Notre Dame
CATHOLIC SIXTH FORM COLLEGE

A-Level Maths

Transition Booklet

Congratulations on choosing A-Level Maths!

We hope you're going to enjoy studying it as much as we enjoy teaching it.

Before you start here at Notre Dame, we strongly recommend you work through this booklet to keep your skills up to scratch. The topics are split into three sections:

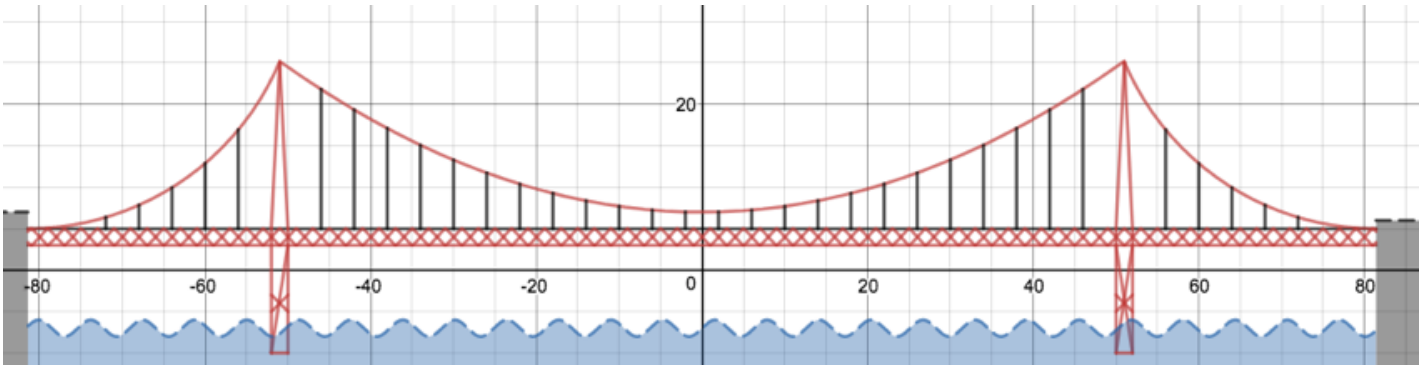
Introduce: these questions should be accessible to you all

Strengthen: these questions are more difficult but you should be able to attempt them

Deepen: these questions will make you think. Try them but don't worry if you find them difficult

Please bring this booklet with you in September.

Name:



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

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: .....

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: .....

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: .....

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

Answer: .....

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

Answer: .....

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

Answer: .....

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

Answer: .....

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 = ...

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

Answer: .....

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

Answer: .....

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

Answer: .....

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: .....

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

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: .....

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

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

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: .....

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: .....

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: .....

Q1 Find the two solutions to the equation

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

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: .....

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: .....

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: .....

Q1 Solve the following simultaneous equations:

$6x + y = 22$

$2x + y = 10$

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

Q2 Solve the following simultaneous equations:

$7x - 4y = 20$

$2x + 4y = 16$

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

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

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:

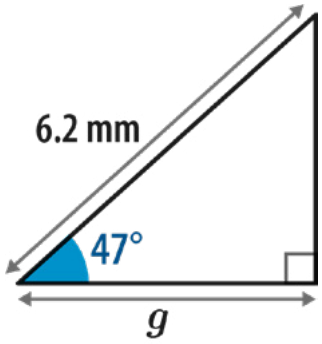
$6x - 7y = -10$

$12x - 5y = 16$

$2x + ay = 10$

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

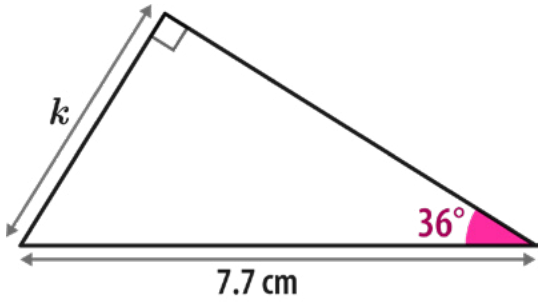
Q1 Work out the length g.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... mm

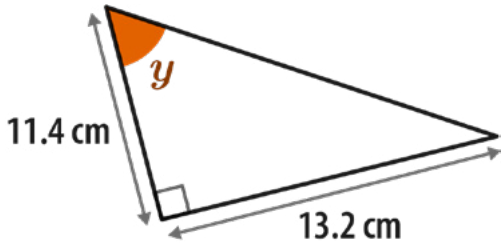
Q2 Work out the length k.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... cm

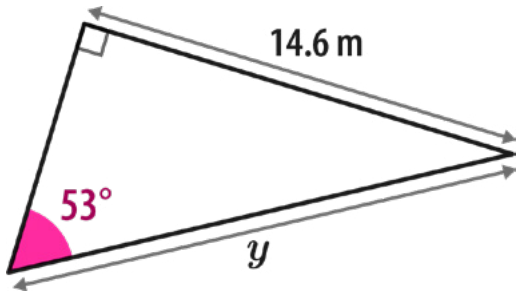
Q3 Calculate the size of angle y.
Give your answer to the nearest integer.



Not drawn accurately

Answer: ..... °

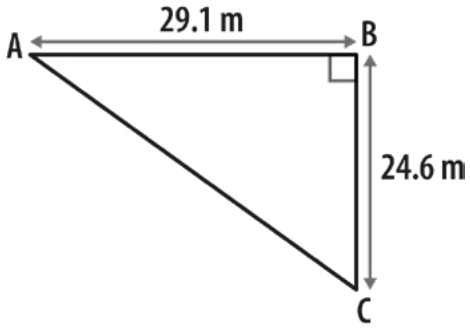
Q1 Calculate the length y.
Give your answer to 2 d.p.



Not drawn accurately

Answer: ..... m

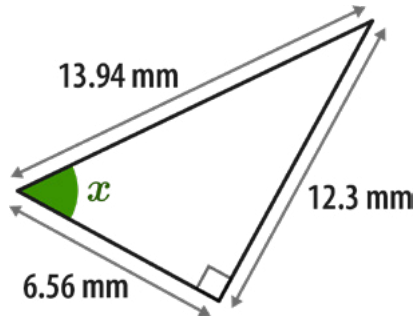
Q2 Calculate the size of angle BAC.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... °

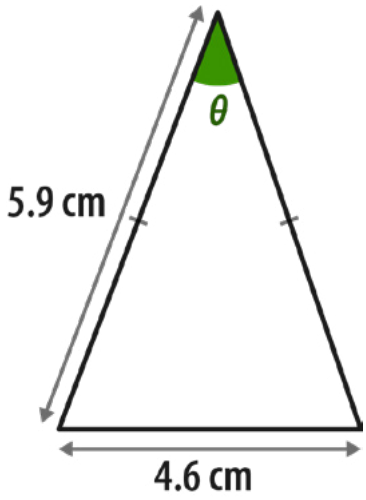
Q3 What is the size of angle x?
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... °

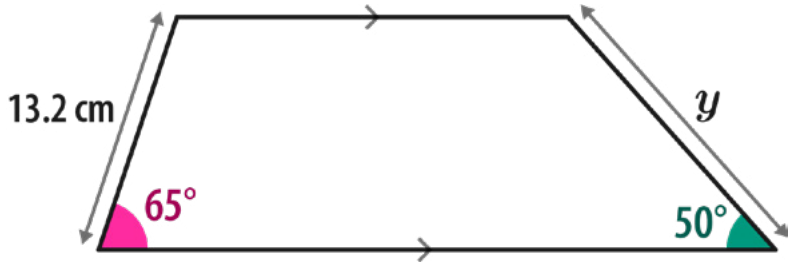
Q1 Calculate the size of angle θ.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... °

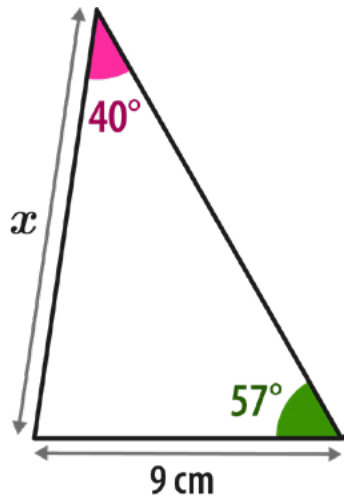
Q2 Work out the length y.
Give your answer to 2 d.p.



Not drawn accurately

Answer: ..... cm

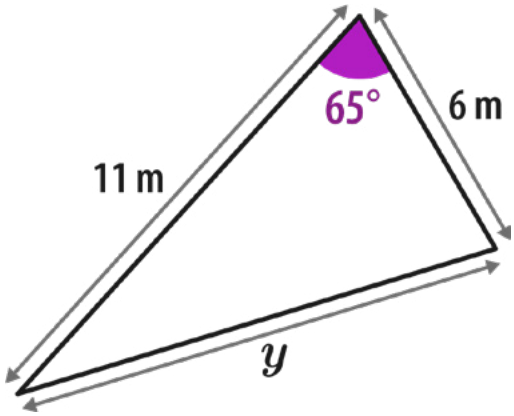
Q1 Using the sine rule, calculate the length x.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... cm

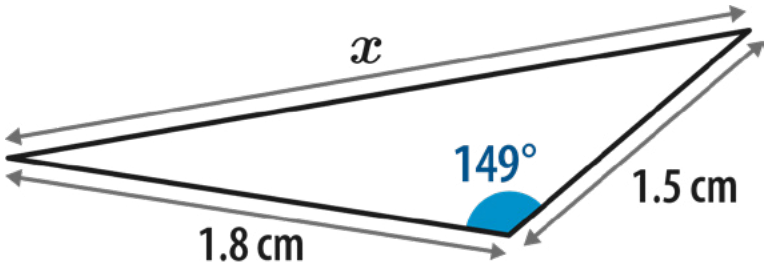
Q2 Using the cosine rule, work out the length y.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... m

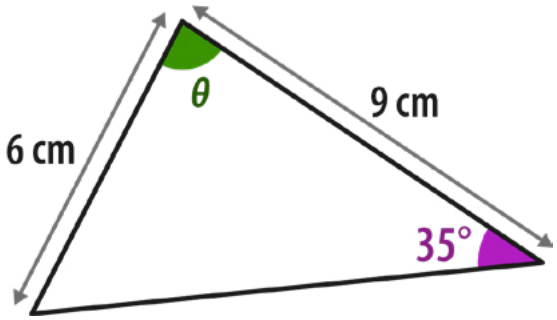
Q1 Work out length x.
Give your answer to 1 d.p.



Not drawn accurately

Answer: ..... cm

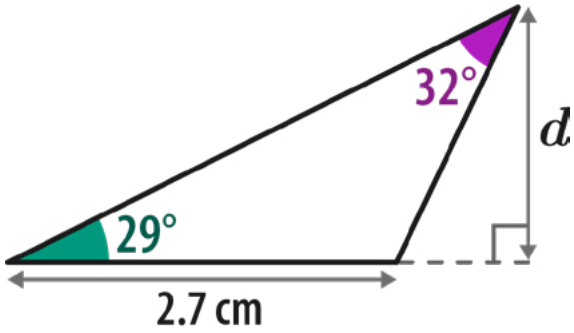
Q2 All the angles in the triangle below are acute.
Calculate the angle θ to 1 d.p.



Not drawn accurately

Answer: ..... °

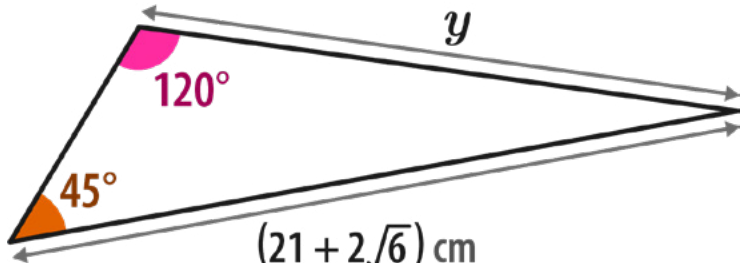
Q1 Calculate the length d.
Give your answer to 2 s.f.



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