

GCSE MATHEMATICS (9-1) — EXAM PRACTICE WORKBOOK

Grade 7 Mathematics — Practice Questions

(Higher Tier)

Higher Tier Exam Practice, Calculator Tags, 2 Mixed Review Papers & Full Answer Key

- 6 Edexcel Higher Exam-Style Questions per topic with mark allocations
- Calculator & Non-Calculator Badges on every single question
- 2 Interleaved Mixed Review Sets (Paper 1 & Paper 2/3 method selection)
- Structured Working Spaces & Topic-Linked Answer Key Appendix

Student Name: _____

Class / Teacher: _____

Target Grade: _____



SCAN FOR ONLINE PRACTICE & WORKED SOLUTIONS

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Interactive Step-by-Step GCSE Mathematics Mastery

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Click any topic to jump straight there. Complete both Mixed Review Sets before checking the Answer Key Appendix.

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ALGEBRA

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Simplifying Surds

EDEXCEL GCSE EXAM PRACTICE

Total: 11 marks

Simplifying Surds — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(1 mark)

Simplify $9\sqrt{2} - 5\sqrt{2}$

WORKING OUT SPACE

Answer:

Question 2 ☒ Non-Calculator

(2 marks)

Simplify $\sqrt{640}$

WORKING OUT SPACE

Answer:

Question 3 ☒ Non-Calculator

(2 marks)

Simplify $\sqrt{108} - \sqrt{27}$

WORKING OUT SPACE

Answer:

Question 4 ✎ Non-Calculator**(2 marks)**

Simplify $\frac{\sqrt{75}}{\sqrt{3}}$

WORKING OUT SPACE

Answer:**Question 5** ✎ Non-Calculator**(2 marks)**

Simplify $\frac{18\sqrt{60}}{6\sqrt{3}}$

WORKING OUT SPACE

Answer:**Question 6** ✎ Non-Calculator**(2 marks)**

Simplify $\frac{20\sqrt{45}}{4\sqrt{5}}$

WORKING OUT SPACE

Answer:

NUMBER — SURDS

Expanding with Surds

EDEXCEL GCSE EXAM PRACTICE

Total: 13 marks

Expanding with Surds — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(2 marks)

Simplify fully $3\sqrt{2} \times 5\sqrt{6}$

WORKING OUT SPACE

Answer:

Question 2 ☒ Non-Calculator

(2 marks)

Expand and simplify $\sqrt{2}(6 + \sqrt{2})$

WORKING OUT SPACE

Answer:

Question 3 ☒ Non-Calculator

(2 marks)

Expand and simplify $(3 + 7\sqrt{2})^2$

WORKING OUT SPACE

Answer:

Question 4 **Non-Calculator****(2 marks)**Expand and simplify $(2 + \sqrt{2})(4 + \sqrt{2})$

WORKING OUT SPACE

Answer:**Question 5** **Non-Calculator****(3 marks)**Expand and simplify $(5 + 3\sqrt{2})^2 - (3 - 2\sqrt{2})^2$

WORKING OUT SPACE

Answer:**Question 6** **Non-Calculator****(2 marks)**Expand and simplify $(6 + \sqrt{2})(6 - \sqrt{2})$

WORKING OUT SPACE

Answer:

NUMBER — SURDS

Rationalising the Denominator

EDEXCEL GCSE EXAM PRACTICE

Total: 16 marks

Rationalising the Denominator — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(2 marks)

Rationalise the denominator and simplify: $\frac{10}{2\sqrt{5}}$

WORKING OUT SPACE

Answer:

Question 2 ☒ Non-Calculator

(2 marks)

Rationalise the denominator and simplify: $\frac{7}{3 - \sqrt{2}}$

WORKING OUT SPACE

Answer:

Question 3 ☒ Non-Calculator

(3 marks)

Rationalise the denominator and simplify: $\frac{25 - \sqrt{40}}{\sqrt{5}}$

WORKING OUT SPACE

Answer:

Question 4 Non-Calculator**(3 marks)**

Rationalise the denominator and simplify: $\frac{12}{\sqrt{7} - 1}$

WORKING OUT SPACE

Answer:**Question 5** Non-Calculator**(3 marks)**

Show that $\frac{3 + \sqrt{5}}{\sqrt{5} - 1}$ can be written in the form $a + \sqrt{b}$, where a and b are integers.

WORKING & PROOF SPACE

Question 6 Non-Calculator**(3 marks)**

Rationalise the denominator and simplify: $\frac{(2 + 3\sqrt{5})(\sqrt{5} - 6)}{\sqrt{5}}$

WORKING OUT SPACE

Answer:

Calculating with Bounds

EDEXCEL GCSE EXAM PRACTICE

Total: 12 marks

Calculating with Bounds — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 **Calculator****(2 marks)**

A rectangle has a length of 23cm, to the nearest cm, and a width of 6.7cm, to the nearest mm.

Work out the **lower bound** for the area of the rectangle.

WORKING OUT SPACE

Answer:**Question 2** **Calculator****(2 marks)**

A rectangle has a length of 17cm, to the nearest cm, and a width of 8.0cm, to the nearest mm.

Work out the **upper bound** for the area of the rectangle.

WORKING OUT SPACE

Answer:**Question 3** **Calculator****(2 marks)**

In a right-angled triangle, the hypotenuse $c = 10$ cm (correct to the nearest cm), and one side $a = 6.4$ cm (correct to the nearest mm).

Calculate the **lower bound** for the other side b .

Give your answer to 1 decimal place.

WORKING OUT SPACE

Answer:

Question 4

 Calculator

(2 marks)

$$v = \frac{s}{t}$$

 $s = 6.44$ correct to 2 decimal places. $t = 3.600$ correct to 3 decimal places.Work out the **upper bound** for v .

Give your answer to 3 decimal places.

WORKING OUT SPACE

Answer:

Question 5

 Calculator

(2 marks)

$$p = \frac{F}{A}$$

 $F = 26.00$ correct to 2 decimal places. $A = 5.50$ correct to 3 significant figures.By considering bounds, work out the value of p to a suitable degree of accuracy.

WORKING OUT SPACE

Answer:

Question 6

 Calculator

(2 marks)

$$a = \frac{v - u}{t}$$

 $v = 36.42$ correct to 2 decimal places. $u = 11.21$ correct to 2 decimal places. $t = 7.35$ correct to 2 decimal places.By considering bounds, work out the value of a to a suitable degree of accuracy.

WORKING OUT SPACE

Answer:

Rearranging Harder Formulae

EDEXCEL GCSE EXAM PRACTICE

Total: 18 marks

Rearranging Harder Formulae — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(2 marks)

Make x the subject of the formula: $V = mx + nx$

WORKING OUT SPACE

Answer:

Question 2 ☒ Non-Calculator

(3 marks)

Make x the subject of the formula: $mx + 3 = dx + 11$

WORKING OUT SPACE

Answer:

Question 3 ☒ Non-Calculator

(3 marks)

Make x the subject of the formula: $m(x + 4) = n(x + 2)$

WORKING OUT SPACE

Answer:

Question 4 **Non-Calculator****(3 marks)**

Make x the subject of the formula: $y = \frac{x+5}{x-2}$

WORKING OUT SPACE

Answer:**Question 5** **Non-Calculator****(3 marks)**

Make x the subject of the formula: $y = \frac{4x+3}{5x-2}$

WORKING OUT SPACE

Answer:**Question 6** **Non-Calculator****(4 marks)**

Make x the subject of the formula:

$$y = \sqrt{\frac{9-2x}{3x-4}}$$

WORKING OUT SPACE

Answer:

Factorising Harder Quadratics

EDEXCEL GCSE EXAM PRACTICE

Total: 12 marks

Factorising Harder Quadratics — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(2 marks)

Factorise $2x^2 + 7x + 3$

WORKING OUT SPACE

Answer:

Question 2 ☒ Non-Calculator

(2 marks)

Factorise $3x^2 - 11x + 6$

WORKING OUT SPACE

Answer:

Question 3 ☒ Non-Calculator

(2 marks)

Factorise $2x^2 + 5x - 12$

WORKING OUT SPACE

Answer:

Question 4 **Non-Calculator****(2 marks)**Factorise $3x^2 - 5x - 12$

WORKING OUT SPACE

Answer:

Question 5 **Non-Calculator****(2 marks)**Factorise $6x^2 - 11x + 3$

WORKING OUT SPACE

Answer:

Question 6 **Non-Calculator****(2 marks)**Factorise $4x^2 + 8x - 5$

WORKING OUT SPACE

Answer:

The Quadratic Formula

EDEXCEL GCSE EXAM PRACTICE

Total: 18 marks

The Quadratic Formula — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(2 marks)

Solve $5x^2 + 15x + 10 = 0$.

WORKING OUT SPACE

$x = \dots\dots\dots$ or $x = \dots\dots\dots$

Question 2 ☒ Non-Calculator

(2 marks)

Solve $2x^2 - 5x - 12 = 0$.

WORKING OUT SPACE

$x = \dots\dots\dots$ or $x = \dots\dots\dots$

Question 3 ☒ Non-Calculator

(2 marks)

Solve $12x^2 - 23x + 5 = 0$.

WORKING OUT SPACE

$x = \dots\dots\dots$ or $x = \dots\dots\dots$

Question 4 **Calculator****(4 marks)**

Solve $2x^2 + 9x - 9 = 0$.

Give your answers correct to 2 decimal places.

WORKING OUT SPACE

$x = \dots\dots\dots$ or $x = \dots\dots\dots$

Question 5 **Calculator****(4 marks)**

Solve $2x^2 + 6x - 5 = 0$.

Give your answers correct to 2 decimal places.

WORKING OUT SPACE

$x = \dots\dots\dots$ or $x = \dots\dots\dots$

Question 6 **Calculator****(4 marks)**A rectangle has width x cm and length $(x + 6)$ cm.The area of the rectangle is 12 cm^2 .Form a quadratic equation and solve it to find the width x of the rectangle.

Give your answer correct to 2 decimal places.

WORKING OUT SPACE

$x = \dots\dots\dots \text{ cm}$

Quadratic Sequences

EDEXCEL GCSE EXAM PRACTICE

Total: 18 marks

Quadratic Sequences — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(3 marks)

Find the n th term of the sequence: 0, 6, 14, 24, ...

WORKING OUT SPACE

Answer:

Question 2 ☒ Non-Calculator

(3 marks)

Find the n th term of the sequence: 5, 19, 39, 65, ...

WORKING OUT SPACE

Answer:

Question 3 ☒ Non-Calculator

(3 marks)

Find the n th term of the sequence: 27, 22, 15, 6, ...

WORKING OUT SPACE

Answer:

Question 4 **Non-Calculator****(3 marks)**Find the n th term of the sequence: 5, 16, 35, 62, ...

WORKING OUT SPACE

Answer:**Question 5** **Non-Calculator****(3 marks)**Find the n th term of the sequence: 3, 14, 29, 48, ...

WORKING OUT SPACE

Answer:**Question 6** **Non-Calculator****(3 marks)**Find the n th term of the sequence: 39, 34, 25, 12, ...

WORKING OUT SPACE

Answer:

Functions

EDEXCEL GCSE EXAM PRACTICE

Total: 16 marks

Functions — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(2 marks)

Given that $f(x) = 3x^2 - 4x$ and $g(x) = 2x - 5$, work out the value of $fg(1)$.

WORKING OUT SPACE

Answer:

Question 2 ☒ Non-Calculator

(2 marks)

Given that $f(x) = \frac{4x - 7}{3}$, find an expression for $f^{-1}(x)$.

WORKING OUT SPACE

 $f^{-1}(x) = \dots\dots\dots$ **Question 3** ☒ Non-Calculator

(3 marks)

Given that $f(x) = 2x^2 - 3x + 1$ and $g(x) = 3x - 2$, find and simplify an expression for $fg(x)$.

WORKING OUT SPACE

Answer:

Question 4 Non-Calculator**(3 marks)**

The functions f and g are defined such that $f(x) = x^2 + 2$ and $g(x) = 2x - 3$.
Solve the equation $fg(x) = gf(x)$.

WORKING OUT SPACE

 $x = \dots\dots\dots$ or $x = \dots\dots\dots$ **Question 5** Non-Calculator**(3 marks)**

The functions f and g are defined such that $f(x) = \frac{5x+7}{x-1}$ and $g(x) = 2x - 1$.
Solve the equation $fg(x) = 7$.

WORKING OUT SPACE

Answer: $\dots\dots\dots$ **Question 6** Non-Calculator**(3 marks)**

Given that $f(x) = \frac{3x+5}{x-4}$, find an expression for $f^{-1}(x)$.

WORKING OUT SPACE

 $f^{-1}(x) = \dots\dots\dots$

Trig & Exponential Graphs

EDEXCEL GCSE EXAM PRACTICE

Total: 15 marks

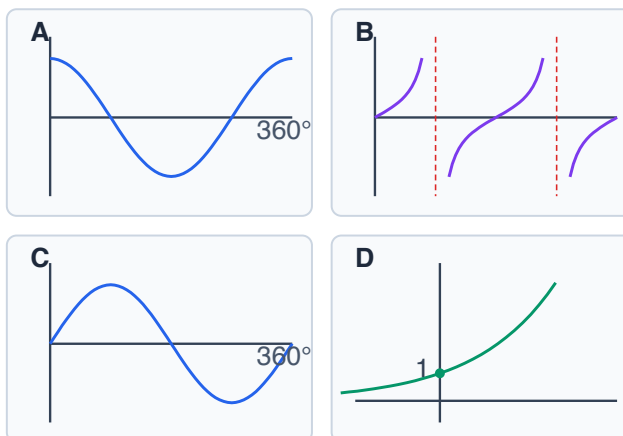
Trig & Exponential Graphs — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 Non-Calculator

(2 marks)

Four graphs labeled A , B , C , and D are shown below for $0^\circ \leq x \leq 360^\circ$ (or real x).



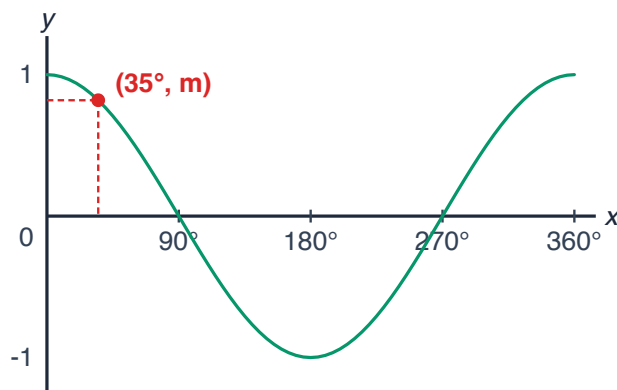
Match the equations $y = \sin x^\circ$, $y = \cos x^\circ$, $y = \tan x^\circ$, and $y = 2^x$ to the letters A , B , C , D in that order.

WORKING OUT SPACE

$y = \sin x^\circ$: $y = \cos x^\circ$: $y = \tan x^\circ$: $y = 2^x$:

Question 2 ✎ Non-Calculator**(2 marks)**

Here is a sketch of the curve $y = \cos x^\circ$ for $0 \leq x \leq 360$.



Given that $\cos 35^\circ = m$, write down in terms of m :

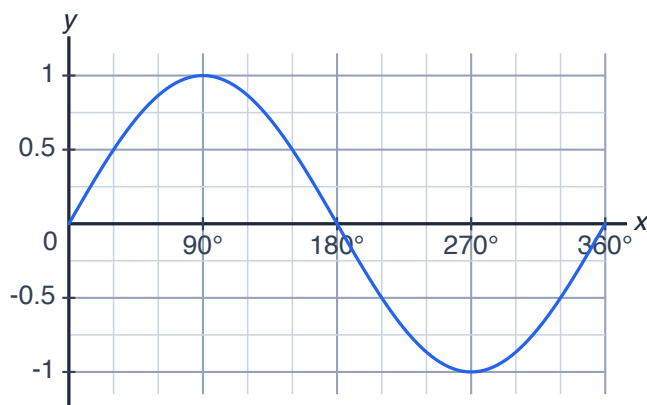
- (a) the value of $\cos 145^\circ$
 (b) the value of $\cos 325^\circ$

WORKING OUT SPACE

(a) (b)

Question 3 ✎ Non-Calculator**(2 marks)**

Here is the graph of $y = \sin x^\circ$ for $0 \leq x \leq 360$.



Use the graph to find the two solutions to $\sin x^\circ = -0.5$ in the interval $0 \leq x \leq 360$.

WORKING OUT SPACE

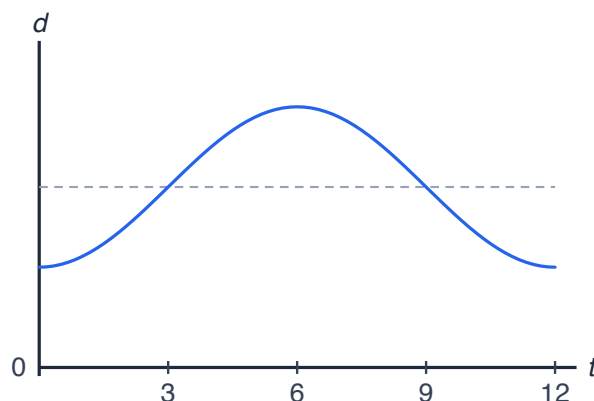
 $x = \dots^\circ$ and $x = \dots^\circ$

Question 4 **Non-Calculator****(3 marks)**

The depth of water, d metres, at the entrance to a harbour is modelled by

$$d = 9 - 4 \cos(30t)^\circ$$

where t is the number of hours after midnight for $0 \leq t \leq 12$.



Find:

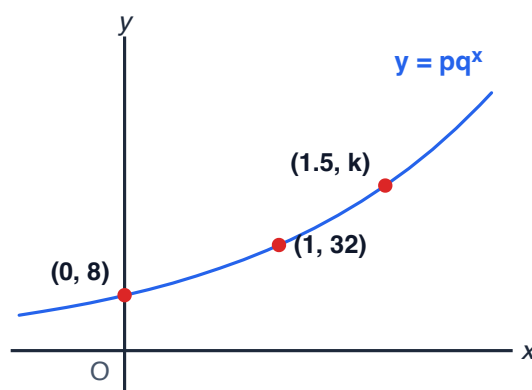
- the maximum depth of water in the harbour (in metres),
- the value of t when this maximum depth occurs.

WORKING OUT SPACE

(a) m (b) $t =$

Question 5 **Non-Calculator****(3 marks)**

The diagram shows a sketch of the curve $y = pq^x$, where p and q are positive constants. The curve passes through the points $(0, 8)$, $(1, 32)$, and $(1.5, k)$.



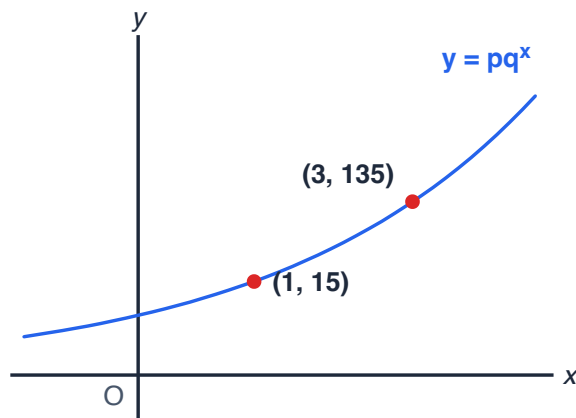
Work out the value of k .

WORKING OUT SPACE

$k =$

Question 6 **Non-Calculator****(3 marks)**

A curve has equation $y = pq^x$, where p and q are positive constants.
The curve passes through the points $(1, 15)$ and $(3, 135)$.



Find the value of p and the value of q .

WORKING OUT SPACE

$p = \dots\dots\dots$ $q = \dots\dots\dots$

Algebraic Fractions

EDEXCEL GCSE EXAM PRACTICE

Total: 14 marks

Algebraic Fractions — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator

(2 marks)

Simplify fully $\frac{3x^2 - 9x - 12}{x^2 - 6x + 8}$

WORKING OUT SPACE

Answer:

Question 2 ☒ Non-Calculator

(2 marks)

Write as a single fraction: $\frac{6}{x+5} - \frac{3}{x+4}$

WORKING OUT SPACE

Answer:

Question 3 ☒ Non-Calculator

(2 marks)

Write as a single fraction: $\frac{3}{x+3} + \frac{5}{x-2}$

WORKING OUT SPACE

Answer:

Question 4 **Non-Calculator****(2 marks)**

Simplify fully $\frac{4x}{x+4} \div \frac{x^2+2x}{x^2+7x+12}$

WORKING OUT SPACE

Answer:

Question 5 **Calculator****(3 marks)**

Solve $\frac{6}{x-3} - \frac{4}{2x+5} = 3$

WORKING OUT SPACE

 $x = \dots\dots\dots$ or $x = \dots\dots\dots$ **Question 6** **Non-Calculator****(3 marks)**

Solve $\frac{7}{x+2} + \frac{4}{3x-5} = 2$

WORKING OUT SPACE

 $x = \dots\dots\dots$ or $x = \dots\dots\dots$

Algebraic Proportion

EDEXCEL GCSE EXAM PRACTICE**Total: 14 marks**

Algebraic Proportion — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 ☒ Non-Calculator**(2 marks)**

c is directly proportional to q .

When $c = 84$, $q = 12$.

Find the value of c when $q = 3$.

WORKING OUT SPACE

Answer:**Question 2** ☒ Non-Calculator**(2 marks)**

p is inversely proportional to q .

When $p = 9$, $q = 4$.

Find the value of p when $q = 3$.

WORKING OUT SPACE

Answer:

Question 3 Non-Calculator**(2 marks)** y is inversely proportional to the square of x .When $y = 9$, $x = 4$.Find the value of y when $x = 3$.

WORKING OUT SPACE

Answer:

Question 4 Non-Calculator**(2 marks)**The table shows pairs of values for x and y .

x	4	5
y	80	125

(i) Is $y \propto x$, $y \propto x^2$, or $y \propto x^3$?(ii) Write a formula for y in terms of x .

WORKING OUT SPACE

(i) (ii) $y =$ **Question 5** Non-Calculator**(3 marks)** p is inversely proportional to the square root of q .When $p = 6$, $q = 16$.Find the value of q when $p = 3$.

WORKING OUT SPACE

Answer:

Question 6 **Non-Calculator****(3 marks)**

y is directly proportional to the cube of x .

When $x = 2$, $y = 40$.

Find the value of x when $y = 135$.

WORKING OUT SPACE

Answer:

Similar Shapes: Area, Volume & Frustums

EDEXCEL GCSE EXAM PRACTICE**Total: 19 marks**

Similar Shapes: Area, Volume & Frustums — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

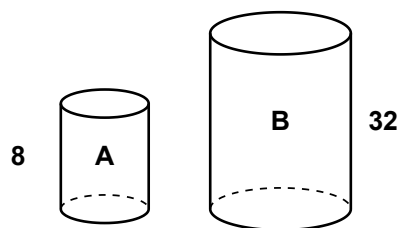
Question 1 **Calculator****(3 marks)**

Two solid shapes, A and B, are mathematically similar.

The length of shape A is 8 cm and the length of shape B is 32 cm.

The volume of shape A is 440 cm^3 .

Work out the volume of shape B.

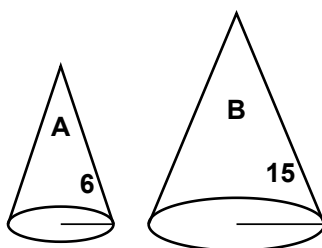


WORKING OUT SPACE

Answer:

Question 2 **Calculator****(3 marks)**

Two solid shapes, A and B, are mathematically similar.
The radius of A is 6 cm and the radius of B is 15 cm.
The surface area of shape A is 290 cm^2 .
Work out the surface area of shape B.

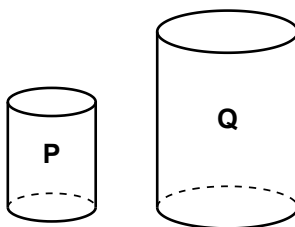


WORKING OUT SPACE

Answer:

Question 3 **Non-Calculator****(3 marks)**

Two solid shapes, P and Q, are mathematically similar.
The volume of shape P is 50 cm^3 .
The volume of shape Q is 400 cm^3 .
The length of shape P is 6 cm.
Work out the length of shape Q.



WORKING OUT SPACE

Answer:

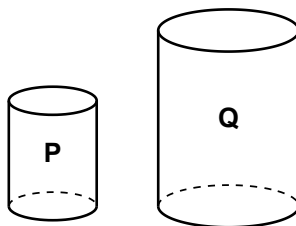
Question 4 ✎ Non-Calculator**(3 marks)**

Two solid shapes, P and Q, are mathematically similar.

The volume of shape P is 24 cm^3 and the volume of shape Q is 192 cm^3 .

The total surface area of shape P is 30 cm^2 .

Work out the total surface area of shape Q.



WORKING OUT SPACE

Answer:

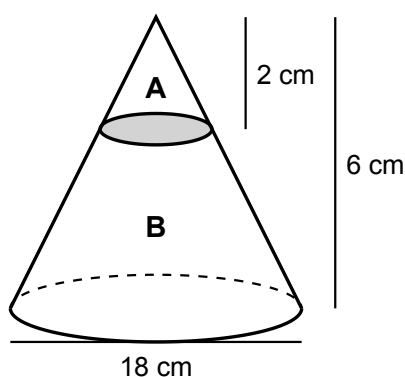
Question 5 ✎ Non-Calculator**(4 marks)**

The diagram represents a large cone of height 6 cm and base diameter 18 cm.

The large cone is made by placing a small cone A of height 2 cm on top of a frustum B.

Calculate the volume of the frustum B.

Give your answer in terms of π . (*Volume of a cone* $= \frac{1}{3}\pi r^2 h$)



WORKING OUT SPACE

Answer:

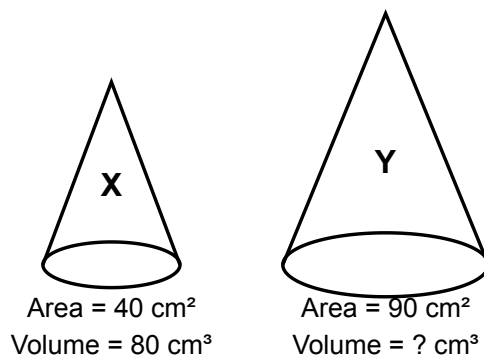
Question 6 **Non-Calculator****(3 marks)**

Two solid shapes, X and Y, are mathematically similar.

The total surface area of shape X is 40 cm^2 and the total surface area of shape Y is 90 cm^2 .

The volume of shape X is 80 cm^3 .

Work out the volume of shape Y.

**WORKING OUT SPACE****Answer:**

3D Pythagoras & Trig

EDEXCEL GCSE EXAM PRACTICE**Total: 20 marks**

3D Pythagoras & Trig — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 **Calculator****(3 marks)**

The diagram shows a cuboid ABCDEFGH.

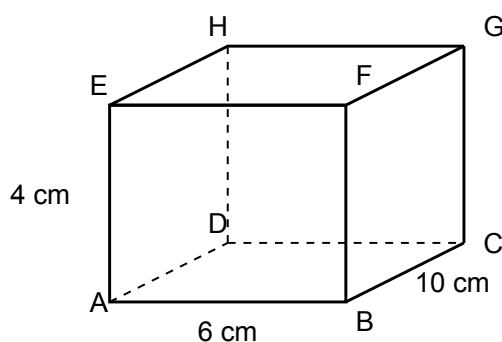
$AB = 6 \text{ cm}$

$BC = 10 \text{ cm}$

$AE = 4 \text{ cm}$

Calculate the length of AG.

Give your answer correct to 1 decimal place if it is a decimal.



WORKING OUT SPACE

Answer:

Question 2 **Calculator****(3 marks)**

The diagram shows a cuboid ABCDEFGH.

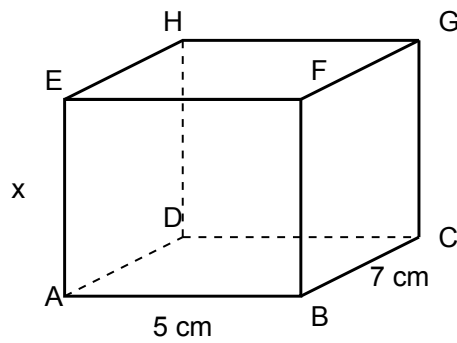
$AB = 5 \text{ cm}$

$BC = 7 \text{ cm}$

$AG = 10 \text{ cm}$

Calculate the length of AE (x).

Give your answer correct to 1 decimal place.



WORKING OUT SPACE

Answer:

Question 3 **Calculator****(3 marks)**

The diagram shows a cuboid ABCDEFGH.

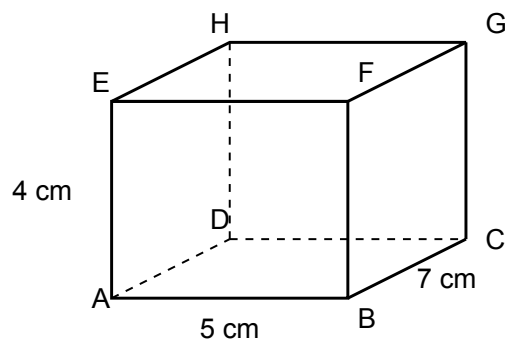
$AB = 5 \text{ cm}$

$BC = 7 \text{ cm}$

$AE = 4 \text{ cm}$

Calculate the size of angle ECA.

Give your answer correct to 1 decimal place.



WORKING OUT SPACE

Answer:

Question 4 **Calculator****(3 marks)**

The diagram shows a cuboid ABCDEFGH.

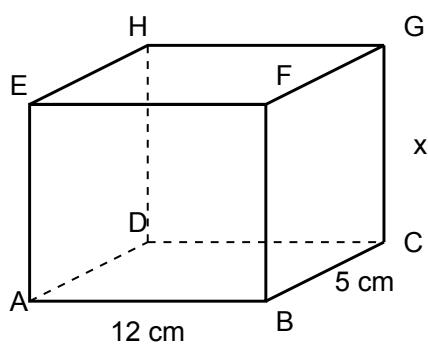
$AB = 12\text{ cm}$

$BC = 5\text{ cm}$

Angle $GAC = 32^\circ$

Calculate the vertical height CG (x) of the cuboid.

Give your answer correct to 1 decimal place.



WORKING OUT SPACE

Answer:

Question 5 **Calculator****(4 marks)**

The diagram shows a triangular prism.

The base ABCD is a rectangle.

$AD = 30$ cm

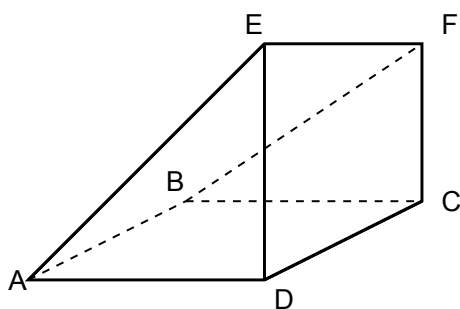
$CD = 22$ cm

Angle $FDC = 44^\circ$

Triangle FDC is right-angled at C.

Calculate the size of the angle the line AF makes with the plane ABCD.

Give your answer correct to 1 decimal place.



WORKING OUT SPACE

Answer:

Question 6**Calculator****(4 marks)**

The diagram shows a pyramid.

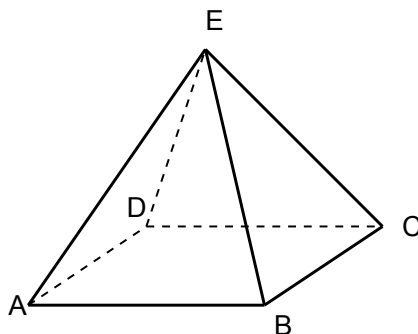
The base ABCD is a square.

$AB = 11$ cm

Angle $EAC = 71^\circ$ (where E is the peak directly above the center of the base).

Calculate the volume of the pyramid.

Give your answer correct to 1 decimal place.



WORKING OUT SPACE

Answer:

The Sine Rule

EDEXCEL GCSE EXAM PRACTICE**Total: 21 marks**

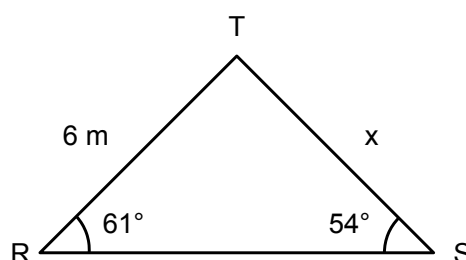
The Sine Rule — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 **Calculator****(3 marks)**

Work out the value of x .

Give your answer to 1 decimal place.

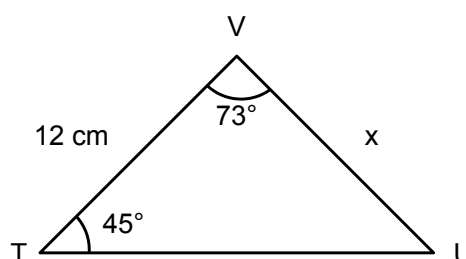


WORKING OUT SPACE

Answer:**Question 2** **Calculator****(3 marks)**

Work out the value of x .

Give your answer to 1 decimal place.

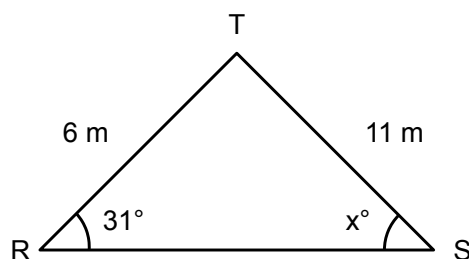


WORKING OUT SPACE

Answer:

Question 3 **Calculator****(3 marks)**Work out the size of angle x .

Give your answer to 1 decimal place.

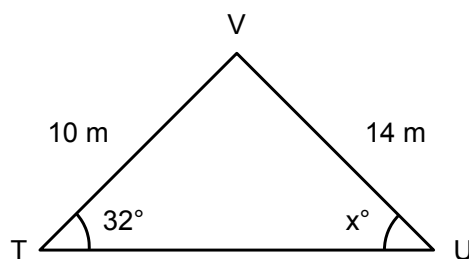


WORKING OUT SPACE

Answer:

Question 4 **Calculator****(3 marks)**Work out the size of angle x .

Give your answer to 1 decimal place.

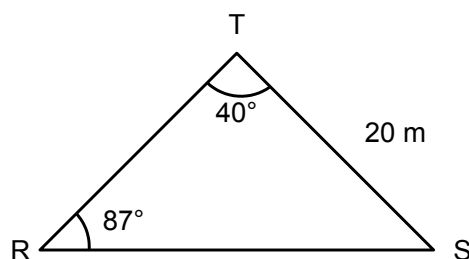


WORKING OUT SPACE

Answer:

Question 5 **Calculator****(5 marks)**

Work out the area of triangle RST .
Give your answer to 1 decimal place.

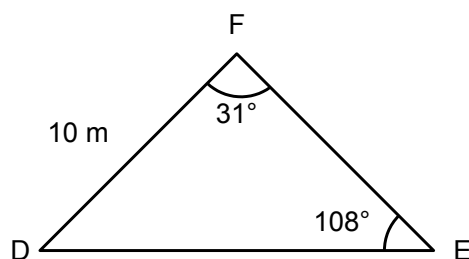


WORKING OUT SPACE

Answer:

Question 6 **Calculator****(4 marks)**

Work out the perimeter of triangle DEF .
Give your answer to 1 decimal place.



WORKING OUT SPACE

Answer:

The Cosine Rule

EDEXCEL GCSE EXAM PRACTICE**Total: 20 marks**

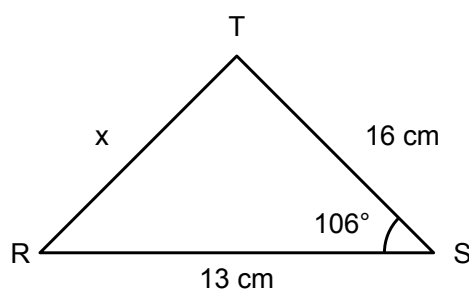
The Cosine Rule — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 **Calculator****(3 marks)**

Work out the value of x .

Give your answer to 1 decimal place.

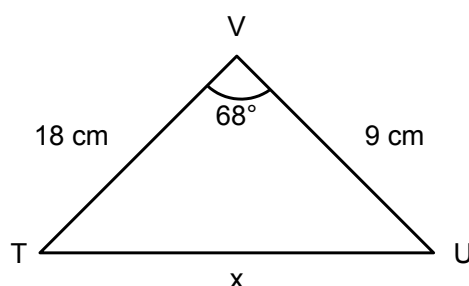


WORKING OUT SPACE

Answer:**Question 2** **Calculator****(3 marks)**

Work out the value of x .

Give your answer to 1 decimal place.

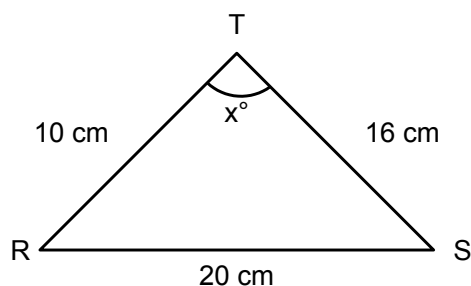


WORKING OUT SPACE

Answer:

Question 3 **Calculator****(3 marks)**Work out the size of angle x .

Give your answer to 1 decimal place.

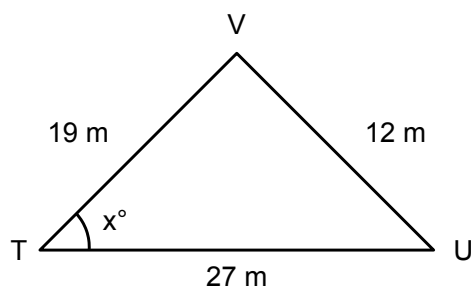


WORKING OUT SPACE

Answer:

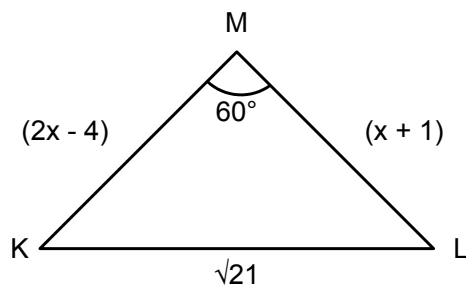
Question 4 **Calculator****(3 marks)**Work out the size of angle x .

Give your answer to 1 decimal place.



WORKING OUT SPACE

Answer:

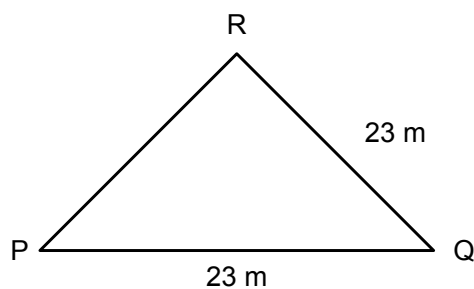
Question 5 **Non-Calculator****(4 marks)**Work out the value of x .

WORKING OUT SPACE

Answer:

Question 6 **Calculator****(4 marks)**

The area of the triangle is 193 m^2 .
Calculate the perimeter of the triangle.
Give your answer to 1 decimal place.



WORKING OUT SPACE

Answer:

Area of Any Triangle

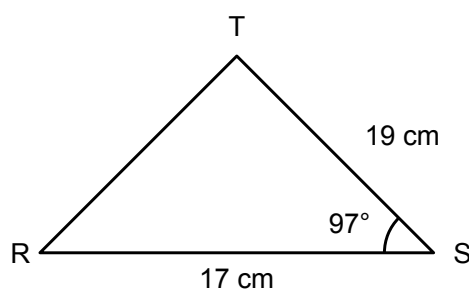
EDEXCEL GCSE EXAM PRACTICE**Total: 19 marks**

Area of Any Triangle — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 **Calculator****(2 marks)**

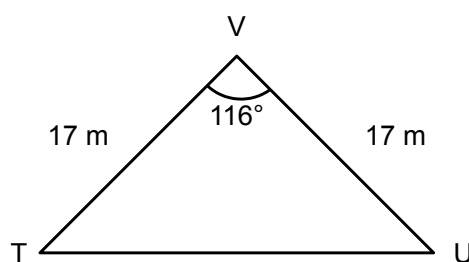
Work out the area of the triangle.
Give your answer to 1 decimal place.



WORKING OUT SPACE

Answer:**Question 2** **Calculator****(2 marks)**

Work out the area of the triangle.
Give your answer to 1 decimal place.



WORKING OUT SPACE

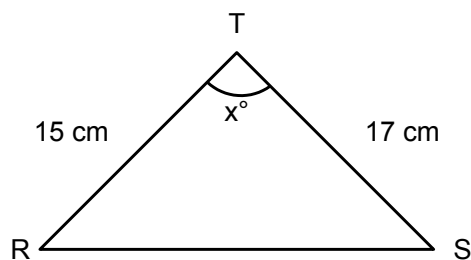
Answer:

Question 3 **Calculator****(3 marks)**

The area of the triangle is 84 cm^2 .

Work out the value of x .

Give your answer to 1 decimal place.



WORKING OUT SPACE

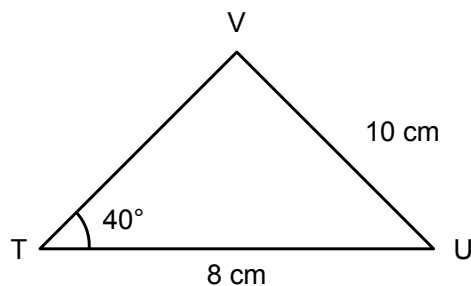
Answer:

Question 4 **Calculator****(4 marks)**

The diagram shows triangle TUV .

Work out the area of triangle TUV .

Give your answer to 1 decimal place.



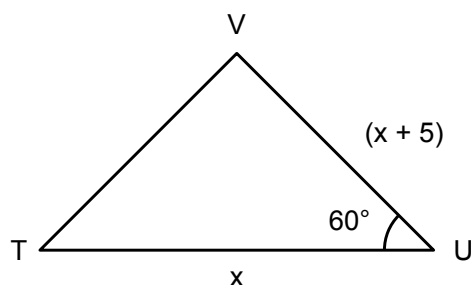
WORKING OUT SPACE

Answer:

Question 5 **Non-Calculator****(4 marks)**

The area of the triangle is $\frac{50\sqrt{3}}{4} \text{ cm}^2$.

Work out the value of x .



WORKING OUT SPACE

Answer:

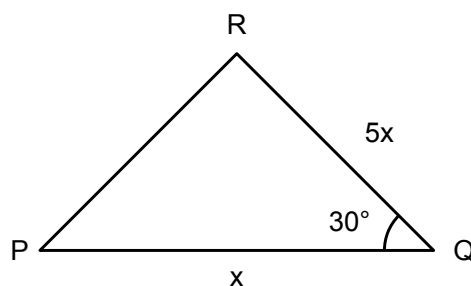
Question 6 **Non-Calculator****(4 marks)**

The ratio of the lengths of two sides of the triangle is 5:1.

The angle between them is 30° .

The area of the triangle is 125 cm^2 .

Work out the length of the shorter side, x .



WORKING OUT SPACE

Answer:

Conditional Probability

EDEXCEL GCSE EXAM PRACTICE

Total: 19 marks

Conditional Probability — Practice Questions

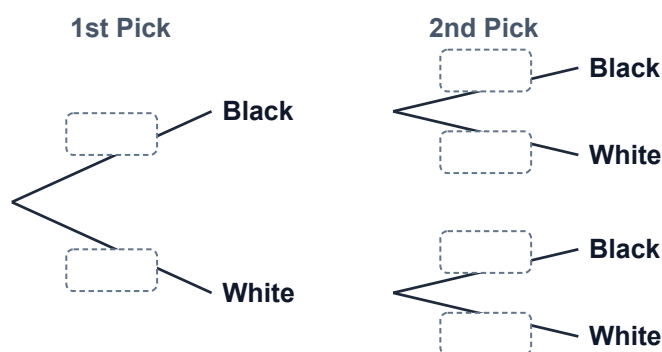
Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

Question 1 Non-Calculator

(2 marks)

A bag contains 5 Black counters and 5 White counters. Two counters are taken at random **without replacement**.

Complete the probability tree diagram and find the probability of picking Black both times.



WORKING OUT SPACE

Answer:

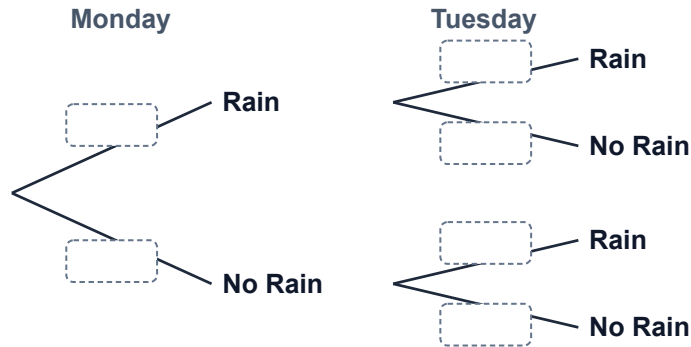
Question 2 **Non-Calculator****(3 marks)**

The probability that it rains on Monday is 0.2.

If it rains on Monday, the probability that it rains on Tuesday is 0.65.

If it does not rain on Monday, the probability that it rains on Tuesday is 0.15.

Complete the probability tree diagram and work out the probability that it rains on **exactly one** of the two days.



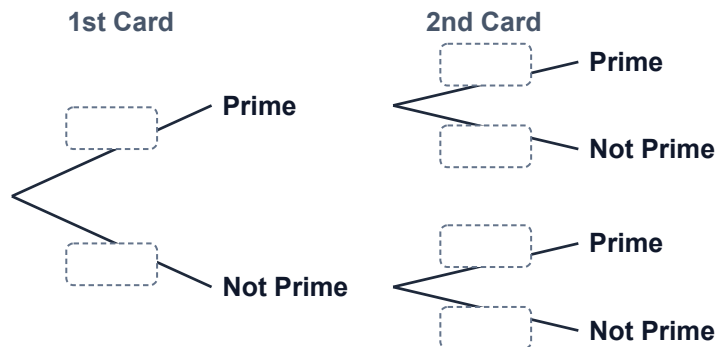
WORKING OUT SPACE

Answer:

Question 3 **Non-Calculator****(3 marks)**

A set of 8 cards has the numbers 1, 2, 3, 4, 5, 6, 7, 8. Two cards are drawn at random **without replacement**.

Complete the probability tree diagram and work out the probability that **at least one** of the cards drawn is a prime number.



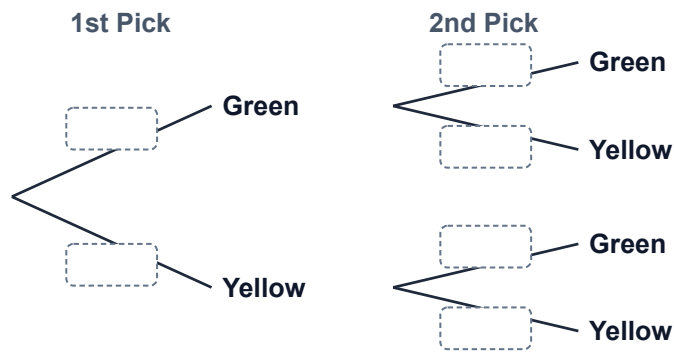
WORKING OUT SPACE

Answer:

Question 4 **Calculator****(3 marks)**

A bag contains 7 Green counters and 5 Yellow counters. Two counters are taken at random from the bag **without replacement**.

Complete the probability tree diagram and work out the probability that the two counters taken are of **different** colours.



WORKING OUT SPACE

Answer:

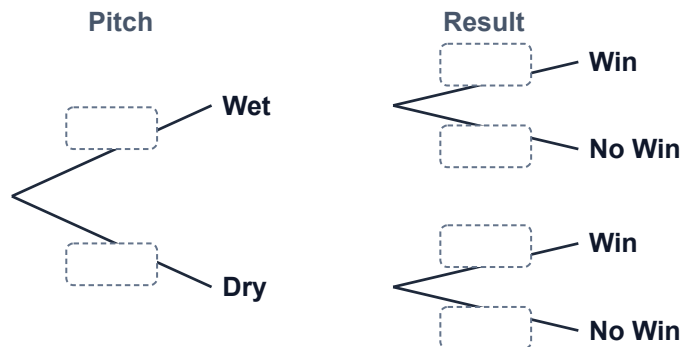
Question 5 **Non-Calculator****(4 marks)**

The probability that a rugby team plays on a wet pitch is 0.3.

When the pitch is wet, the probability that the team wins is 0.6.

When the pitch is dry, the probability that the team wins is 0.8.

(a) Complete the probability tree diagram.



(b) Work out the overall probability that the team wins the match.

WORKING OUT SPACE

(b)

Question 6**Calculator****(4 marks)**

A bag contains 4 Red counters, 5 Blue counters, and 3 Green counters.

Two counters are taken at random from the bag **without replacement**.

Work out the probability that both counters taken are the **same** colour. Give your answer as a fraction in its simplest form.

WORKING OUT SPACE

Answer:

Histograms

EDEXCEL GCSE EXAM PRACTICE

Total: 23 marks

Histograms — Practice Questions

Check the Calculator or Non-Calculator label on each question before you start. Show your working clearly in the box.

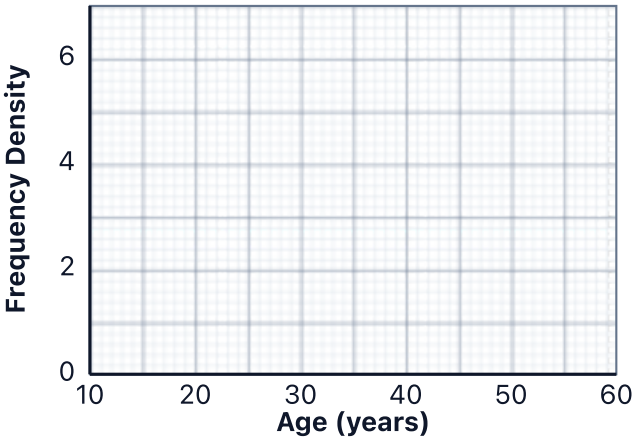
Question 1

Non-Calculator

(3 marks)

The table shows information about the ages of 90 members at a tennis club.

Age, a (years)	Frequency
$10 < a \leq 20$	14
$20 < a \leq 25$	18
$25 < a \leq 30$	22
$30 < a \leq 45$	24
$45 < a \leq 60$	12



On the grid, draw a histogram for the information in the table, and state the **frequency density** for the interval $25 < a \leq 30$.

WORKING OUT SPACE

Frequency density =

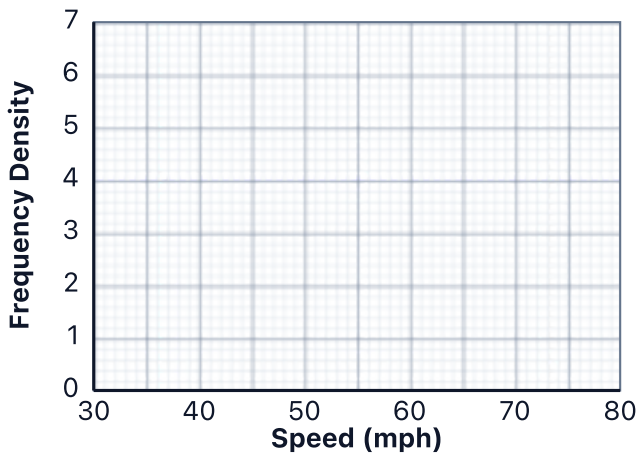
Question 2

Calculator

(4 marks)

The table shows information about the speed, in mph, of some vans passing a speed camera.

Speed, s (mph)	Frequency
$30 < s \leq 45$	9
$45 < s \leq 50$	14
$50 < s \leq 55$	32
$55 < s \leq 65$	36
$65 < s \leq 80$	9



- (a) On the grid, draw a histogram for the information in the table.
- (b) Work out an estimate for the number of vans travelling at over 60 mph.

WORKING OUT SPACE

(b)

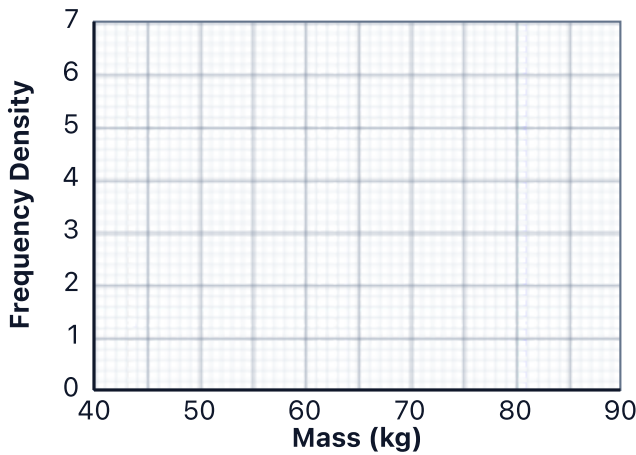
Question 3

Calculator

(4 marks)

The table shows information about the mass, in kg, of 80 sheep on a farm.

Mass, m (kg)	Frequency
$40 < m \leq 55$	12
$55 < m \leq 65$	20
$65 < m \leq 70$	32
$70 < m \leq 90$	16



- (a) On the grid, draw a histogram for the information in the table.
- (b) Find an estimate for the median mass.

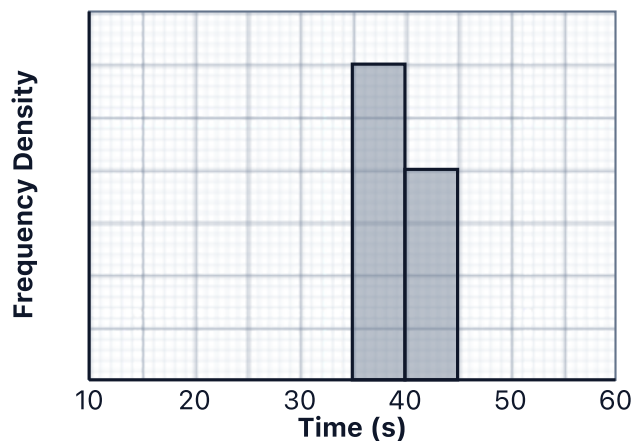
WORKING OUT SPACE

(b) kg

Question 4 **Non-Calculator****(4 marks)**

The table and histogram show information about the time, in seconds, taken by some students to solve a logic puzzle.

Time, t (s)	Frequency
$10 < t \leq 25$	18
$25 < t \leq 35$	34
$35 < t \leq 40$	30
$40 < t \leq 45$	
$45 < t \leq 60$	12



(a) Use the information in the table to complete the histogram.

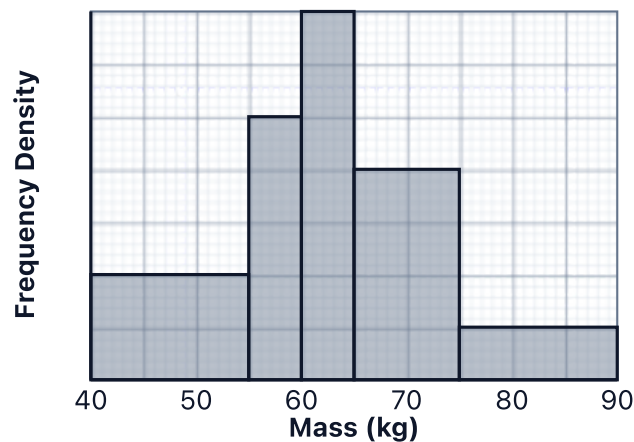
(b) Use the histogram to find the missing frequency for the interval $40 < t \leq 45$ to complete the table.

WORKING OUT SPACE

(b) Missing frequency =

Question 5 **Non-Calculator****(4 marks)**

The histogram shows information about the mass, in kg, of some calves on a farm.



30 calves have a mass between 40 kg and 55 kg.

(a) Work out an estimate for the number of calves with a mass greater than 70 kg.

(b) Explain why your answer to part (a) is only an estimate.

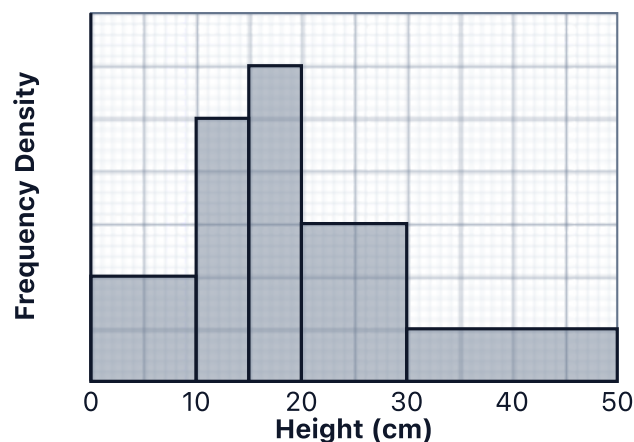
WORKING OUT SPACE

(a)

(b) Reason:

Question 6 **Non-Calculator****(4 marks)**

The histogram shows information about the height, in cm, of some seedlings in a greenhouse.



(a) Work out an estimate for the proportion of seedlings that are over 25 cm tall.

(b) Explain why your answer to part (a) is only an estimate.

WORKING OUT SPACE

(a)

(b) Reason:

Mixed Review 1 — Choosing the Right Method (Non-Calculator)**Total: 45 marks**

These 15 unseen Grade 7 questions are mixed across topics with no topic headings — just like a real Edexcel Paper 1 exam. Identify the underlying method first, set out full algebraic or geometric working, and give exact simplified answers.

Question 1 **Non-Calculator****(2 marks)**

Simplify fully:

$$\sqrt{75} + \frac{12\sqrt{24}}{3\sqrt{2}}$$

Give your answer in the form $k\sqrt{3}$, where k is an integer.

WORKING OUT SPACE

Answer:**Question 2** **Non-Calculator****(2 marks)**

Factorise fully:

$$6x^2 + 7x - 20$$

WORKING OUT SPACE

Answer:

Question 3 **Non-Calculator****(3 marks)**

Here are the first five terms of a quadratic sequence:

$$2, \quad 12, \quad 28, \quad 50, \quad 78$$

Find an expression, in terms of n , for the n th term of this sequence.

WORKING OUT SPACE

Answer:

Question 4 **Non-Calculator****(3 marks)**

y is inversely proportional to the square of x . When $x = 2$, $y = 9$.

Find the positive value of x when $y = 4$.

WORKING OUT SPACE

Answer:

Question 5 **Non-Calculator****(3 marks)**

Expand and simplify fully:

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

WORKING OUT SPACE

Answer:

Question 6 **Non-Calculator****(3 marks)**

A bag contains 5 red counters and 4 blue counters. Two counters are taken at random from the bag without replacement.

Work out the probability that the two counters taken are of different colours. Give your answer as a fraction in its simplest form.

WORKING OUT SPACE

Answer:

Question 7 **Non-Calculator****(3 marks)**

Make x the subject of the formula:

$$y = \frac{3x - 8}{x + 2}$$

WORKING OUT SPACE

Answer:

Question 8 **Non-Calculator****(3 marks)**

Two solid cones, A and B , are mathematically similar. The total surface area of cone A is 36 cm^2 and the total surface area of cone B is 100 cm^2 .

The volume of cone A is 54 cm^3 . Work out the volume of cone B in cm^3 .

WORKING OUT SPACE

Answer:

Question 9 ✎ Non-Calculator**(3 marks)**

Rationalise the denominator and simplify fully:

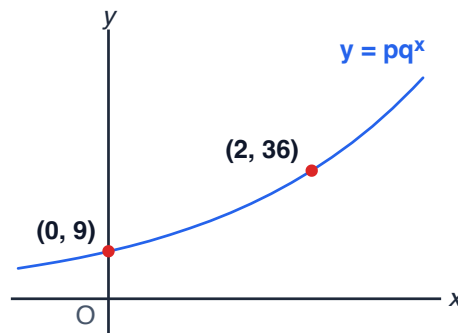
$$\frac{14}{3 - \sqrt{2}}$$

WORKING OUT SPACE

Answer:

Question 10 ✎ Non-Calculator**(3 marks)**

The diagram shows a sketch of the exponential curve $y = pq^x$, where p and q are positive constants. The curve passes through $(0, 9)$ and $(2, 36)$.



(a) Find the value of p and the value of q . (b) Find the value of y when $x = 3$.

WORKING OUT SPACE

(a) $p =$ $q =$ (b) $y =$

Question 11 Non-Calculator**(3 marks)**

The functions f and g are defined such that $f(x) = 2x - 5$ and $g(x) = x^2 + 4$.
Solve the equation $gf(x) = 29$.

WORKING OUT SPACE

 $x = \dots\dots\dots$ or $x = \dots\dots\dots$ **Question 12** Non-Calculator**(3 marks)**

A cuboid $ABCDEFGH$ has base length $AB = 6$ cm, base width $BC = 8$ cm, and space diagonal $AG = 26$ cm.

Work out the vertical height AE of the cuboid in cm.

WORKING OUT SPACE

Answer: $\dots\dots\dots$ **Question 13** Non-Calculator**(3 marks)**

Simplify fully:

$$\frac{2x^2 + 5x - 3}{x^2 - 9} \div \frac{4x - 2}{x^2 + 2x - 15}$$

WORKING OUT SPACE

Answer: $\dots\dots\dots$

Question 14 **Non-Calculator****(4 marks)**

In triangle PQR , $PQ = x$ cm, $PR = (x + 4)$ cm, and angle $QPR = 30^\circ$.

The area of triangle PQR is 8 cm^2 . Form and solve a quadratic equation to find the value of x .

WORKING OUT SPACE

Answer:**Question 15** **Non-Calculator****(4 marks)**

The table shows information about the time, t minutes, spent exercising by 100 students.

Time, t (minutes)	$0 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 40$	$40 < t \leq 60$
Frequency	16	24	36	24

(a) Calculate the frequency density for each of the four intervals.

(b) Work out an estimate for the fraction of the students who exercised for between 25 minutes and 50 minutes. Give your fraction in its simplest form.

WORKING OUT SPACE

(a) FDs: **(b)**

Mixed Review 2 — Choosing the Right Method (Calculator)**Total: 52 marks**

These 15 unseen Grade 7 questions are interleaved across topics to test method selection under Paper 2/3 conditions. Write down every formula, substitution, or bound clearly before rounding your final answer.

Question 1 **Calculator****(3 marks)**

$d = \frac{m}{v}$, where $m = 45.6$ correct to 1 decimal place and $v = 8.20$ correct to 2 decimal places.

Work out the upper bound for d . Give your answer correct to 2 decimal places.

WORKING OUT SPACE

Answer:**Question 2** **Calculator****(3 marks)**

Solve $3x^2 - 8x - 5 = 0$. Give your answers correct to 2 decimal places.

WORKING OUT SPACE

 $x = \dots\dots\dots$ or $x = \dots\dots\dots$ **Question 3** **Calculator****(3 marks)**

In triangle ABC , $BC = 11$ cm, $AC = 15$ cm, and angle $BAC = 38^\circ$. Angle ABC is acute. Work out the size of angle ABC . Give your answer correct to 1 decimal place.

WORKING OUT SPACE

Answer:

Question 4 **Calculator****(3 marks)**

P is directly proportional to the cube root of Q . When $Q = 64$, $P = 28$.

(a) Find a formula for P in terms of Q . (b) Work out the value of Q when $P = 35$.

WORKING OUT SPACE

(a) $P = \dots\dots\dots$ (b) $Q = \dots\dots\dots$

Question 5 **Calculator****(3 marks)**

In triangle PQR , $PQ = 14$ cm, $PR = 19$ cm, and angle $QPR = 104^\circ$.

Calculate the length of QR . Give your answer correct to 1 decimal place.

WORKING OUT SPACE

Answer: $\dots\dots\dots$

Question 6 **Calculator****(3 marks)**

Solve $\cos x^\circ = 0.35$ for $0 \leq x \leq 360$. Give both of your answers correct to 1 decimal place.

WORKING OUT SPACE

$x = \dots\dots\dots^\circ$ and $x = \dots\dots\dots^\circ$

Question 7 **Calculator****(3 marks)**

The function f is defined by $f(x) = \frac{5x - 2}{x + 3}$ for $x \neq -3$.

Find an expression for the inverse function $f^{-1}(x)$.

WORKING OUT SPACE

$$f^{-1}(x) = \dots\dots\dots$$

Question 8 **Calculator****(4 marks)**

A frustum is made by removing a small cone of height 4 cm from the top of a mathematically similar large cone of height 12 cm and base radius 9 cm.

Calculate the volume of the frustum. Give your answer correct to 1 decimal place. (*Volume of a cone*

$$= \frac{1}{3}\pi r^2 h)$$

WORKING OUT SPACE

Answer:

Question 9 **Calculator****(3 marks)**

$a = \frac{v^2}{2s}$, where $v = 18.4$ correct to 3 significant figures and $s = 12.8$ correct to 3 significant figures.

By considering bounds, work out the value of a to a suitable degree of accuracy. You must show all your working and give a reason for your answer.

WORKING OUT SPACE

$a = \dots\dots\dots$ **Reason:**

Question 10 **Calculator****(4 marks)**

A cuboid $ABCDEFGH$ has a horizontal rectangular base $ABCD$ with $AB = 14$ cm and $BC = 9$ cm. The vertical height of the cuboid is $CG = 7$ cm.

Calculate the size of the angle that the space diagonal AG makes with the horizontal plane $ABCD$. Give your answer correct to 1 decimal place.

WORKING OUT SPACE

Answer:

Question 11 **Calculator****(4 marks)**

Solve algebraically:

$$\frac{6}{x-2} - \frac{2}{x+3} = 1$$

WORKING OUT SPACE

 $x = \dots\dots\dots$ or $x = \dots\dots\dots$ **Question 12** **Calculator****(4 marks)**

A box contains 6 milk chocolates, 5 dark chocolates, and 4 white chocolates. Two chocolates are taken at random from the box without replacement.

Work out the probability that both chocolates taken are of the same type. Give your answer as a fraction in its simplest form.

WORKING OUT SPACE

Answer:

Question 13 **Calculator****(4 marks)**

In triangle ABC , $AB = 9$ cm, $BC = 14$ cm, and $AC = 17$ cm.

- (a) Calculate the size of angle ABC , giving your answer correct to 1 decimal place.
 (b) Hence calculate the area of triangle ABC , giving your answer correct to 1 decimal place.

WORKING OUT SPACE

(a)° (b) cm²**Question 14** **Calculator****(4 marks)**

A right pyramid $VABCD$ has a rectangular horizontal base $ABCD$ with $AB = 10$ cm and $BC = 6$ cm.

The apex V is directly above the centre M of the base, and each sloping edge

$VA = VB = VC = VD = 13$ cm.

Calculate the vertical height VM of the pyramid, and hence work out its volume, giving each answer correct to 1 decimal place. (Volume of a pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$)

WORKING OUT SPACE

 $VM = \dots\dots\dots$ cm Volume = cm³**Question 15** **Calculator****(4 marks)**

A histogram shows the distribution of the mass, m grams, of 120 apples in an orchard:

Mass, m (grams)	$80 < m \leq 100$	$100 < m \leq 115$	$115 < m \leq 125$	$125 < m \leq 155$
Frequency Density	1.0	2.0	4.0	1.0

Use the histogram information to calculate an estimate for the median mass of the apples in grams.

WORKING OUT SPACE

Answer:

APPENDIX

Answers & Mark Schemes

Complete Edexcel Higher answers, completed solution diagrams, and Mixed Review topic guides.

Topic 1: Simplifying Surds

Q1 (Non-Calc):	$4\sqrt{2}$	[1m]
Q2 (Non-Calc):	$8\sqrt{10}$	[2m]
Q3 (Non-Calc):	$3\sqrt{3}$	[2m]
Q4 (Non-Calc):	5	[2m]
Q5 (Non-Calc):	$6\sqrt{5}$	[2m]
Q6 (Non-Calc):	15	[2m]

Topic 2: Expanding with Surds

Q1 (Non-Calc):	$30\sqrt{3}$	[2m]
Q2 (Non-Calc):	$2 + 6\sqrt{2}$	[2m]
Q3 (Non-Calc):	$107 + 42\sqrt{2}$	[2m]
Q4 (Non-Calc):	$10 + 6\sqrt{2}$	[2m]
Q5 (Non-Calc):	$26 + 42\sqrt{2}$	[3m]
Q6 (Non-Calc):	34	[2m]

Topic 3: Rationalising the Denominator

Q1 (Non-Calc):	$\sqrt{5}$	[2m]
Q2 (Non-Calc):	$3 + \sqrt{2}$	[2m]
Q3 (Non-Calc):	$5\sqrt{5} - 2\sqrt{2}$	[3m]
Q4 (Non-Calc):	$2 + 2\sqrt{7}$	[3m]
Q5 (Non-Calc):	$\frac{(3 + \sqrt{5})(\sqrt{5} + 1)}{4} = 2 + \sqrt{5}$	[3m]
Q6 (Non-Calc):	$\frac{3\sqrt{5} - 80}{5}$	[3m]

Topic 4: Calculating with Bounds

Q1 (Calc):	149.625	[2m]
Q2 (Calc):	140.875	[2m]
Q3 (Calc):	7.0	[2m]
Q4 (Calc):	1.791	[2m]
Q5 (Calc):	4.7	[2m]
Q6 (Calc):	3.43	[2m]

Topic 5: Rearranging Harder Formulae

Q1 (Non-Calc):	$x = \frac{V}{m + n}$	[2m]
Q2 (Non-Calc):	$x = \frac{8}{m - d}$	[3m]
Q3 (Non-Calc):	$x = \frac{2n - 4m}{m - n}$	[3m]
Q4 (Non-Calc):	$x = \frac{2y + 5}{y - 1}$	[3m]
Q5 (Non-Calc):	$x = \frac{2y + 3}{5y - 4}$	[3m]
Q6 (Non-Calc):	$x = \frac{4y^2 + 9}{3y^2 + 2}$	[4m]

Topic 6: Factorising Harder Quadratics

Q1 (Non-Calc):	$(2x + 1)(x + 3)$	[2m]
Q2 (Non-Calc):	$(3x - 2)(x - 3)$	[2m]
Q3 (Non-Calc):	$(2x - 3)(x + 4)$	[2m]
Q4 (Non-Calc):	$(3x + 4)(x - 3)$	[2m]
Q5 (Non-Calc):	$(3x - 1)(2x - 3)$	[2m]
Q6 (Non-Calc):	$(2x - 1)(2x + 5)$	[2m]

Topic 7: The Quadratic Formula

- Q1 (Non-Calc):** $x = -2, -1$ [2m]
- Q2 (Non-Calc):** $x = -\frac{3}{2}, 4$ [2m]
- Q3 (Non-Calc):** $x = \frac{1}{4}, \frac{5}{3}$ [2m]
- Q4 (Calc):** $x = -5.34, 0.84$ [4m]
- Q5 (Calc):** $x = -3.68, 0.68$ [4m]
- Q6 (Calc):** $x^2 + 6x - 12 = 0 \Rightarrow 1.58 \text{ cm}$ [4m]

Topic 8: Quadratic Sequences

- Q1 (Non-Calc):** $n^2 + 3n - 4$ [3m]
- Q2 (Non-Calc):** $3n^2 + 5n - 3$ [3m]
- Q3 (Non-Calc):** $-n^2 - 2n + 30$ [3m]
- Q4 (Non-Calc):** $4n^2 - n + 2$ [3m]
- Q5 (Non-Calc):** $2n^2 + 5n - 4$ [3m]
- Q6 (Non-Calc):** $-2n^2 + n + 40$ [3m]

Topic 9: Functions

- Q1 (Non-Calc):** **39** [2m]
- Q2 (Non-Calc):** $f^{-1}(x) = \frac{3x+7}{4}$ [2m]
- Q3 (Non-Calc):** $18x^2 - 33x + 15$ [3m]
- Q4 (Non-Calc):** $x = 1, 5$ [3m]
- Q5 (Non-Calc):** $x = 4$ [3m]
- Q6 (Non-Calc):** $f^{-1}(x) = \frac{4x+5}{x-3}$ [3m]

Topic 10: Trig & Exponential Graphs

- Q1 (Non-Calc):** C, A, B, D [2m]
- Q2 (Non-Calc):** **(a) $-m$, (b) m** [2m]
- Q3 (Non-Calc):** $210^\circ, 330^\circ$ [2m]
- Q4 (Non-Calc):** **(a) 13 m, (b) $t = 6$** [3m]
- Q5 (Non-Calc):** $k = 64$ [3m]
- Q6 (Non-Calc):** $p = 5, q = 3$ [3m]

Topic 11: Algebraic Fractions

- Q1 (Non-Calc):** $\frac{3(x+1)}{x-2}$ [2m]
- Q2 (Non-Calc):** $\frac{3x+9}{(x+5)(x+4)}$ [2m]
- Q3 (Non-Calc):** $\frac{8x+9}{(x+3)(x-2)}$ [2m]
- Q4 (Non-Calc):** $\frac{4(x+3)}{x+2}$ [2m]
- Q5 (Calc):** $x = -3, \frac{29}{6}$ [3m]
- Q6 (Non-Calc):** $x = \frac{1}{3}, \frac{7}{2}$ [3m]

Topic 12: Algebraic Proportion

- Q1 (Non-Calc):** **21** [2m]
- Q2 (Non-Calc):** **12** [2m]
- Q3 (Non-Calc):** **16** [2m]
- Q4 (Non-Calc):** **(i) $y \propto x^2$, (ii) $y = 5x^2$** [2m]
- Q5 (Non-Calc):** **64** [3m]
- Q6 (Non-Calc):** **3** [3m]

Topic 13: Similar Shapes: Area, Volume & Frustums

Q1 (Calc):	28,160 cm ³	[3m]
Q2 (Calc):	1812.5 cm ²	[3m]
Q3 (Non-Calc):	12 cm	[3m]
Q4 (Non-Calc):	120 cm ²	[3m]
Q5 (Non-Calc):	156π cm ³	[4m]
Q6 (Non-Calc):	270 cm ³	[3m]

Topic 14: 3D Pythagoras & Trig

Q1 (Calc):	12.3	[3m]
Q2 (Calc):	5.1	[3m]
Q3 (Calc):	24.9	[3m]
Q4 (Calc):	8.1	[3m]
Q5 (Calc):	29.7	[4m]
Q6 (Calc):	911.1	[4m]

Topic 15: The Sine Rule

Q1 (Calc):	6.5	[3m]
Q2 (Calc):	9.6	[3m]
Q3 (Calc):	16.3	[3m]
Q4 (Calc):	22.2	[3m]
Q5 (Calc):	102.8	[5m]
Q6 (Calc):	22.3	[4m]

Topic 16: The Cosine Rule

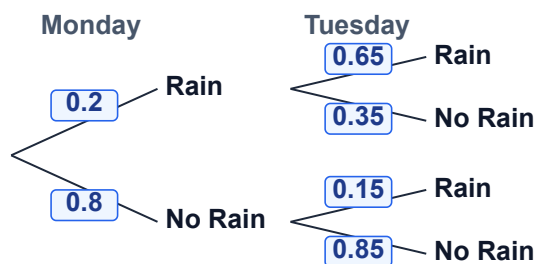
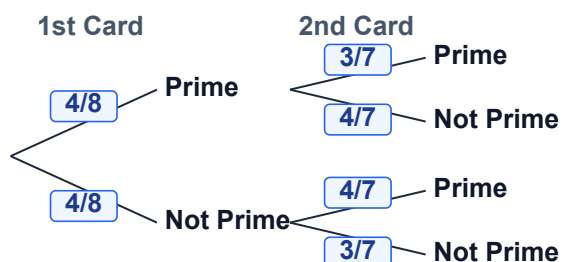
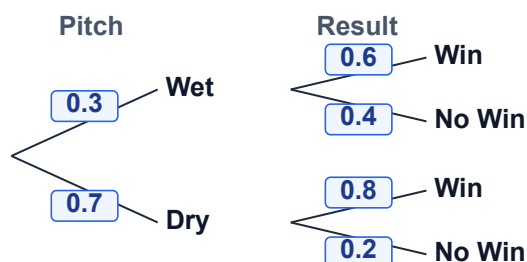
Q1 (Calc):	23.2	[3m]
Q2 (Calc):	16.8	[3m]
Q3 (Calc):	97.9	[3m]
Q4 (Calc):	22.8	[3m]
Q5 (Non-Calc):	4	[4m]
Q6 (Calc):	64.3	[4m]

Topic 17: Area of Any Triangle

Q1 (Calc):	160.3	[2m]
Q2 (Calc):	129.9	[2m]
Q3 (Calc):	41.2	[3m]
Q4 (Calc):	37.8	[4m]
Q5 (Non-Calc):	5	[4m]
Q6 (Non-Calc):	10	[4m]

Topic 18: Conditional Probability

Q1 (Non-Calc):	$\frac{2}{9}$ (see completed tree below)	[2m]
Q2 (Non-Calc):	0.19 (see completed tree below)	[3m]
Q3 (Non-Calc):	$\frac{11}{14}$ (see completed tree below)	[3m]
Q4 (Calc):	$\frac{35}{66}$ (see completed tree below)	[3m]
Q5 (Non-Calc):	(a) See completed tree below, (b) 0.74	[4m]
Q6 (Calc):	$\frac{19}{66}$	[4m]

Q1 — Completed Probability Tree**Q2 — Completed Probability Tree****Q3 — Completed Probability Tree****Q4 — Completed Probability Tree****Q5 — Completed Probability Tree****Topic 19: Histograms**

Q1 (Non-Calc): FD = 4.4 (bars: 1.4, 3.6, 4.4, 1.6, 0.8 — see histogram below) [3m]

Q2 (Calc): (a) Bars: 0.6, 2.8, 6.4, 3.6, 0.6 (see below), (b) 27 [4m]

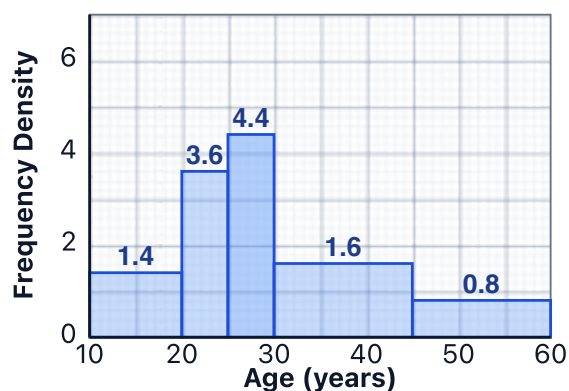
Q3 (Calc): (a) Bars: 0.8, 2.0, 6.4, 0.8 (see below), (b) 66.25 kg [4m]

Q4 (Non-Calc): (a) Bars: 1.2, 3.4, 0.8 (see below), (b) 20 [4m]

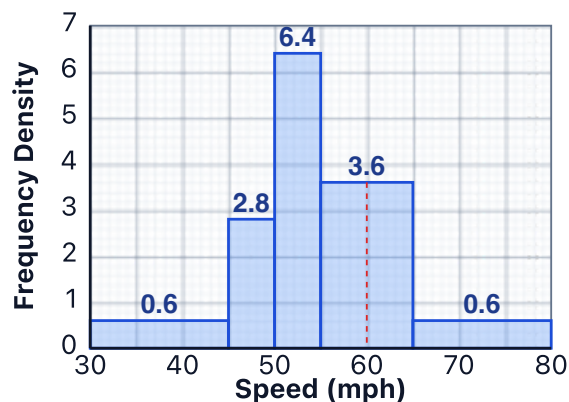
Q5 (Non-Calc): (a) 35, (b) Data is grouped; uniform distribution assumed in interval [4m]

Q6 (Non-Calc): (a) $\frac{7}{25}$, (b) Data is grouped; uniform distribution assumed in interval [4m]

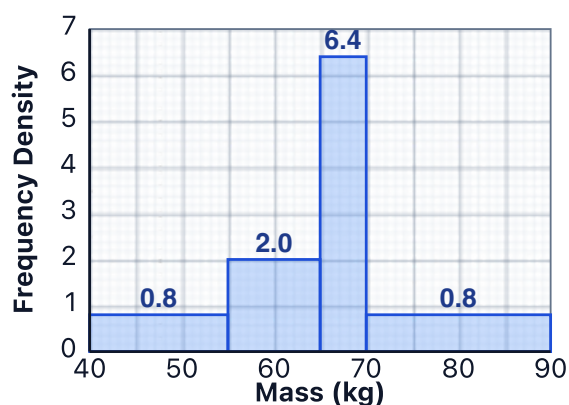
Q1 — Completed Histogram



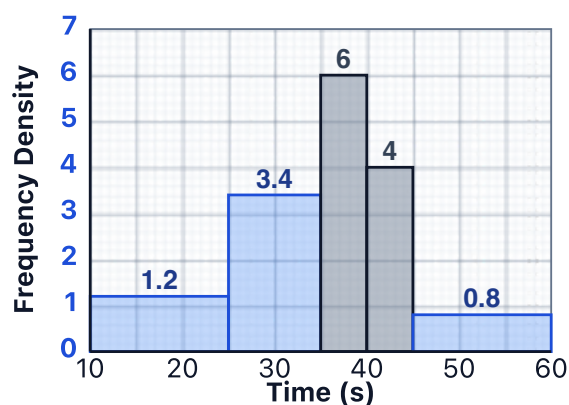
Q2 — Completed Histogram



Q3 — Completed Histogram



Q4 — Completed Histogram



Mixed Review 1 — Choosing the Right Method (Non-Calculator) — Answers & Topic Guide

Q1 (Simplifying Surds, Non-Calc): $13\sqrt{3}$ [2m]Q3 (Quadratic Sequences, Non-Calc): $3n^2 + n - 2$ [3m]Q5 (Expanding with Surds, Non-Calc): $18 + 8\sqrt{3}$ [3m]Q7 (Rearranging Formulae, Non-Calc): $x = \frac{2y + 8}{3 - y}$ [3m]Q9 (Rationalising Denominator, Non-Calc): $6 + 2\sqrt{2}$ [3m]Q11 (Composite Functions, Non-Calc): $x = 0, 5$ [3m]Q13 (Algebraic Fractions, Non-Calc): $\frac{x + 5}{2}$ [3m]Q15 (Histograms, Non-Calc): **(a)** 0.8, 2.4, 3.6, 1.2, **(b)** $\frac{3}{5}$ [4m]Q2 (Factorising Quadratics, Non-Calc): $(3x - 4)(2x + 5)$ [2m]Q4 (Algebraic Proportion, Non-Calc): $x = 3$ [3m]Q6 (Conditional Probability, Non-Calc): $\frac{5}{9}$ [3m]Q8 (Similar Shapes, Non-Calc): 250 cm^3 [3m]Q10 (Exponential Graphs, Non-Calc): **(a)** $p = 9$, $q = 2$, **(b)** $\frac{72}{72}$ [3m]Q12 (3D Pythagoras, Non-Calc): 24 cm [3m]Q14 (Area of Any Triangle, Non-Calc): $x = 4$ [4m]

Mixed Review 2 — Choosing the Right Method (Calculator) — Answers & Topic Guide

Q1 (Calculating with Bounds, Calc):

$$5.57 \quad [3\text{m}]$$

Q2 (The Quadratic Formula, Calc):

$$x = -0.52, 3.19 \quad [3\text{m}]$$

Q3 (The Sine Rule, Calc):

$$57.1^\circ \quad [3\text{m}]$$

Q4 (Algebraic Proportion, Calc):

$$\text{(a)} P = 7\sqrt[3]{Q}, \text{(b)} \frac{125}{125} \quad [3\text{m}]$$

Q5 (The Cosine Rule, Calc):

$$26.2 \text{ cm} \quad [3\text{m}]$$

Q6 (Trig Equations, Calc):

$$69.5^\circ, 290.5^\circ \quad [3\text{m}]$$

Q7 (Inverse Functions, Calc):

$$f^{-1}(x) = \frac{3x+2}{5-x} \quad [3\text{m}]$$

Q8 (Frustum Volume, Calc):

$$980.2 \text{ cm}^3 \quad [4\text{m}]$$

Q9 (Bounds Accuracy, Calc):

$$13 \left(\begin{array}{l} \text{LB} = 13.10, \text{UB} = 13.35 \end{array} \right) \quad [3\text{m}]$$

Q10 (3D Trigonometry, Calc):

$$22.8^\circ \quad [4\text{m}]$$

Q11 (Algebraic Fractions, Calc):

$$x = -4, 7 \quad [4\text{m}]$$

Q12 (Conditional Probability, Calc):

$$\frac{31}{105} \quad [4\text{m}]$$

Q13 (Cosine & Area Rules, Calc):

$$\text{(a)} 92.7^\circ, \text{(b)} 62.9 \text{ cm}^2 \quad [4\text{m}]$$

Q14 (3D Pyramid, Calc):

$$11.6 \text{ cm}, 232.4 \text{ cm}^3 \quad [4\text{m}]$$

Q15 (Histograms Median, Calc):

$$117.5 \text{ g} \quad [4\text{m}]$$