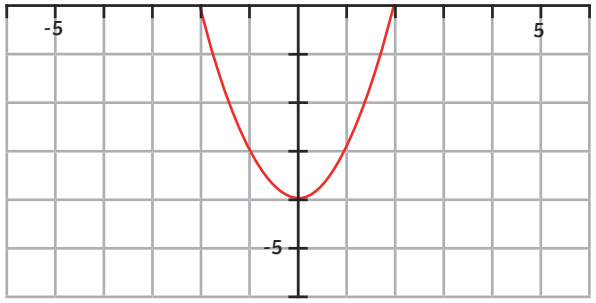
Find the volume of the piece of iron in cm³. Give your answer correct to 3 significant figures.

f

Factorise $4x^2 - 9$

a

By drawing suitable triangles of width one unit, estimate the area between the curve $y = x^2 - 4$ and the x-axis.



b

Estimate the solution to √60 to 1 decimal place. Show all your reasoning.

c

Expand and simplify $4(2x + 7) - 3(x - 5)$

d

Find the next two terms of the sequence:

64, 16, 4, 1...

e

There are 450 students in a school, 210 of whom are girls. Find the percentage of students in the school who are girls. Give your answer correct to 1 decimal place.

f

A piece of string measures 70cm to the nearest 5cm. Work out the smallest possible length of the piece of string.

a

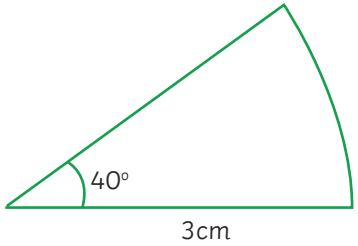
Solve the simultaneous equations:

$4x + 3y = 9$

$y = x - 4$

b

The diagram shows a sector of a circle.
Find the perimeter of the sector, giving your answer correct to 1 decimal place.



c

Complete the square for the expression $x^2 + 8x + 20$

d

Share £60 in the ratio 1:7:4.

e

Simplify $(3x^{\frac{1}{8}} y^{\frac{2}{7}})^3$

f

The table shows the ages of 40 employees. Draw a histogram to represent the data.

Age, x, years	Frequency
$16 \leq x < 20$	6
$20 \leq x < 26$	12
$26 \leq x < 30$	7
$30 \leq x < 40$	10
$40 \leq x < 60$	5

a

Find the lowest common multiple of 54 and 84.

756

b

Increase £98 by 23%.

£120.54

c

Simplify $(3a^4b^2)^3$

$27a^{12}b^6$

d

i) Complete the table of values for $y = x^3 - 3x^2 + 4$

x	-2	-1	0	1	2	3
y	**-16**	**0**	**4**	**2**	**0**	**4**

ii) Hence draw the graph of $y = x^3 - 3x^2 + 6$ for the values $-2 \leq x \leq 3$.

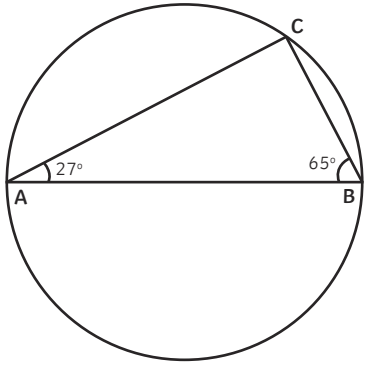
Correctly drawn graph

e

The diagram shows a circle. Angle BAC is 27° and angle ABC is 65°.

Is the line AB the diameter of the circle? Give a reason for your answer.

No, because $27^o + 65^o = 92^o$, which means angle ACB is 88°. It would be 90° if AB was the diameter because the angle in a semi-circle is 90°.



f

The list shows the ages of 11 children.
Find the lower quartile of the ages.

9, 7, 11, 13, 10, 15, 13, 17, 12, 10, 8

9

a

Work out $(3.1 \times 10^6) - (2.4 \times 10^5)$, leaving your answer in standard form.

2.86×10^6

b

Write $0.\dot{2}\dot{5}$ as a fraction. Show all your working.

$n = 0.\dot{2}\dot{5}$

$100n = 25.\dot{2}\dot{5}$

$99n = 25$

$\frac{25}{99}$

c

The function $f(x)$ is given by the following:

$f(x) = 3x + 2$

Find the value of f(2).

8

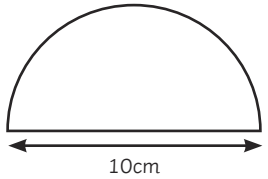
d

For any integer n, 2n + 1 is always an odd number. Explain why.

For any integer n, 2n is always an even number which means 2n + 1 is always odd.

e

The diagram shows a semi-circle. Find the area of the semi-circle, giving your answer correct to 3 significant figures.



39.3cm²

f

Two fair six-sided dice are rolled. The numbers are added together.

Complete the sample space diagram to show all possible outcomes.

		Dice 1					
	+	1	2	3	4	5	6
	1	**2**	**3**	**4**	**5**	**6**	**7**
	2	**3**	**4**	**5**	**6**	**7**	**8**
	3	**4**	**5**	**6**	**7**	**8**	**9**
Dice 2	4	**5**	**6**	**7**	**8**	**9**	**10**
	5	**6**	**7**	**8**	**9**	**10**	**11**
	6	**7**	**8**	**9**	**10**	**11**	**12**

P(prime) = $\frac{15}{36} = \frac{5}{12}$

a

Write the following numbers in order of size, starting with the smallest.

62%, 0.65, $\frac{11}{25}$, $\frac{5}{9}$

$\frac{11}{25}$, $\frac{5}{9}$, 62%, 0.65

b

Solve

$3(a - 5) = 5a - 3$

a = -6

c

Solve the simultaneous equations:

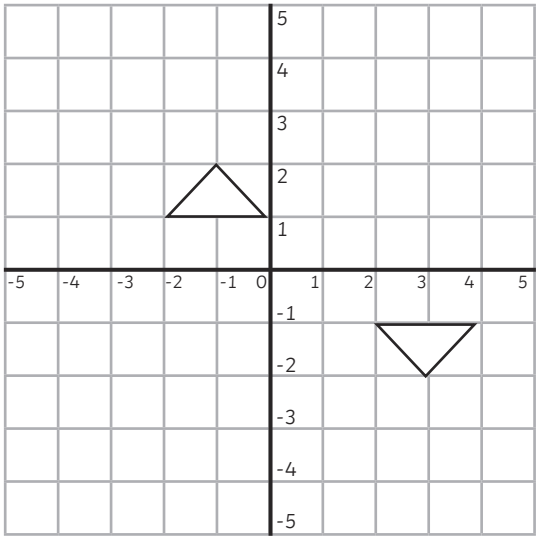
$3x + 2y = 4$

$x + y = 1$

$x = 2, y = -1$

d

Rotate the shape 180° clockwise about the point (1,0).



e

Claire played 15 netball matches for her school. The number of goals she scored in the matches are shown in the frequency table.

Number of Goals	Frequency
0	3
1	4
2	7
3	1

i) Find the mean number of goals scored.

1.4

ii) Find the median number of goals scored.

2

f

The table shows the probabilities of picking a chocolate at random from a bag.

Fairy Milk	Sneakers	Snars Bar	Kit Kit
0.1	0.2	0.6	0.1

Form and solve an equation to find the probabilities of picking each of the chocolate bars.

$10x = 1$

So $x = 0.1$

a

Work out, without using a calculator:

i) -7.5 ÷ 1.5

-5

ii) -0.3 × -0.7

0.21

iii) –(-3 + 7)

-4

b

Eleanor thinks of a number, x, multiplies it by 3 and then adds 4.

Given that her answer is -2, form and solve an equation to find the value of x.

$3x + 4 = -2$

$x = -2$

c

Look at the Venn diagram.

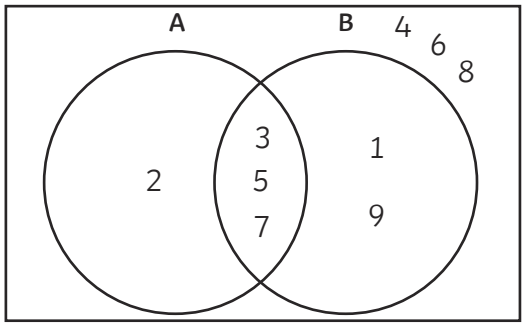
Write down the numbers that are in set:

i) A∩B

3, 5, 7

ii) A'

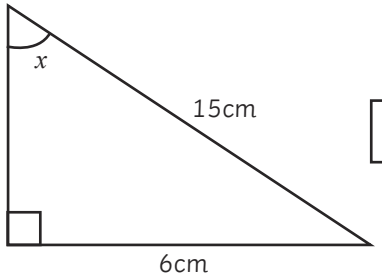
1, 4, 6, 8, 9, 10



d

Below is a right-angled triangle.

Calculate the size of angle x.



23.6° (3sf)

e

A piece of iron has a density of 8g/cm³ and mass of 1700g.

Find the volume of the piece of iron in cm³. Give your answer correct to 3 significant figures.

213cm³

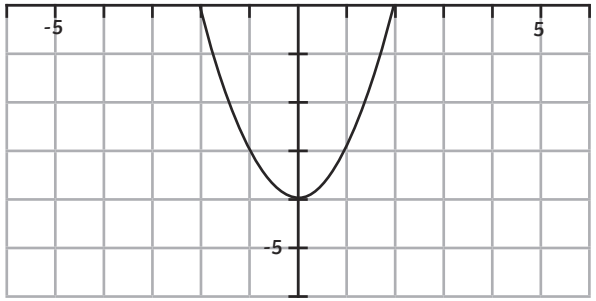
f

Factorise $4x^2 - 9$

$(2x + 3)(2x - 3)$

a

By drawing suitable triangles of width one unit, estimate the area between the curve $y = x^2 - 4$ and the x-axis.



10 units²

b

Estimate the solution to √60 to 1 decimal place. Show all your reasoning.

7^2 is 49

8^2 is 64

Therefore √60 is between the two (allow 7.5 – 7.9)

c

Expand and simplify $4(2x + 7) - 3(x - 5)$

$5x + 43$

d

Find the next two terms of the sequence:

64, 16, 4, 1...

$\frac{1}{4}, \frac{1}{16}$

e

There are 450 students in a school, 210 of whom are girls. Find the percentage of students in the school who are girls. Give your answer correct to 1 decimal place.

46.7%

f

A piece of string measures 70cm to the nearest 5cm. Work out the smallest possible length of the piece of string.

67.5cm

a

Solve the simultaneous equations:

$4x + 3y = 9$

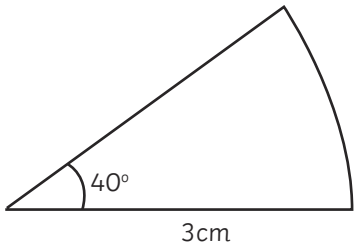
$y = x - 4$

$x = 3$ y = -1

b

The diagram shows a sector of a circle.

Find the perimeter of the sector, giving your answer correct to 1 decimal place.



8.1cm

c

Complete the square for the expression $x^2 + 8x + 20$

$(x + 4)^2 + 4$

d

Share £60 in the ratio 1:7:4.

£5 : £35 : £20

e

Simplify $(3x^{\frac{1}{8}} y^{\frac{2}{7}})^3$

$27x^{\frac{3}{8}}y^{\frac{6}{7}}$

f

Histogram with following frequency densities:

Age, x, years	Frequency Density
$16 \leq x < 20$	1.5
$20 \leq x < 26$	2
$26 \leq x < 30$	1.75
$30 \leq x < 40$	1
$40 \leq x < 60$	0.25