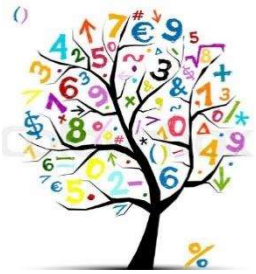
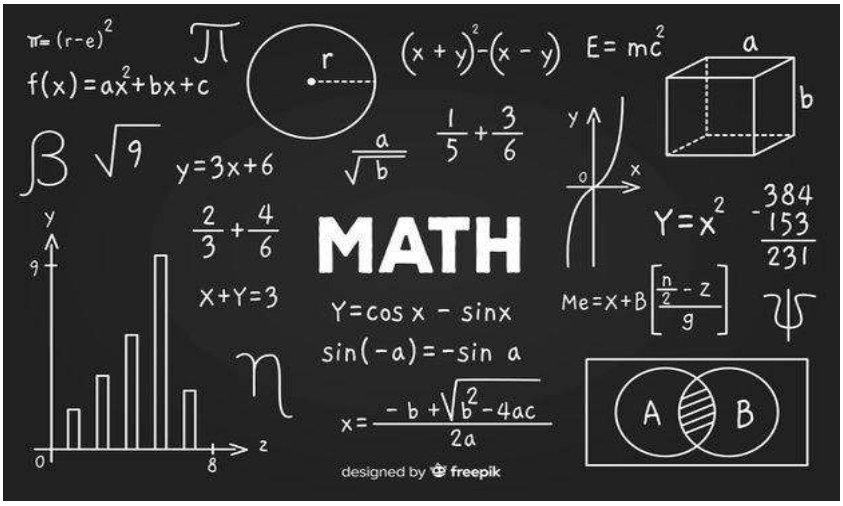


Higham Lane School

A Level Maths

Transitional Skills Booklet



Welcome to Key Stage 5 Maths @ Higham Lane School!

This booklet has been produced by Sparx Maths.

In this booklet, there are a range of questions from key topics that you will have seen in GCSE and will be helpful for AS and A-Level.

Each topic has three sections:

- **Introduce** questions allow you to practise the key concepts.
- **Strengthen** questions build on your knowledge of the key concepts.
- **Deepen** questions will challenge your understanding.

Unless otherwise indicated, you may use a calculator.

For your bridging work, you should complete <u>at least one</u> section from each topic area and be prepared to submit this during your first Maths lesson in September.

The topic areas are:

- Surds
- Expanding brackets
- Factorising quadratics
- Simplifying expressions
- Operations with algebraic fractions
- Solving quadratic equations
- Quadratic graphs
- Linear simultaneous equations
- Straight-line graphs
- Right-angled trigonometry
- Further trigonometry

QR codes have been provided for each topic area. By scanning these, you will be taken to YouTube videos to help your understanding.

It is really important that you are confident with all of these skills before you start with us.

Answers are provided at the back of the booklet so that you can check your work as you go. At A-Level Maths, for all exercises, we provide you with the answers, but you should not get used to just using these.

We are looking forward to you joining us in September!

Mr Kingston – Assistant Subject Leader for Maths with responsibility for Key Stage 5

Mr Fox – Subject Leader for Maths

Reading List

As a student who is choosing to study A Level Maths, it's logical to assume you have an interest in the subject. The following books may provide additional reading for you:

- *Alex's Adventures in Numberland* by Alex Bellos
- *Cabinet of Mathematical Curiosity* by Ian Stewart
- *The num8er My5teries* by Marcus De Sautoy
- *How Many Socks Make a Pair? Surprisingly Interesting Maths* by Rob Eastaway
- *The Curious Incident of The Dog in the Night-time* by Mark Haddon
- *The Penguin Dictionary of Curious and Interesting Numbers* by David Wells
- *The Calculus Wars* by Jason Socrates Bardi
- *The Code Book* by Simon Singh
- *50 Mathematical Ideas You Should Really Know* by Tony Crilly

Key Facts and Formulae

The Quadratic formula:

The solution of $ax^2 + bx + c = 0$

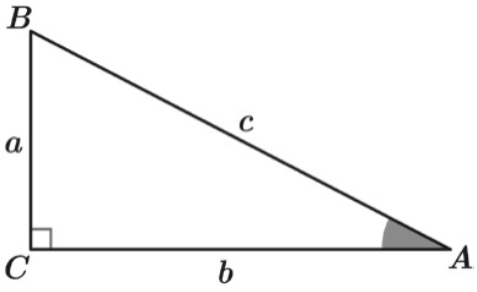
where $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Trigonometry:

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

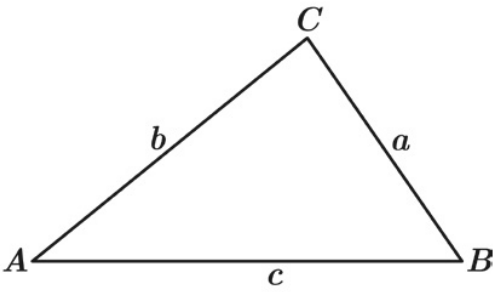
$$\sin A = \frac{a}{c} \qquad \cos A = \frac{b}{c} \qquad \tan A = \frac{a}{b}$$



In any triangle ABC where a, b and c are the length of the sides:

sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

cosine rule: $a^2 = b^2 + c^2 - 2bc\cos A$



Q1 Expand and fully simplify $\sqrt{5}(\sqrt{5}+\sqrt{7})$

Stuck? Scan me!

Answer: .....

Q2 Rationalise the denominator of $\frac{2\sqrt{5}}{\sqrt{6}}$

Give your answer in its simplest form.

Answer: .....

Q3 Expand and fully simplify $(6+\sqrt{5})(1+\sqrt{5})$

Answer: .....

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Q4 Write $(5 + \sqrt{12})(11 + \sqrt{3})$ in the form $a + b\sqrt{3}$, where a and b are integers.

Answer: .....

Q5 Rationalise the denominator of $\frac{1 + \sqrt{2}}{\sqrt{2}}$

Give your answer as a fraction in its simplest form.

Answer: .....

Q1 Expand and fully simplify $(2\sqrt{6} - 5\sqrt{2})^2$

Answer: .....

Q2 Rationalise the denominator of $\dfrac{15 + \sqrt{3}}{10\sqrt{3}}$

Give your answer as a fraction in its simplest form.

Answer: .....

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Q3 Rationalise the denominator of $\frac{2\sqrt{7}}{3+\sqrt{7}}$

Give your answer in its simplest form.

Answer: .....

Q4 Write $\sqrt{12} + \frac{33}{\sqrt{3}}$ in the form $r\sqrt{3}$, where r is an integer.

Answer: .....

Q1 Expand and fully simplify $(4 + \sqrt{7})^2 - (4 - \sqrt{7})^2$

Answer: .....

Q2 Work out the value of x in the equation below.

$x(\sqrt{11} - 2) = 21$

Give your answer in the form $a + b\sqrt{11}$, where a and b are integers.

Answer: .....

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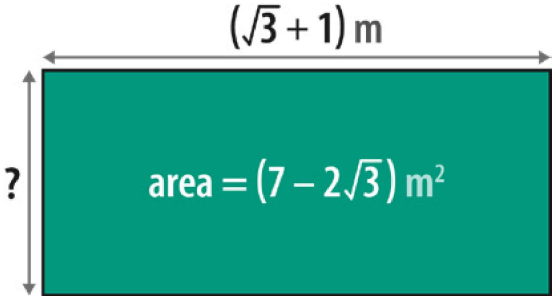
Q3 Given that h is a prime number, rationalise the denominator of $\frac{5h - \sqrt{h}}{\sqrt{h}}$

Give your answer in its simplest form.

Answer: .....

Q4 Calculate the unknown side length, in metres, of the rectangle below.

Give your answer in its simplest form, rationalising the denominator if necessary.



Answer: ..... m

Q1 Expand and fully simplify $(m + 9)(m + 2)$

Stuck? Scan me!

Answer: .....

Q2 Expand and fully simplify $(2a + 3)(4a + 5)$

Answer: .....

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Q3 Expand and fully simplify $(x - 3)(4x + 9)$

Answer: .....

Q4 Expand and fully simplify $(6n - 5)^2$

Answer: .....

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Q1 Expand and fully simplify $2(4d + 5)(3d + 1)$

Answer: .....

Q2 Expand and fully simplify $(x + 1)(x^2 + 3x + 5)$

Answer: .....

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Q3 Expand and fully simplify $(3n + 4)(5n + 2) + 5(n + 7)$

Answer: .....

Q4 Expand and fully simplify $(t - 2)(t + 5)(t - 4)$

Answer: .....

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Q1 Expand and fully simplify $(2x + 5)(4x - 3)(5x - 4)$

Answer: .....

Q2 Work out the values of a, b and c in the identity below.

$(3x - 1)(x + 2)(ax + b) \equiv 15x^3 + 16x^2 - 25x + c$

Answer: a = ... b = ... c = ...

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Q3 Write the following expression in the form $\frac{1}{ax^b} + \frac{1}{cy^d}$ where a, b, c, and d are integers.

$$\left(\frac{1}{5x} + \frac{1}{4y}\right)\left(\frac{1}{25x^2} - \frac{1}{20xy} + \frac{1}{16y^2}\right)$$

Answer: .....

Q4 Show that $(x^2 + 1)(y^2 + 4) \equiv (xy - 2)^2 + (2x + y)^2$

Q1 Fully factorise $y^2 + 9y + 20$

Stuck? Scan me!

Answer: .....

Q2 Fully factorise $x^2 - x - 20$

Answer: .....

Q3 Fully factorise $w^2 - 15w + 54$

Answer: .....

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Q1 Fully factorise x^2 - 16

Answer: .....

Q2 Fully factorise $2r^2 + 15r + 7$

Answer: .....

Q3 Fully factorise $5x^2 + 22x + 8$

Answer: .....

Q1 Fully factorise $49h^2 - m^2$

Answer: .....

Q2 Fully factorise $7b - b^2 - 10$

Answer: .....

Q3 Fully factorise $4k^2 - 25n^2 - (2k - 5n)^2$

Answer: .....

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Q1 Fully simplify the expression $4y^5 \times 3y^2$

Stuck? Scan me!

Answer: .....

Q2 Simplify $(h^{-5})^3$

Give your answer without any negative indices.

Answer: .....

Q3 Write $\frac{2t^6u}{8t^3}$ as a fraction in its simplest form.

Answer: .....

Q4 Fully simplify $\left(\frac{t^3}{u^5}\right)^2$

Answer: .....

Q5 Write $\frac{33xy + 9x}{18x}$ as a fraction in its simplest form.

Answer: .....

Q6 Fully simplify $\frac{6a + 42}{a^2 + 11a + 28}$

Answer: .....

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Q1 Write $\frac{(3a)^2}{54ak}$ as a fraction in its simplest form.

Answer: .....

Q2 Fully simplify $(64g^8h^4)^{\frac{1}{2}}$

Answer: .....

Q3 Fully simplify $\frac{x+2}{2x^2 - 31x - 70}$

Answer: .....

Q1 Work out the values of a, b and c in the equality below.

$$\frac{2x^{20}y^4 \times 12x^4y^{26}}{(2xy^2)^3} = ax^by^c$$

Answer: $a =$ ..... $b =$ ..... $c =$ .....

Q2 Work out what expression should replace the ? in the equivalent fractions below.

$$\frac{?}{12r^4(t+6)} = \frac{2n}{3r}$$

Answer: ? = ...

Q3 $\frac{ax^2 + bx + c}{dx^2 - 25}$ simplifies to give $\frac{x-4}{2x-5}$

Work out the values of a, b, c and d in the original fraction.

Answer: $a =$ ..... $b =$ ..... $c =$ ..... $d =$ .....

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Q1 Fully simplify $\frac{14a}{b} \times \frac{b}{2}$

Stuck? Scan me!

Answer: .....

Q2 Fully simplify $\frac{6a}{v} \div \frac{2a}{5}$

Give your answer as a fraction.

Answer: .....

Q3 Fully simplify the expression below to give a single fraction.

$\frac{n+2}{5} + \frac{6n}{7}$

Answer: .....

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Q1

Fully simplify $\frac{2}{5a+4} \times \frac{45a+36}{a}$

Give your answer as a fraction.

Answer: .....

Q2

Fully simplify $\frac{6x}{(5x-7)(x+1)} - \frac{1}{5x-7}$

Give your answer fully factorised.

Answer: .....

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Q3 Write the following as a single fraction in its simplest form:

$$\frac{2x^2 - 11x + 12}{x + 5} \div (4x^2 - 6x)$$

Give your answer fully factorised.

Answer: .....

Q4 Fully simplify $\frac{4ab^2}{k} \times \frac{3ak}{12k} \times \frac{7}{5ab}$

Give your answer as a fraction.

Answer: .....

Q1 Fully simplify $\frac{7}{36 - x^2} - \frac{3}{6 + x}$

Give your answer fully factorised.

Answer: .....

Q2 Write the following as a single fraction in its simplest form:

$$6 - (x + 4) \div \frac{x^2 + 11x + 28}{x - 7}$$

Give your answer fully factorised.

Answer: .....

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Q1 Find the two solutions to the equation

$(x - 9)(x + 5) = 0$

Stuck? Scan me!

Answer: .....

Q2 Solve this equation by factorising:

$y^2 + 3y - 10 = 0$

Answer: .....

Q3 Solve this equation by factorising:

$12 - 8w + w^2 = 0$

Answer: .....

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Q4 Using the quadratic formula, solve

$4x^2 + 16x + 15 = 0$

Answer: .....

Q5 Solve this equation by factorising:

$2m^2 - 11m + 5 = 0$

Answer: .....

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Q1 Using the quadratic formula, solve $y^2 - 6y + 7 = 0$

Give your answer in the form $a \pm \sqrt{b}$

Answer: .....

Q2 Solve the equation below using factorising.

$6y^2 - 11y - 10 = 0$

Answer: .....

Q3 Using the quadratic formula, solve $6x^2 - 35 = -11x$

Answer: .....

Q4 Solve $3r(3r - 4) = 2$

Give your answers to 2 d.p.

Answer: .....

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Q1 Solve $x(x + 4) - 4(5x + 9) = 0$

Answer: .....

Q2 Jessica thinks of a positive number, n, which is less than 1
She adds this number to its reciprocal and gets 2.9

Work out the value of n.
Give your answer as a fraction in its simplest form.

Answer: .....

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Q3

Solve $\frac{4}{y-1} - \frac{5}{y+2} = \frac{3}{y}$

Answer: .....

Q4

$x = \frac{-3 \pm \sqrt{29}}{2}$

There is only one equation of the form $x^2 + bx + c = 0$ that gives these values of x as solutions.

Work out the values of b and c.

Answer: b = ... c = ...

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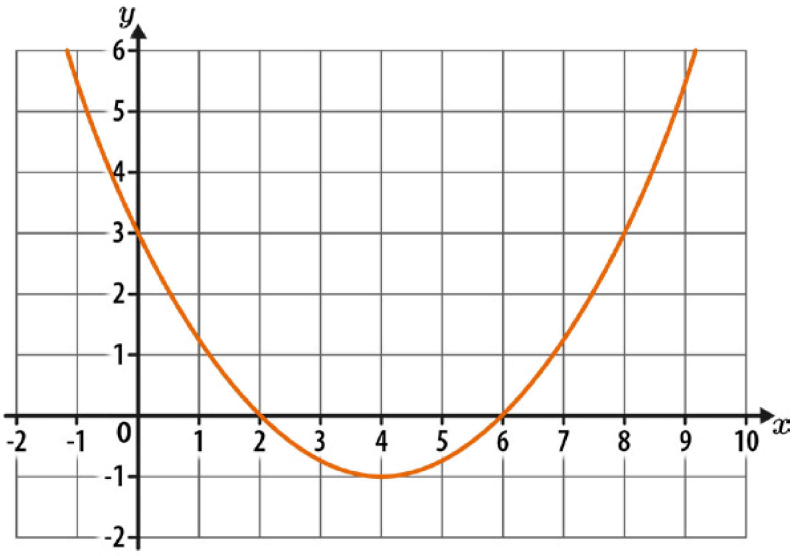
Q1 Write down the coordinates of the roots of the quadratic curve shown below.

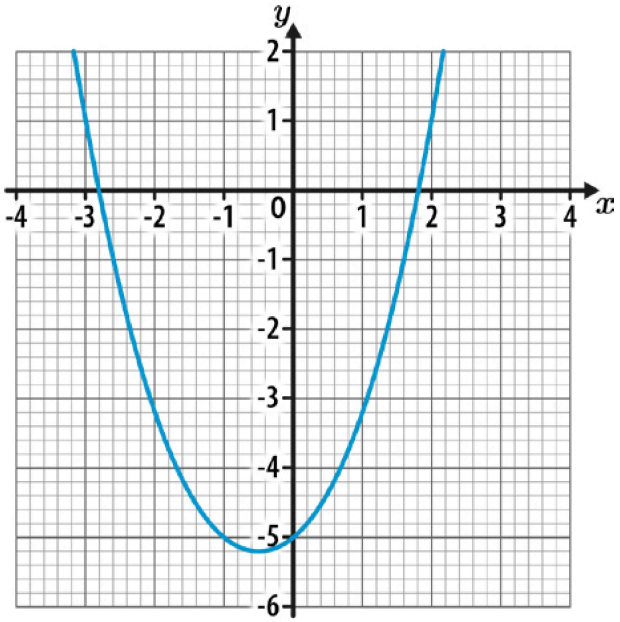


Stuck? Scan me!

Answer: (..... , ...) and (..... , ...)

Q2 Here is the graph of the function $y = x^2 + x - 5$

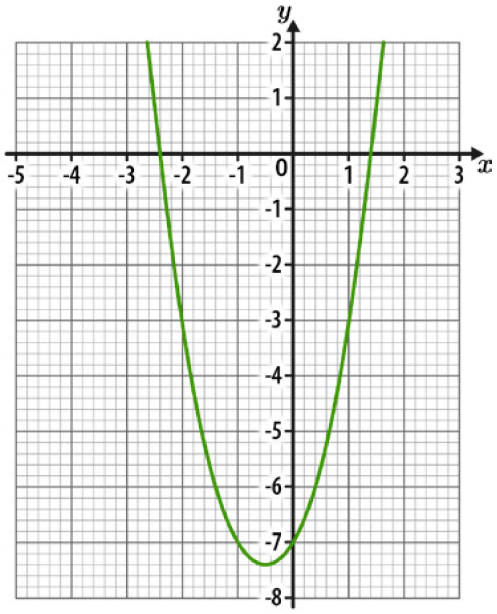
Estimate the solutions to $x^2 + x - 5 = 0$
Give your answers to 1 d.p.



Answer: .....

Q3 The diagram below shows the graph of the function $y = 2x^2 + 2x - 7$

Work out the solutions to $2x^2 + 2x - 7 = -3$



Answer: .....

Q4 a) Write $x^2 + 6x + 11$ in the form $(x + c)^2 + d$, where c and d are numbers.

Answer: a) .....

b) Hence, write down the coordinates of the turning point on the curve $y = x^2 + 6x + 11$

Answer: b) (..... , ...)

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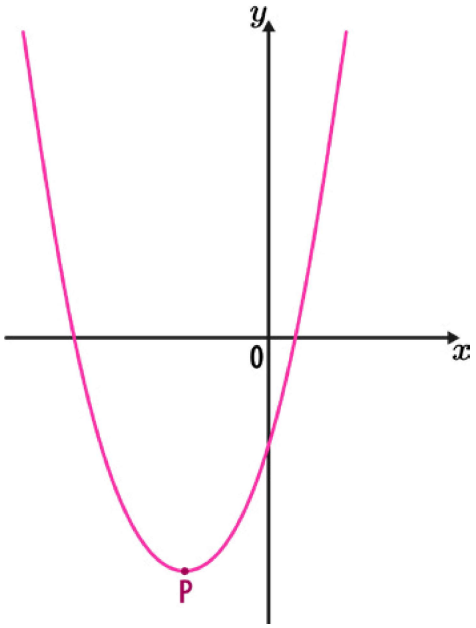
Q1 The diagram below shows a sketch of the curve $y = x^2 + 8x - 10$

P is the turning point of the curve.

Work out the coordinates of P.



Answer: (..... , ...)

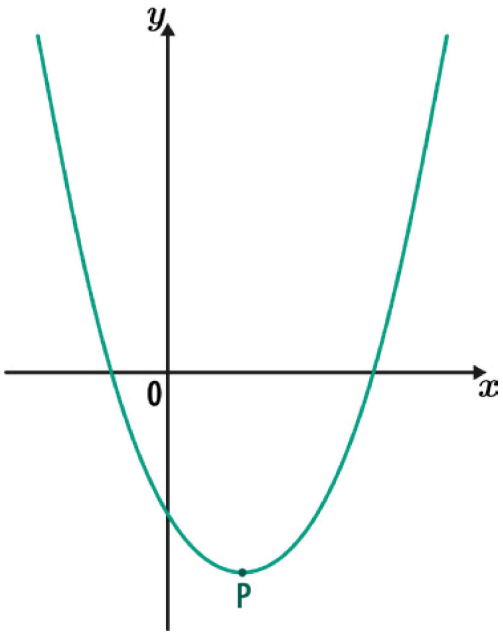
Q2 Work out the coordinates of the turning point of the curve $y = x^2 - 5x + 1$

Answer: (..... , ...)

Q3 The diagram below shows a sketch of the curve $y = 3x^2 - 6x - 10$

P is the turning point of the curve.

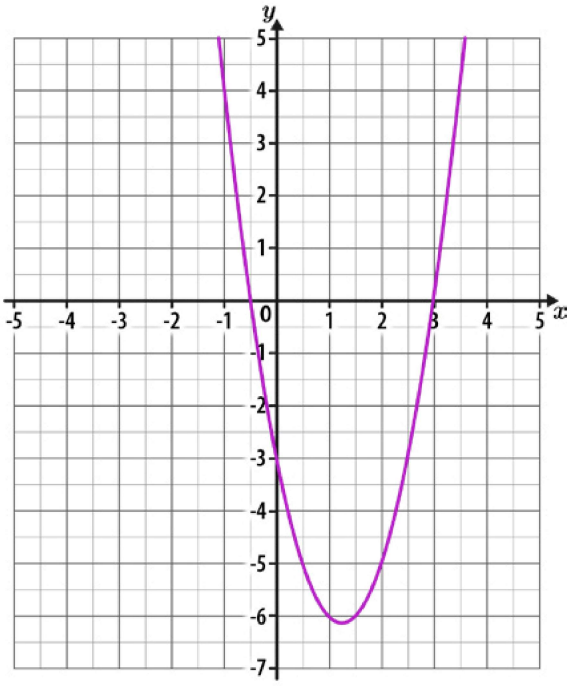
Work out the coordinates of P.



Answer: (..... , ...)

Q4 The diagram below shows the graph of $y = 2x^2 - 5x - 3$

Use the diagram to estimate the solutions to $2x^2 - 5x - 3 = -2x + 2$
Give any decimal answers to 1 d.p.



Answer: .....

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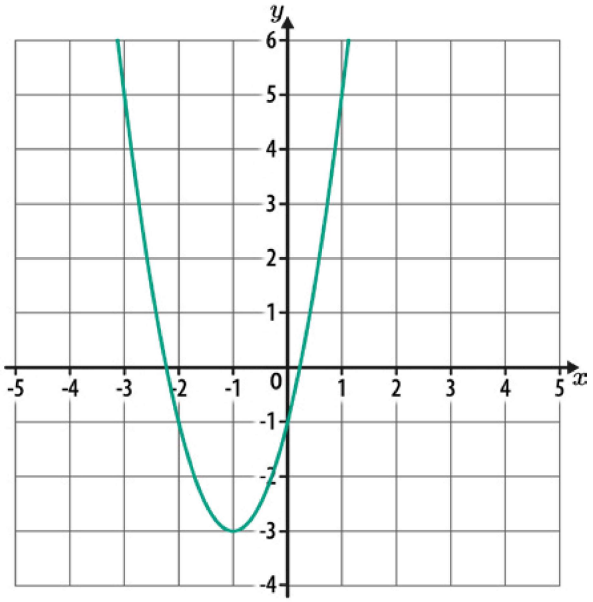
Q1 The diagram below shows the graph of $y = 2x^2 + 4x - 1$
The equation $2x^2 + 4x - 1 = k$ has solutions at $x = -3$ and $x = 1$

What is the value of k?



Answer: $k =$ .....

Q2 A curve has the equation $y = x^2 + ax + b$, where a and b are numbers.
The turning point of the curve is (5, 4)

Work out the values of a and b.

Answer: $a =$ ..... $b =$ .....

Q3 A curve has the equation $y = -x^2 + 16x - 65$

a) Work out the turning point of the curve.

Answer: a) (....., ...)

b) By considering the position of the turning point and the shape of the curve, work out how many real roots $y = -x^2 + 16x - 65$ has.

Answer: b) .....

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Q1 Solve the following simultaneous equations:

$6x + y = 22$

$2x + y = 10$

Stuck? Scan me!

Answer: $x =$ ..... $y =$ .....

Q2 Solve the following simultaneous equations:

$7x - 4y = 20$

$2x + 4y = 16$

Answer: $x =$ ..... $y =$ .....

Q3 Solve the following simultaneous equations:

$15a - 4b = 25$

$5a + 2b = 25$

Answer: $a =$ ..... $b =$ .....

Q4 Solve the following simultaneous equations:

$2x + 3y = 8$

$3x + 4y = 11$

Answer: $x =$ ..... $y =$ .....

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Q1 Solve the following simultaneous equations:

$7x + 5y = 8$

$3x - 2y = -9$

Answer: $x =$ ..... $y =$ .....

Q2 Solve the following simultaneous equations:

$6x + 7y = 5$

$9x + 13y = -10$

Answer: $x =$ ..... $y =$ .....

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Q3 Solve the following simultaneous equations:

$7y + 2x = \frac{23}{2}$

$5y + 3x = 9$

Answer: $x =$ ..... $y =$ .....

Q4 Solve the following simultaneous equations:

$4.6t + 8.1u = 104$

$3.8t - 2.7u = -8$

Answer: $t =$ ..... $u =$ .....

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Q1 Solve the following simultaneous equations:

$3x = 3 - 4y$

$12y + 11 = -5x$

Answer: $x =$ ..... $y =$ .....

Q2 Find the values of x, y and a by solving the following simultaneous equations:

$6x - 7y = -10$

$12x - 5y = 16$

$2x + ay = 10$

Answer: $x =$ ..... $y =$ ..... $a =$ .....

Q3 Solve the following simultaneous equations:

$$\frac{4}{7x - 4} = \frac{1}{6y}$$

$$\frac{5x}{3y + 2} = 4$$

Answer: $x =$ ..... $y =$ .....

Q4 Solve the following simultaneous equations:

$$2^{x} = 4^{(7 - 2y)}$$

$$3^{(5x - 13y)} = 81$$

Answer: $x =$ ..... $y =$ .....

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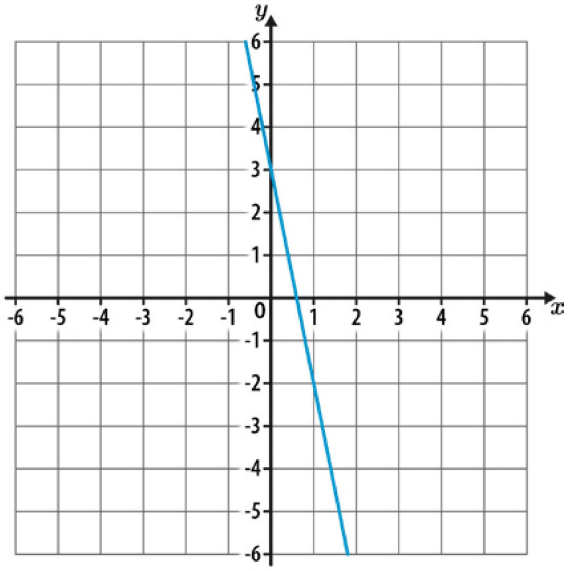
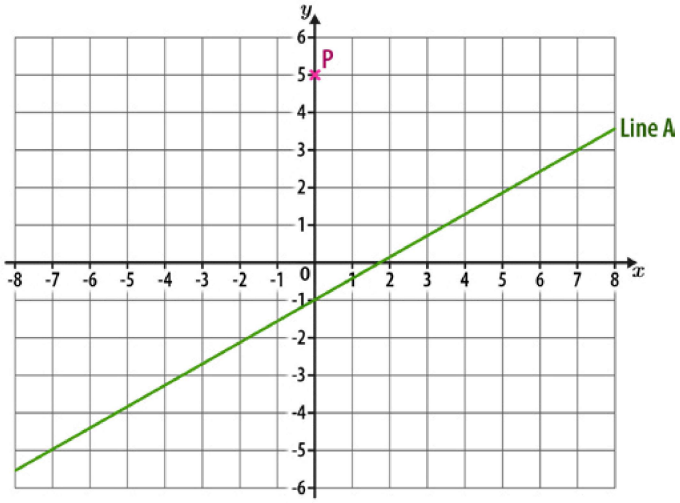
Q1 Work out the equation of the straight line shown below.



Stuck? Scan me!

Answer: .....

Q2 Work out the equation of the straight line that is parallel to line A and passes through point P.



Answer: .....

Q3 Line A has the equation $2y - 10 = 16x$
Line B is perpendicular to Line A.

What is the gradient of Line B?

Answer: .....

Q4 A straight line has a gradient of 3 and passes through the point (2, 10)

Work out the equation of the line.

Answer: .....

Q5 Work out the equation of the straight line that passes through (2, 3) and (5, 18)

Answer: .....

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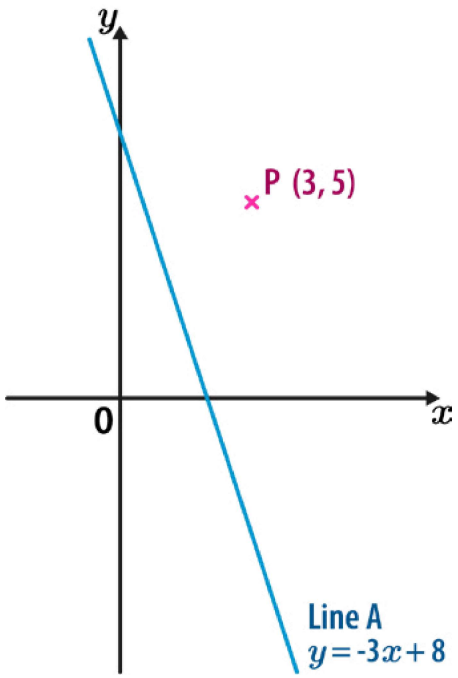
Q1 A straight line has a gradient of $-\frac{3}{4}$, and passes through the point (32, 12)

Work out the equation of the line.

Answer: .....

Q2 The diagram below shows point P and Line A.
Line B is **perpendicular** to line A and passes through point P.

What is the equation of line B?



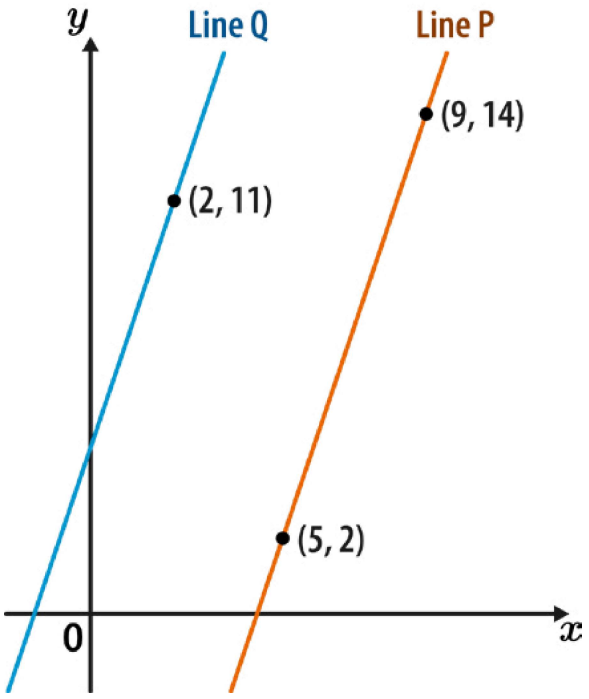
Answer: .....

Q3 Work out the equation of the straight line that passes through (1, -7) and (6, 8)

Answer: .....

Q4 The graph below shows line P and line Q.
Line Q is **parallel** to line P.

What is the equation of line Q?



Answer: .....

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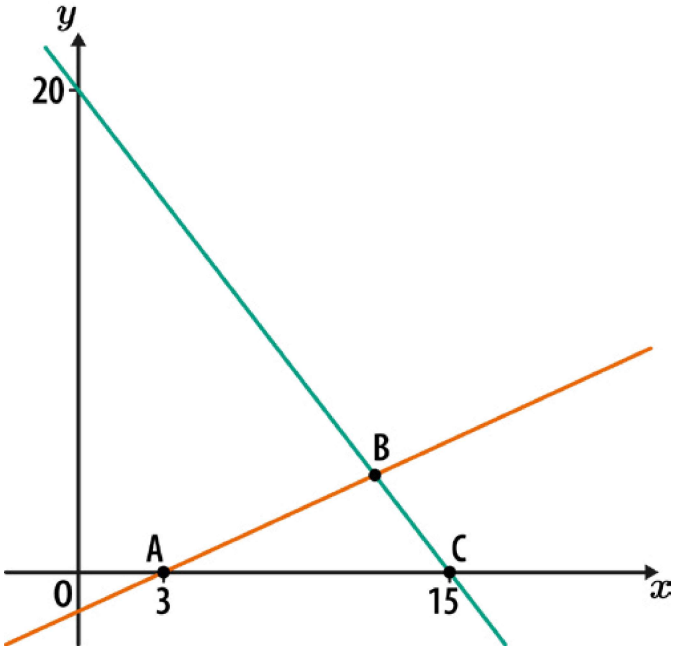
Q1 Write an expression, in terms of h, for the gradient of a line **perpendicular** to the line segment joining $(3h, 20)$ to $(6h, 8)$

Give your answer as a fully simplified fraction.

Answer: .....

Q2 The triangle ABC has an area of 24 square units.

What are the coordinates of point B?

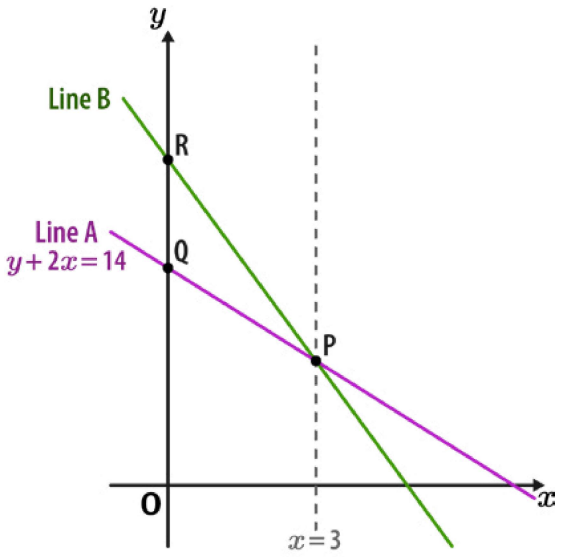


Answer: (..... , ...)

Q3

Line A has the equation $y + 2x = 14$
The gradient of line B is twice the gradient of line A.

Work out the ratio of the length of OQ to the length of OR.
Give your answer in its simplest form.

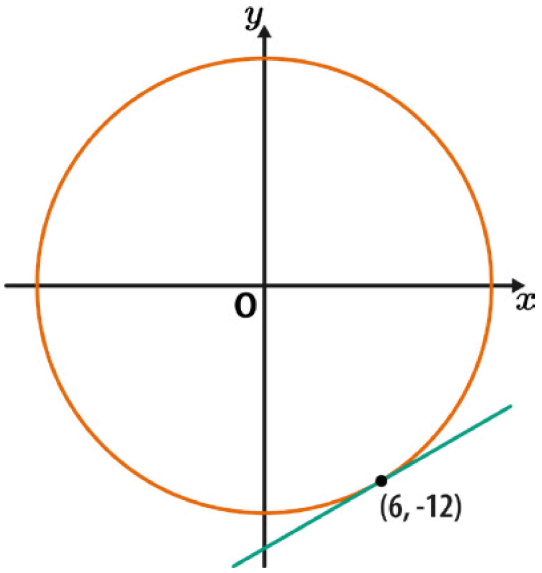


Answer: .....

Q4

A circle, centre O, passes through the point (6, -12), as shown.

Work out the equation of the tangent to the circle at this point.
Give your answer in the form $y = mx + c$, where m and c are integers or fractions in their simplest form.



Answer: .....

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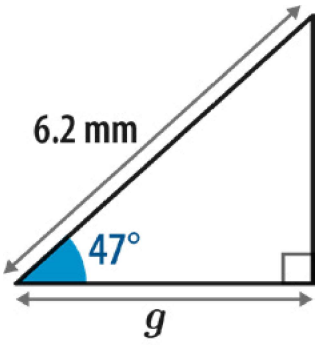
Q1

Work out the length g.
Give your answer to 1 d.p.



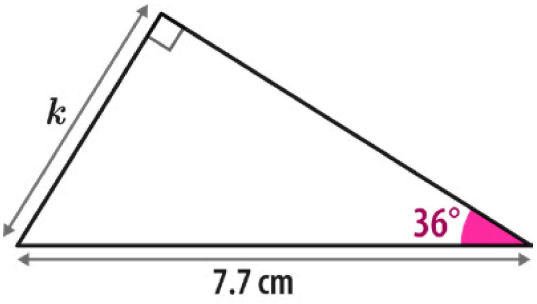
Not drawn accurately

Stuck? Scan me!

Answer: ..... mm

Q2

Work out the length k.
Give your answer to 1 d.p.

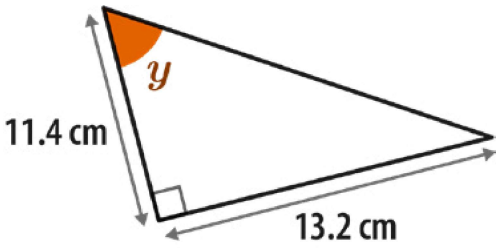


Not drawn accurately

Answer: ..... cm

Q3

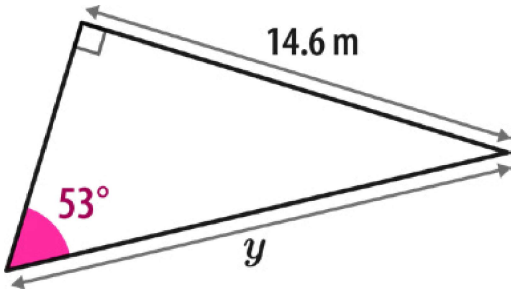
Calculate the size of angle y.
Give your answer to the nearest integer.



Not drawn accurately

Answer: ..... °

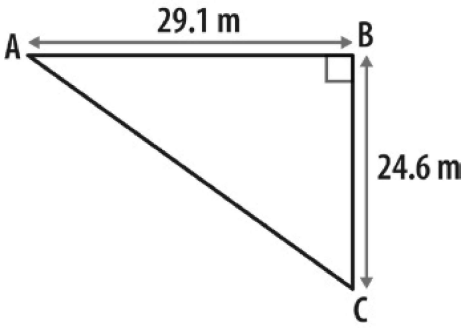
Q1 Calculate the length y.
Give your answer to 2 d.p.



Not drawn accurately

Answer: ..... m

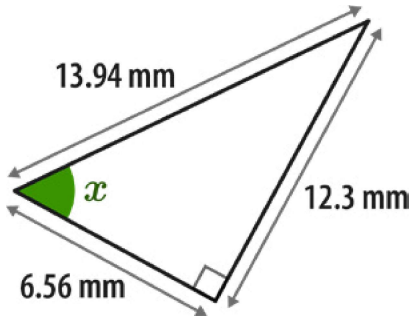
Q2 Calculate the size of angle BAC.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... °

Q3 What is the size of angle x?
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... °

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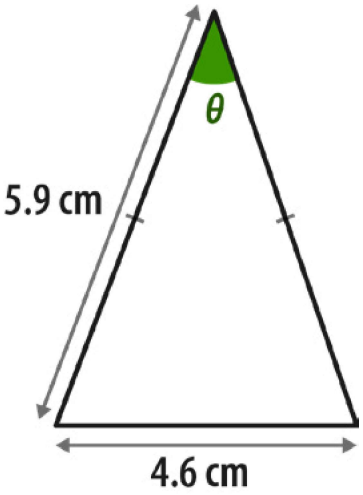
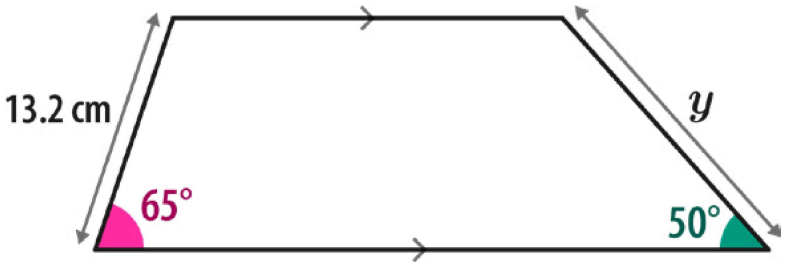
Q1 Calculate the size of angle θ.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... °

Q2 Work out the length y.
Give your answer to 2 d.p.

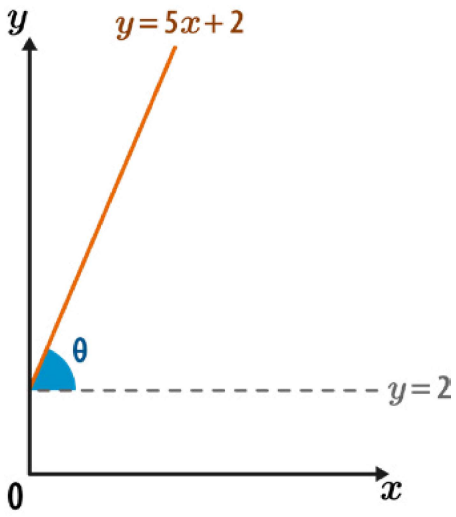


Not drawn accurately

Answer: ..... cm

Q3 The graph below shows the line with equation $y = 5x + 2$
The axes both have the same scale.

Calculate the size of angle θ.
Give your answer in degrees to the nearest integer.

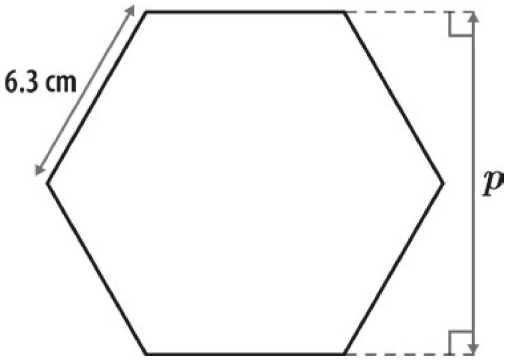


Not drawn accurately

Answer: ..... °

Q4 The shape below is a regular hexagon.

Use trigonometry to calculate the distance p.
Give your answer in centimetres to 2 d.p.



Not drawn accurately

Answer: ..... cm

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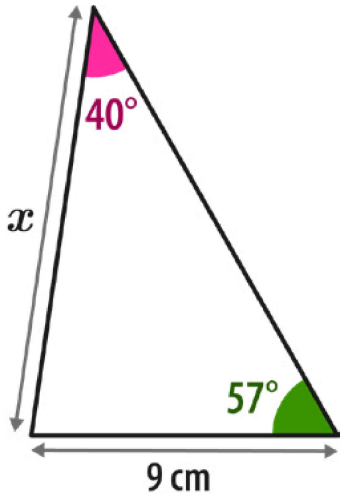
Q1 Using the sine rule, calculate the length x.
Give your answer to 1 d.p.

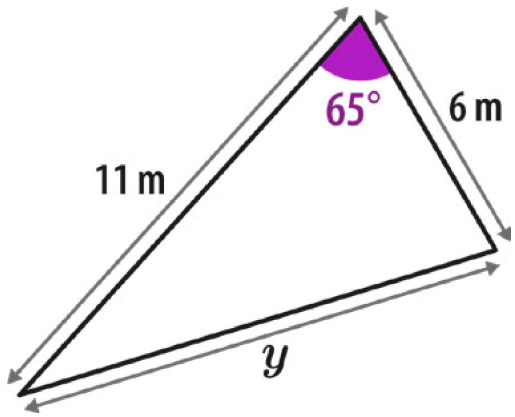
Stuck? Scan me!



Not drawn accurately

Answer: ..... cm

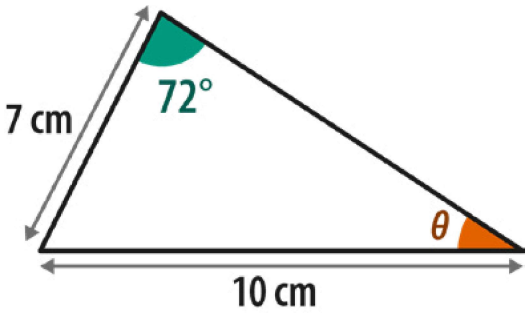
Q2 Using the cosine rule, work out the length y.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... m

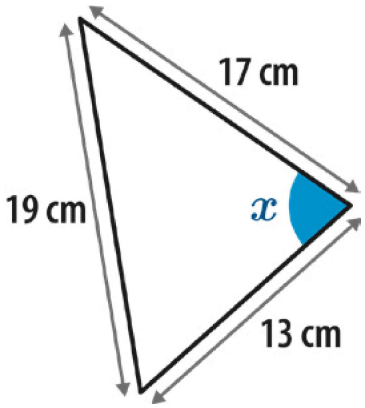
Q3 Use the sine rule to calculate angle θ.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... °

Q4 Use the cosine rule to calculate the size of angle x.
Give your answer to the nearest degree.



Not drawn accurately

Answer: ..... °

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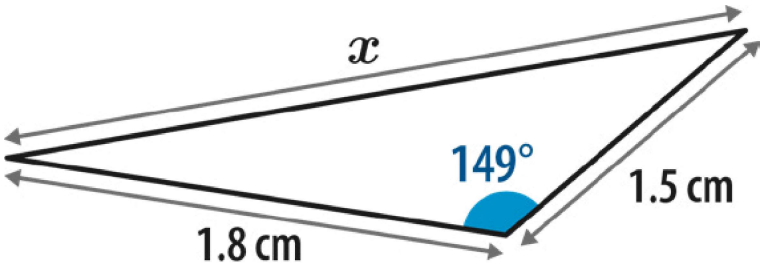
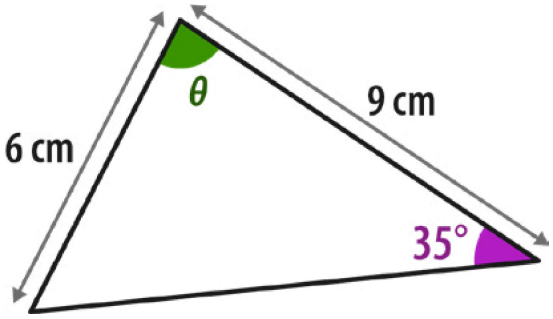
Q1 Work out length x.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... cm

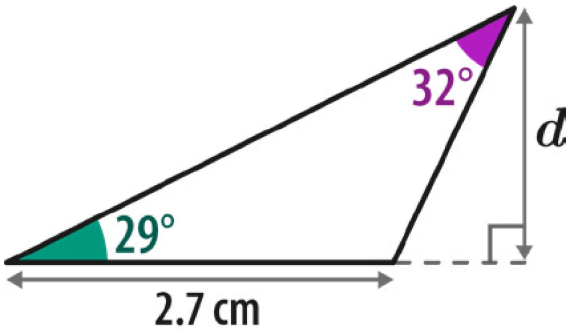
Q2 All the angles in the triangle below are acute.
Calculate the angle θ to 1 d.p.



Not drawn accurately

Answer: ..... °

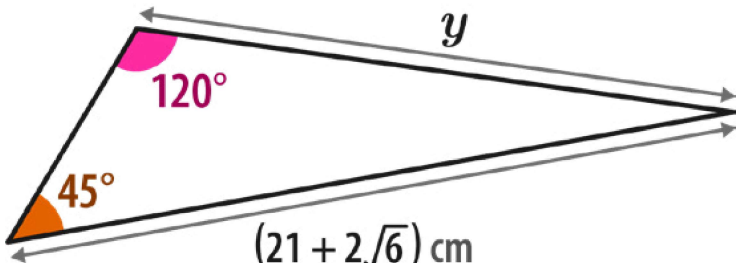
Q1 Calculate the length d.
Give your answer to 2 s.f.



Not drawn accurately

Answer: ..... cm

Q2 Work out the length y in the triangle below.
Give your answer in its simplest form, rationalising the denominator if necessary.



Not drawn accurately

Answer: ..... cm

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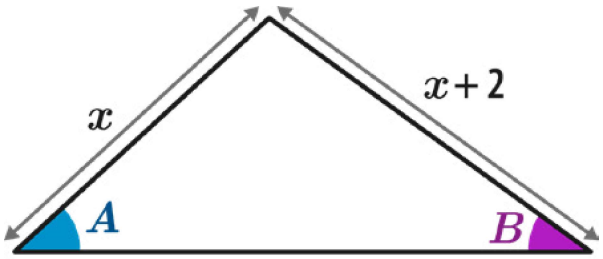
Q3 Using the information below, work out the value of x.

$\sin A = \frac{4}{5}$ $\sin B = \frac{3}{4}$

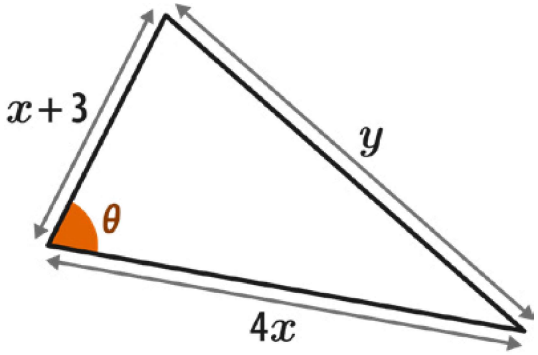


Not drawn accurately

Answer: .....

Q4 Given that $\cos\theta = \frac{1}{8}$ in the triangle below, show that $y^2 = ax^2 + bx + c$ where a, b and c are numbers.

What are the values of a, b and c?



Not drawn accurately

Answer: a = ... b = ... c = ...

		Introduce	Strengthen	Deepen
Surds	Q1	$5 + \sqrt{35}$	$74 - 40\sqrt{3}$	$16\sqrt{7}$
	Q2	$\frac{\sqrt{30}}{3}$	$\frac{1 + 5\sqrt{3}}{10}$	$6 + 3\sqrt{11}$
	Q3	$11 + 7\sqrt{5}$	$3\sqrt{7} - 7$	$5\sqrt{h} - 1$
	Q4	$61 + 27\sqrt{3}$	$13\sqrt{3}$	$\frac{9\sqrt{3} - 13}{2}$
	Q5	$\frac{\sqrt{2} + 2}{2}$		
Expanding brackets	Q1	$m^2 + 11m + 18$	$24d^2 + 38d + 10$	$40x^3 + 38x^2 - 131x + 60$
	Q2	$8a^2 + 22a + 15$	$x^3 + 4x^2 + 8x + 5$	$a = 5,\ b = -3,\ c = 6$
	Q3	$4x^2 - 3x - 27$	$15n^2 + 31n + 43$	$\frac{1}{125x^3} + \frac{1}{64y^3}$
	Q4	$36n^2 - 60n + 25$	$t^3 - t^2 - 22t + 40$	Equivalence correctly shown, for example through expanding brackets and simplifying both sides of the equivalence.
Factorising quadratics	Q1	$(y + 4)(y + 5)$	$(x + 4)(x - 4)$	$(7h + m)(7h - m)$
	Q2	$(x + 4)(x - 5)$	$(2r + 1)(r + 7)$	$(5 - b)(b - 2)$
	Q3	$(w - 6)(w - 9)$	$(5x + 2)(x + 4)$	$10n(2k - 5n)$
Simplifying expressions	Q1	$12y^7$	$\frac{a}{6k}$	$a = 3,\ b = 21,\ c = 24$
	Q2	$\frac{1}{h^{15}}$	$8g^4h^2$	$8nr^3(t + 6)$
	Q3	$\frac{t^3u}{4}$	$\frac{1}{2x - 35}$	$a = 2,\ b = -3,\ c = -20,\ d = 4$
	Q4	$\frac{t^6}{u^{10}}$		
	Q5	$\frac{11y + 3}{6}$		
	Q6	$\frac{6}{a + 4}$		

Operations with algebraic fractions

Introduce

Q1 $7a$

Q2 $\frac{15}{v}$

Q3 $\frac{37n + 14}{35}$

Strengthen

Q1 $\frac{18}{a}$

Q2 $\frac{5x - 1}{(5x - 7)(x + 1)}$

Q3 $\frac{x - 4}{2x(x + 5)}$

Q4 $\frac{7ab}{5k}$

Deepen

Q1 $\frac{3x - 11}{(6 - x)(6 + x)}$

Q2 $\frac{5x + 49}{x + 7}$

Solving quadratic equations

Introduce

Q1 $x = 9$ and $x = -5$

Q2 $y = 2$ and $y = -5$

Q3 $w = 2$ and $w = 6$

Q4 $x = \frac{-5}{2}$ and $x = \frac{-3}{2}$

Q5 $m = \frac{1}{2}$ and $m = 5$

Strengthen

Q1 $y = 3 \pm \sqrt{2}$

Q2 $y = \frac{-2}{3}$ and $y = \frac{5}{2}$

Q3 $y = \frac{-7}{2}$ and $y = \frac{5}{3}$

Q4 $r = -0.15$ and $r = 1.48$

Deepen

Q1 $x = -2$ and $x = 18$

Q2 $n = \frac{2}{5}$

Q3 $y = \frac{-1}{2}$ and $y = 3$

Q4 $b = 3$, $c = -5$

Quadratic graphs

Introduce

Q1 (2, 0) and (6, 0)

Q2 $x = -2.8$ and $x = 1.8$

Q3 $x = -2$ and $x = 1$

Q4 a) $(x + 3)^2 + 2$

b) (-3, 2)

Strengthen

Q1 (-4, -26)

Q2 $\left(\frac{5}{2}, \frac{-21}{4}\right)$

Q3 (1, -13)

Q4 $x = -1$ and $x = 2.5$

Deepen

Q1 5

Q2 $a = -10$, $b = 29$

Q3 a) (8, -1)

b) 0

Linear simultaneous equations

Introduce

Q1 $x = 3$, $y = 4$

Q2 $x = 4$, $y = 2$

Q3 $a = 3$, $b = 5$

Q4 $x = 1$, $y = 2$

Strengthen

Q1 $x = -1$, $y = 3$

Q2 $x = 9$, $y = -7$

Q3 $x = \frac{1}{2}$, $y = \frac{3}{2}$

Q4 $t = 5$, $u = 10$

Deepen

Q1 $x = 5$, $y = -3$

Q2 $x = 3$, $y = 4$, $a = 1$

Q3 $x = 4$, $y = 1$

Q4 $x = 6$, $y = 2$

Straight-line graphs

Introduce

Q1 $y = -5x + 3$

Q2 $y = \frac{4}{7}x + 5$

Q3 $\frac{-1}{8}$

Q4 $y = 3x + 4$

Q5 $y = 5x - 7$

Strengthen

Q1 $y = \frac{-3}{4}x + 36$

Q2 $y = \frac{1}{3}x + 4$

Q3 $y = 3x - 10$

Q4 $y = 3x + 5$

Deepen

Q1 $\frac{h}{4}$

Q2 (12, 4)

Q3 7:10

Q4 $y = \frac{1}{2}x - 15$

	Introduce	Strengthen	Deepen
Right-angled trigonometry	**Q1** 4.2 mm **Q2** 4.5 cm **Q3** 49°	**Q1** 18.28 m **Q2** 40.2° **Q3** 61.9°	**Q1** 45.9° **Q2** 15.62 cm **Q3** 79° **Q4** 10.91 cm
Further trigonometry	**Q1** 11.7 cm **Q2** 10.1 m **Q3** 41.7° **Q4** 77°	**Q1** 3.2 cm **Q2** 85.6°	**Q1** 2.2 cm **Q2** $(4 + 7\sqrt{6})$ cm **Q3** 30 **Q4** $a = 16$, $b = 3$, $c = 9$