AQA Paper 1H Practice Booklet

20 practice questions based on the advance information

Copies of this booklet, as well as hints & solutions, are available at bossmaths.com/advanceinfo

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Question 1

Which is greater, $\frac{4}{3}$ of 87 g or 14% of 800 g?

$\frac{1}{3}$ of 87 = 29

so $\frac{4}{3}$ of 87 = [redacted]

1% of 800 = $\frac{1}{100}$ of 800 = 8

so 14% of 800 = [redacted]

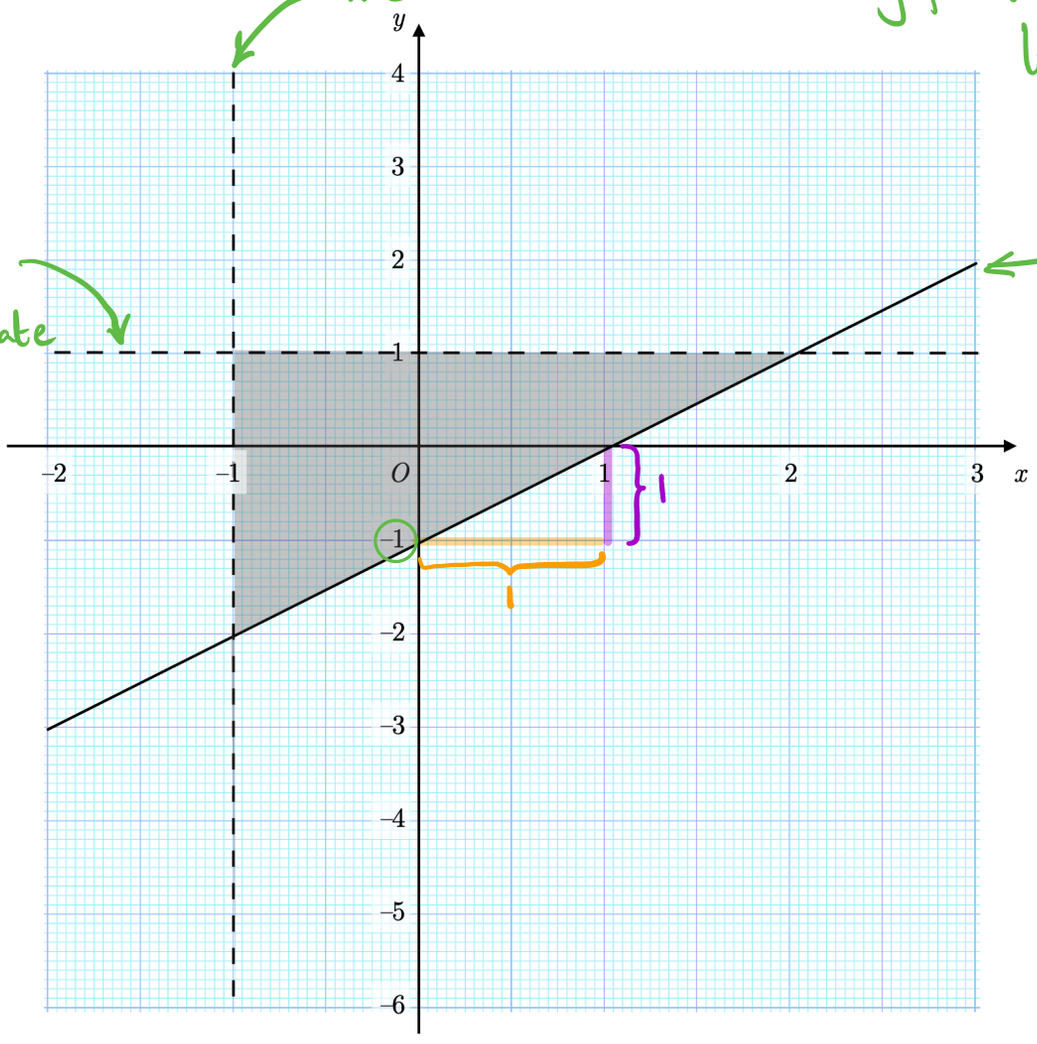
Then state which is greater.

Question 2

Work out $\left((0.35 \times 1.4)^2\right)^{\frac{1}{4}}$ writing your answer as a decimal.

Remember, $(a^m)^n \equiv a^{mn}$

Question 3



The x-coordinate of every point on this line is -1

The y-coordinate of every point on this line is 1.

This line has gradient $\frac{1}{1} = 1$ and a y-intercept of -1.

Write down the three inequalities that define the shaded region.

Remember, dashed lines indicate strict inequalities i.e. $>$ or $<$.

Solid lines indicate non-strict inequalities i.e. $\geqslant$ or $\leqslant$

Question 4

Simplify each of these expressions as far as possible.

$\sqrt{ab} = \sqrt{a}\sqrt{b}$

(a) $5\sqrt{44} - 8\sqrt{11}$ $= 5\sqrt{4}\sqrt{11} - 8\sqrt{11}$

$= \ldots$

(b) $\sqrt{34} \times \sqrt{17}$ $= \sqrt{2} \times \sqrt{17} \times \sqrt{17} = \sqrt{2} \times (\sqrt{17} \times \sqrt{17})$

$= \ldots$

(c) $-7x - 3(9 - 2x)$ $\equiv -7x + -3(9-2x)$

$\equiv \ldots$

Question 5

Simplify fully $\dfrac{2x^2 + 9x - 5}{(3x + 4) - (x + 5)}$

← Factorise

← Simplify by collecting like terms.
Take care with the brackets

Once you've done this, you should see the numerator and denominator share a common factor.

Question 6

Work out $9.5 \times 10^8 + 60{,}200{,}000$, writing your answer in standard form.

$9.5 \times 10^8 + 6.02 \times 10^7$

$= 9.5 \times 10^8 + 0.602 \times 10^8$

$= \ldots$

Question 7

The first three terms of an arithmetic sequence are:

$\frac{x-5}{2}$, $x-5$, $2x-21$

↳ constant difference between consecutive terms

so:

Find the value of x.

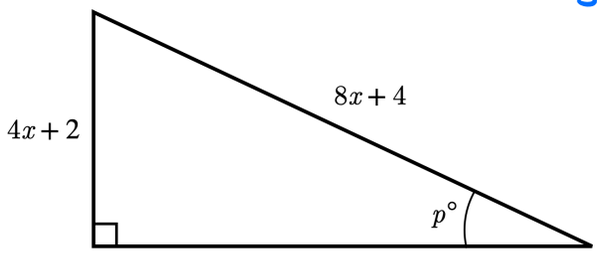
2nd term − 1st term = 3rd term − 2nd term

$(x-5) - \frac{x-5}{2} = 2x - 21 - (x-5)$

Now solve this equation to find x.

Question 8

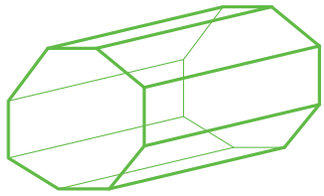
The diagram shows the lengths, in centimetres, of two sides of a right-angled triangle.
Find the value of p.



$\sin(p) = \frac{4x+2}{8x+4}$ ← what does this simplify to?

Question 9

How many faces does an octagonal prism have?



2 octagonal faces
+ ▢ rectangular faces = ▢ faces in total

Question 10

(a) Write $0.1\dot{0}\dot{3}$ as fraction in its simplest form.

So x = ...

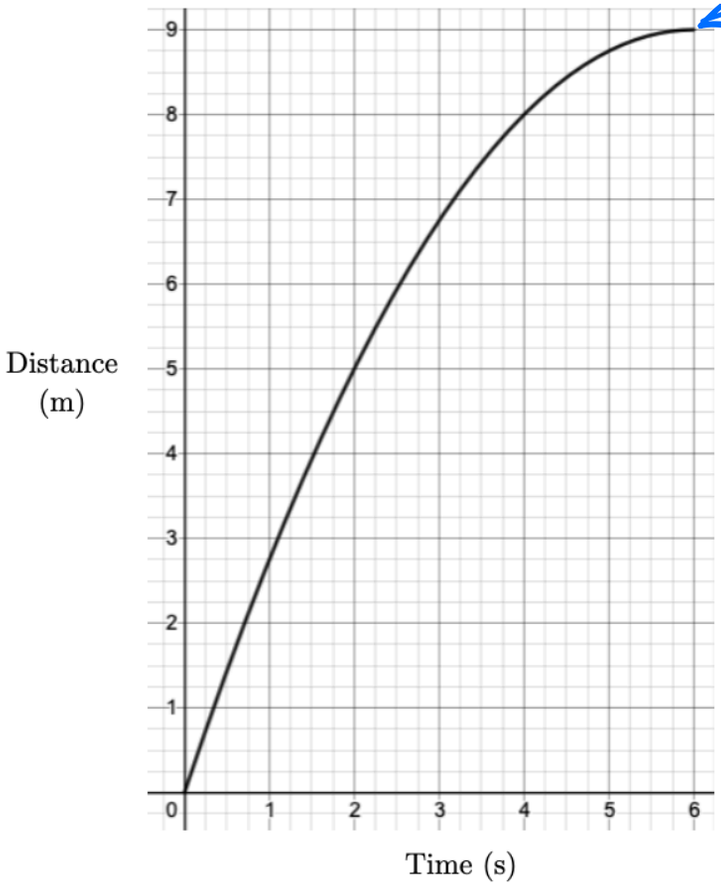
Let x = $0.1030303...$
Then $100x$ = $10.3030303...$
Subtract x = $0.1030303...$
to get $99x$ = _____

(b) A biased coin has a probability of $0.1\dot{0}\dot{3}$ of landing tails side up. If the coin is flipped 330 times, how many times would you expect the coin to land tails side up?

If the coin instead had a probability of $\frac{1}{3}$ of coming up tails, we would expect it to happen $\frac{1}{3}$ of 330 = 110 times. Follow the same logic, but instead of $\frac{1}{3}$, use the fraction you worked out in (a).

Question 11

The graph shows the distance covered by a cyclist for 6 seconds.

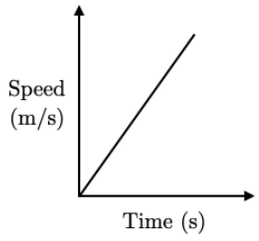


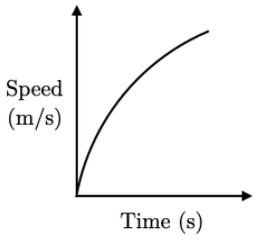
Zero gradient here means the speed is zero at this time

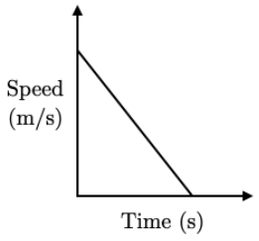
On a distance-time graph, the gradient is the speed.

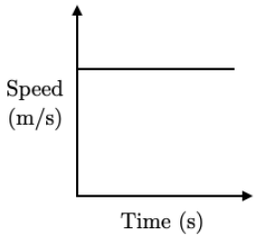
Here, the gradient starts high and decreases to zero.

Here are four sketches of speed-time graphs. **One** of these sketches represents the cyclist's speed during the six-second period shown on the distance-time graph above. Circle this sketch.



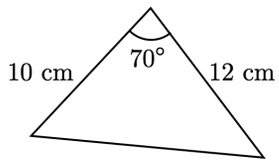


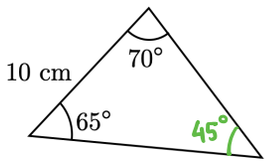


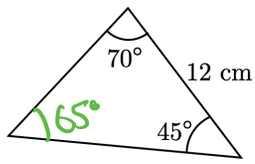


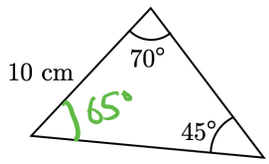
Question 12

Here are sketches of four triangles. The sketches are not drawn to scale. Exactly two of the four triangles are congruent to each other. Circle these two triangles.









Question 13

This graph shows the amount charged by a plumber for up to 4 hours of work.

Give an interpretation of the gradient of this graph.

Gradient = £120 / 3hours

= £40/hr

The gradient represents

...

Question 14

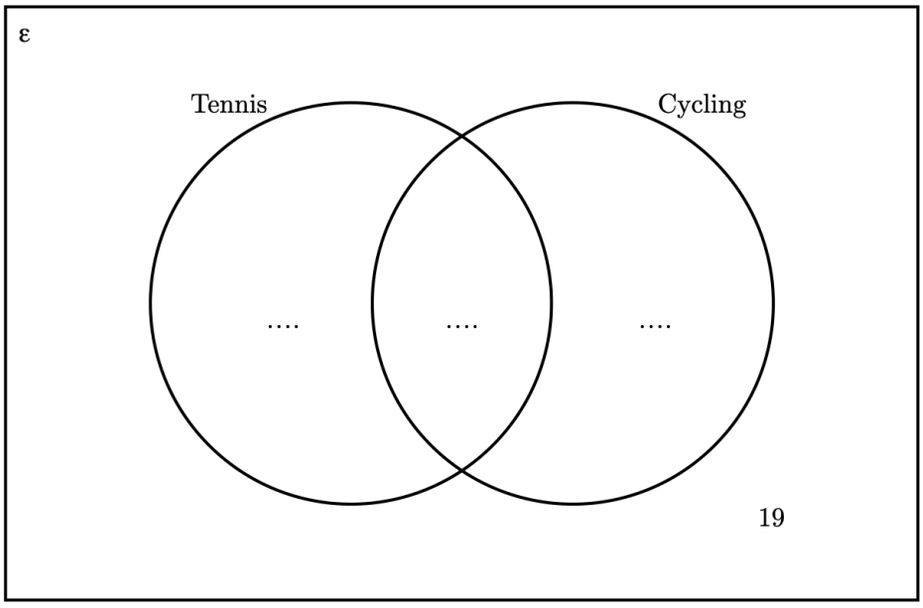
A group of 40 people are asked whether like tennis, cycling, both, or neither.

The probability that a randomly chosen individual likes tennis is $\frac{1}{5}$. } 8 people

The probability that a randomly chosen individual likes cycling is $\frac{3}{8}$. } 15 people

Of the 40 people, 19 said they didn't like either tennis or cycling. } The missing numbers must add up to 40-19 = 21.

Fill in the three blanks in this Venn diagram.



Question 15

Here are the equations of six curves.

A. $y = x^2 - 2x + 1$

B. $y = 5^x$

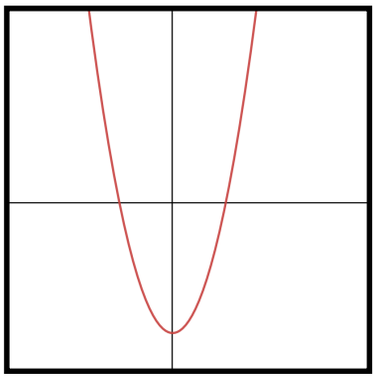
C. $y = \dfrac{1}{x}$

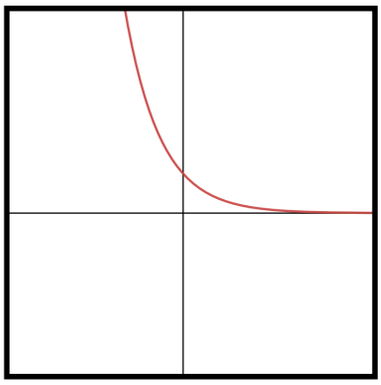
D. $y = x^2 - 8$

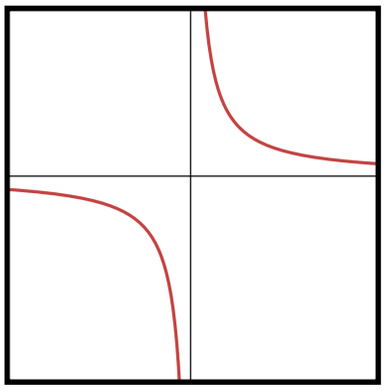
E. $y = 3^{-x}$

F. $y = \sin x$

Sketches of three of the above curves are shown below.







....

Match each graph to its equation from the list above.

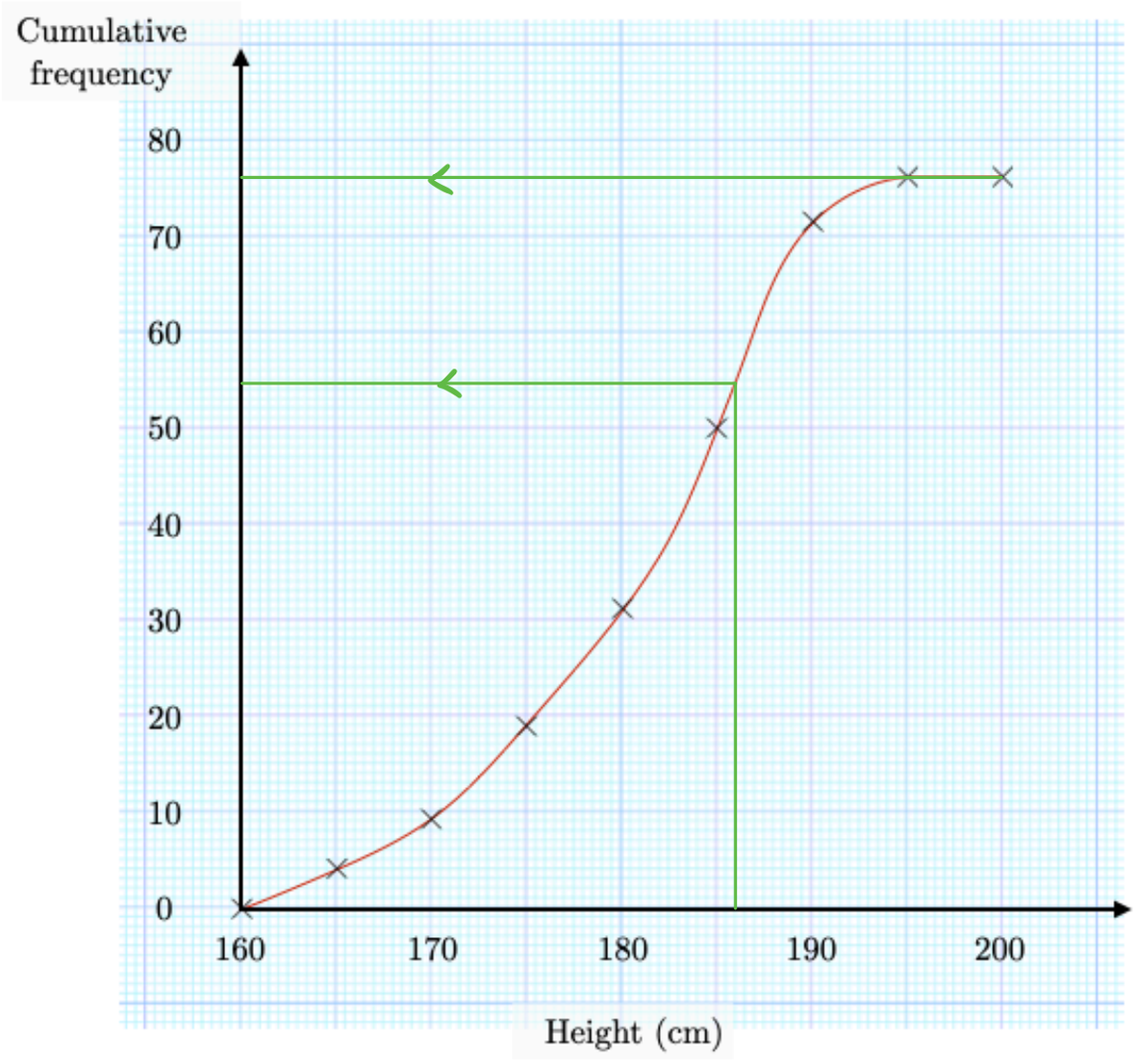
Try substituting $x = 0$ to find where each curve intersects the y-axis.

$y = ax^2 + bx + c$ is a $\cup$-shaped curve when a is positive.

As $x \to \infty$, $\frac{1}{x} \to 0$

Question 16

This cumulative frequency graph shows information about the heights, in cm, of rowers at a rowing club.



Work out an estimate for the number of these rowers with a height greater than 186 cm.

There are ▢ rowers in total.

We estimate that ▢ are up to 186 cm tall.

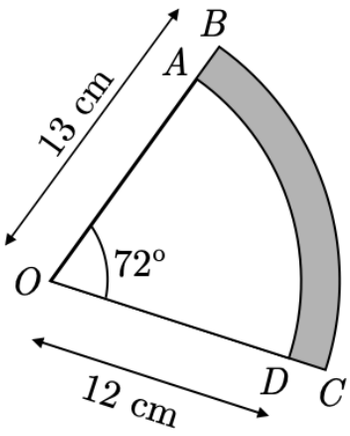
So ▢ rowers are greater than 186 cm tall.

Question 17

OAD and OBC are sectors of circles with centre O.

The points O, A, and B lie on a straight line. Similarly, the points O, D, and C lie on a straight line.

OB has length 13 cm and OD has length 12 cm.



Find, in terms of π, the shaded area $ABCD$ in cm^2.

Area of sector $OBC = \frac{72}{360} \times \pi \times 13^2 = \frac{169}{5}\pi$

Area of sector $OAD = \frac{72}{360} \times \pi \times 12^2 =$ [redacted]

Shaded area $ABCD = \frac{169}{5}\pi -$ [redacted]

$=$ [redacted]

Question 18

(a) Make p the subject of the formula $m = \dfrac{8(q+3p)}{p}$

Multiply both sides by p

$mp = 8q + 24p$

Subtract 24p from both sides

$mp - 24p = 8q$

Factorise out p

$p(\ldots\ldots) = 8q$

...

(b) Work out the value of p when $q = \dfrac{3}{4}$ and $m = \dfrac{53}{2}$.

Write your answer as a fraction in its simplest form.

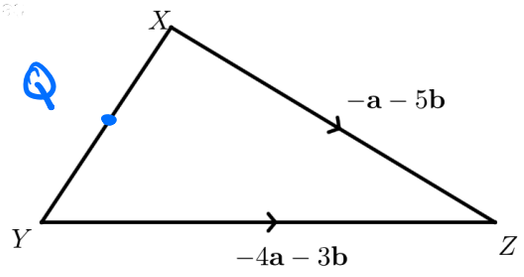
Substitute $q = \frac{3}{4}$ and $m = \frac{53}{2}$ into your formula from (a)

Question 19

The diagram shows the points, X, Y, and Z.

The vector $\overrightarrow{XZ} = -\mathbf{a} - 5\mathbf{b}$
The vector $\overrightarrow{YZ} = -4\mathbf{a} - 3\mathbf{b}$

Q is the midpoint of XY.



Find the vector $\overrightarrow{ZQ}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

$\overrightarrow{XY} = \overrightarrow{XZ} + \overrightarrow{ZY}$

$= -a - 5b + 4a + 3b$

$\overrightarrow{ZY} = -\overrightarrow{YZ}$

$=$ [redacted]

$\overrightarrow{ZQ} = \overrightarrow{ZX} + \overrightarrow{XQ}$

$\overrightarrow{ZX} = -\overrightarrow{XZ}$

$= \overrightarrow{ZX} + \frac{1}{2}\overrightarrow{XY}$

$\overrightarrow{XQ} = \frac{1}{2}\overrightarrow{XY}$

$= a + 5b + \frac{1}{2}$([redacted])

$=$

. . . .

Question 20

The region R contains the set of points within triangle ABC that are closer to A than B **and** closer to BC than AB.

① Perpendicular bisector of AB

② Angle bisector of $\angle ABC$

Construct and shade in the region R.