Edexcel 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

Write 3.8×10^7 as a product of prime factors.

$3.8 \times 10^7 = 3.8 \times 10 \times 10^6$

$= 38 \times 10^6$

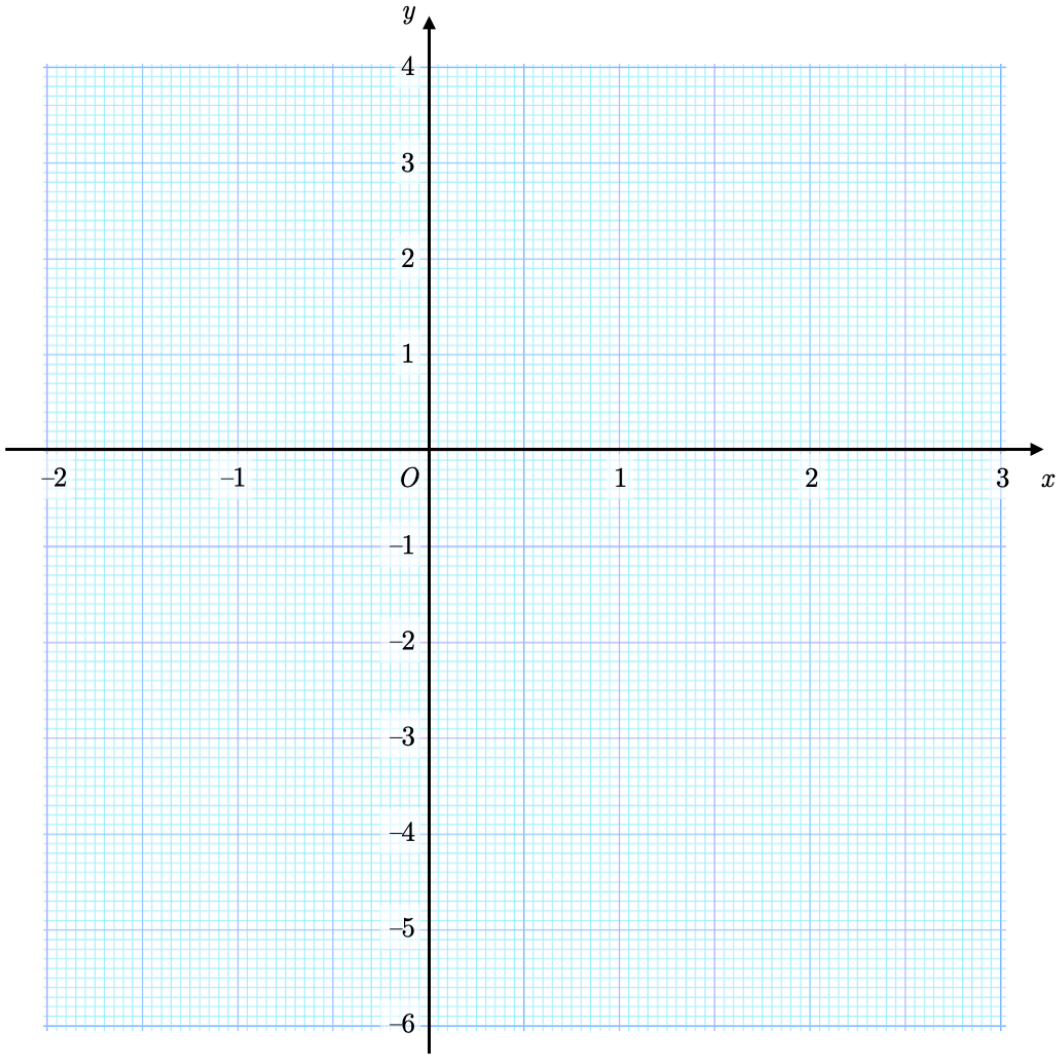
$= \ldots$

Question 3

(a) Complete the table of values for $y = x^2 - 2x - 4$

x	–2	–1	0	1	2	3
y	4	-1				

(b) On the grid, draw the graph of $y = x^2 - 2x - 4$ for values of x from –2 to 3.



(c) By drawing a suitable straight line, use your graph to find estimates for the solutions of $x^2 - 3x + 1 = 0$

$x^2 - 3x + 1 = 0$

$+x \quad -5 \qquad +x - 5$

$\Rightarrow \quad x^2 - 2x - 4 = x - 5$ ← so plot $y = x - 5$

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

Expand and simplify $(x - 3)(x + 10)(x + 3)$

Expand one pair of binomials first.

Then multiply your expanded expression by the third binomial.

Question 6

Work out $\left(8 \times 10^{15}\right)^{-\frac{2}{3}}$, writing your answer in standard form.

$a^{-\frac{2}{3}} = \frac{1}{\left(\sqrt[3]{a}\right)^2}$

Question 7

A cuboid has length x cm, width y cm, and height 9 cm.

You are given that $3x + 8 \leq 29$ and that $18 - 3y \geq 12$.

Calculate the upper bound for the surface area of the cuboid.

$3x + 8 \leq 29$

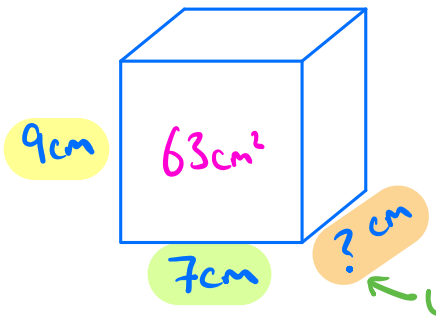
$\Rightarrow 3x \leq 21$

$\Rightarrow x \leq 7$

$18 - 3y \geqslant 12$

$\Rightarrow \ldots$

Using the upper bounds for x and y:

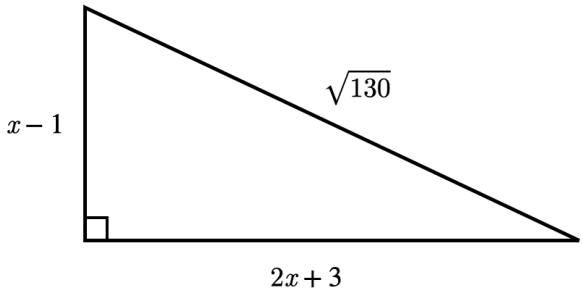


Surface area =

← upper bound for y.

Question 8

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



Pythagoras' theorem $\Rightarrow (2x+3)^2 + (x-1)^2 = (\sqrt{130})^2$

Now solve the equation.

Make sure to reject any solutions that don't make sense in this context.

Question 9

The interior angles of a triangle are p^o, q^o, and r^o.
You are given that $p = q - 12$ and $r = 2p + 20$. ← This information is unnecessary.
Find the mean of p, q, and r.

P, Q, and r must add up to 180.

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 $x = 0.1030303...$

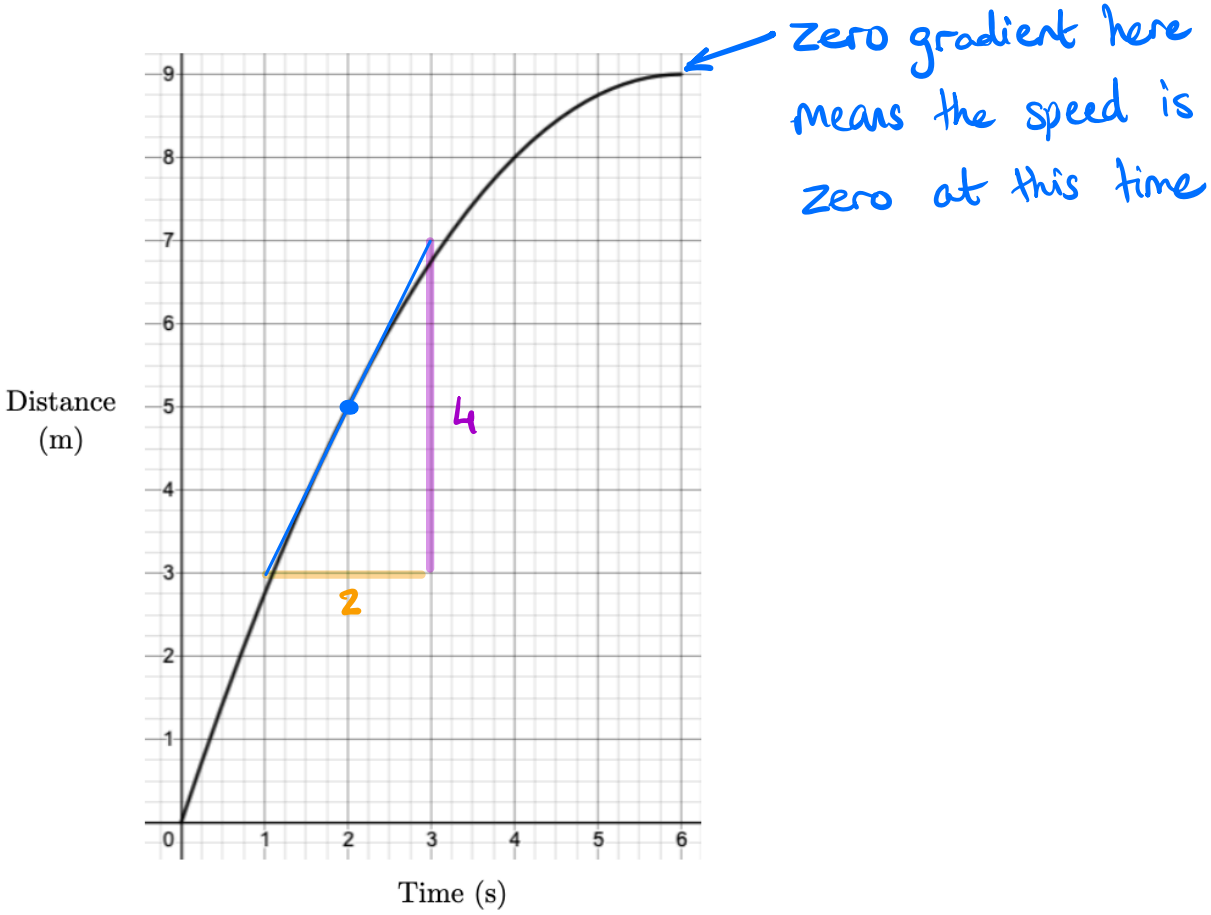
to get $99x =$ _____

(b) A bag contains 330 sweets. The probability of picking an orange sweet from this bag is $0.1\dot{0}\dot{3}$.
How many orange sweets are in the bag?

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

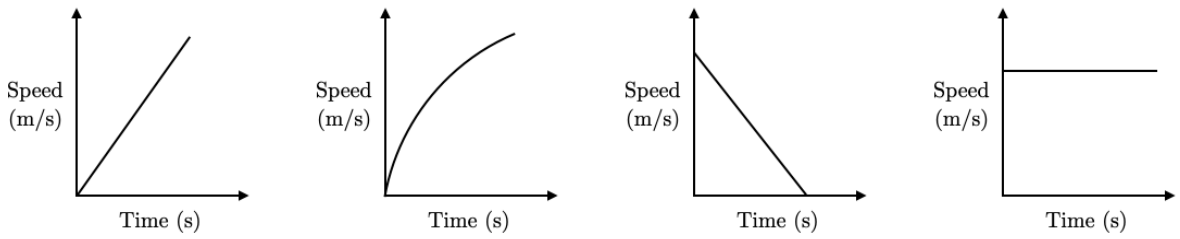
The graph shows the distance covered by a cyclist for 6 seconds.



(a) Estimate the speed of the cyclist at the moment she had travelled 5 metres.

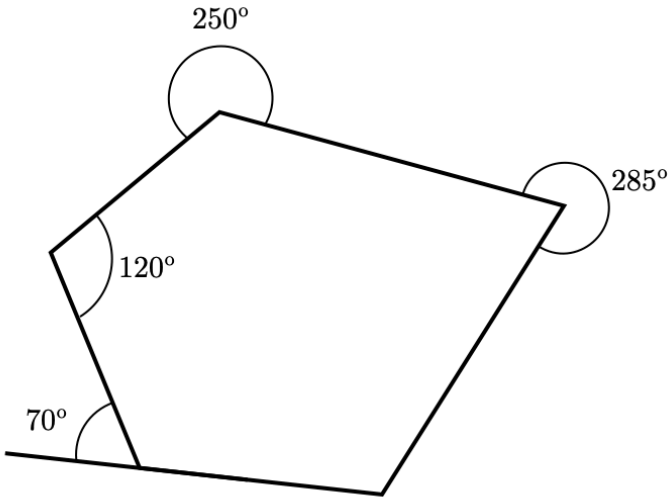
gradient of a distance-time curve

(b) Here are four sketches of speed-time graphs. Circle the sketch that represents the cyclist's speed during the six-second period shown above.



Question 12

The diagram shows pentagon. Various angles are marked on the diagram.
Show that the ratio of the pentagon's largest interior angle to its smallest interior angle is 5 : 3



The interior angles of an n-sided polygon add up to $180(n-2)$ or $180n-360$

Question 13

There are two biscuit tins. Each tin contains a mix of chocolate biscuits and plain biscuits.
The ratio of chocolate biscuits to plain biscuits in the first tin is 3 : 7
The ratio of chocolate biscuits to plain biscuits in the second tin is 4 : 1.

Enda picks at random one biscuit from each tin.

Work out the probability that Enda picks two chocolate biscuits.

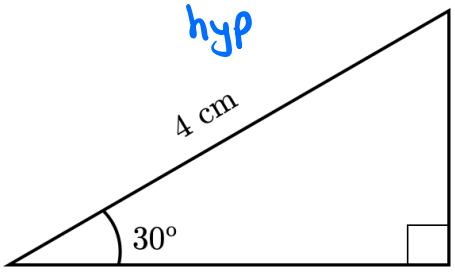
P(Picking chocolate from the first tin) = $\frac{3}{10}$

P(Picking chocolate from the second tin) = ...

P(Picking chocolate from both tins) = ...

Question 14

This triangle has area $\sqrt{k}$ cm^2. Find the value of k.



hyp

opp =

adj =

$\sin(30) = \frac{opp}{hyp}$

so opp = ...

$\cos(30) = \frac{adj}{hyp}$

so adj = ...

$\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$

$= \frac{1}{2} \times adj \times opp$

$= \ldots$

Question 15

An aluminium alloy has a density of 3 g/cm^3.
A cube of mass 375 g is made of this aluminium alloy.
Work out the side length of the cube.

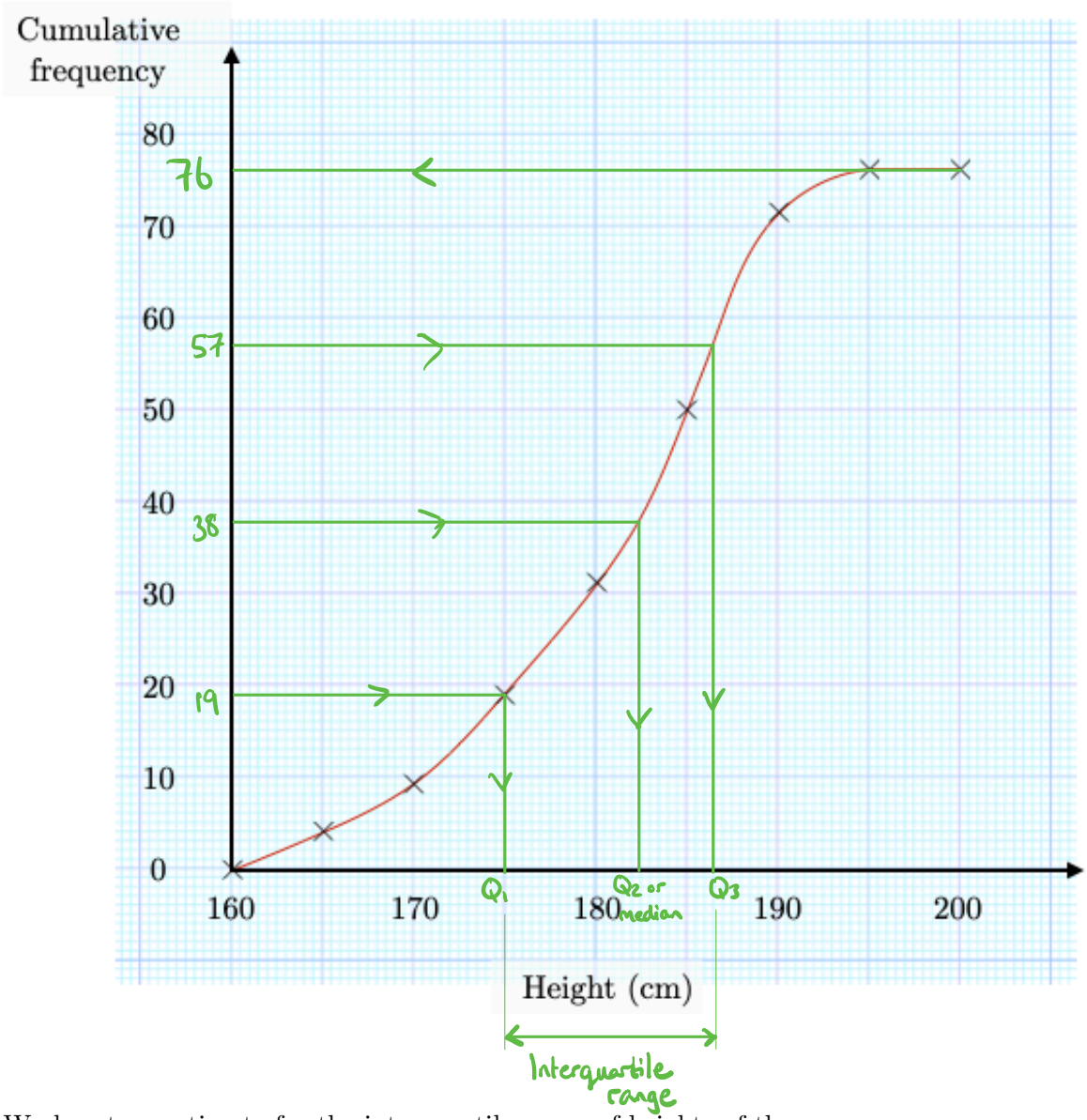
$\text{Density} = \frac{\text{mass}}{\text{volume}}$

$3\,g/cm^3 = \frac{375\,g}{\text{volume}}$

$\Rightarrow \text{volume} = \ldots$

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 interquartile range of heights of the rowers.

There are 76 rowers in total.

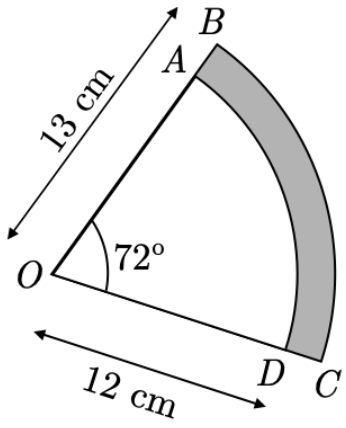
$\frac{76}{4} = 19$ ...

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) $\frac{x+2}{x-1} - \frac{x+3}{x+1}$ can be written in the form $\frac{x+a}{x^2+b}$, where a and b are integers.

Work out the values of a and b.

Rewrite the fractions so they have a common denominator — in this case $(x-1)(x+1)$:

$$\frac{(x+2)(x+1)}{(x-1)(x+1)} - \frac{(x-1)(x+3)}{(x-1)(x+1)}$$

$= \ldots$

(b) Hence, or otherwise, work out $\frac{1002}{999} - \frac{1003}{1001}$

Substitute $x = 1000$ into your answer to (a)

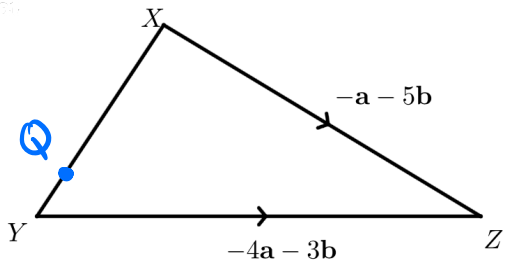
Question 19

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 point on XY such that $XQ : QY = 5 : 1$

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



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

$= -\underline{a} - 5\underline{b} + 4\underline{a} + 3\underline{b}$

$=$ [redacted]

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

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

$= \overrightarrow{ZX} + \frac{5}{6}\overrightarrow{XY}$

$= \underline{a} + 5\underline{b} + \frac{5}{6}$ [redacted]

$=$

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

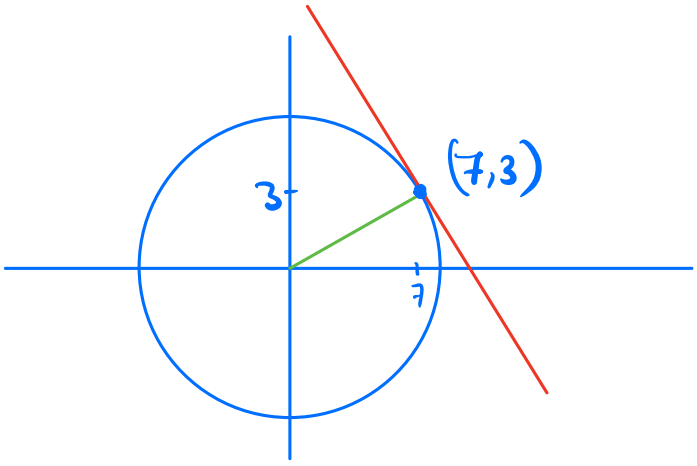
$\overrightarrow{XQ} = \frac{5}{6}\overrightarrow{XY}$

. . . . .

Question 20

(a) The point A has coordinates $(7, 3)$. Given that A lies on the circle with equation $x^2 + y^2 = k$, find the value of k.

$7^2 + 3^2 = k$ so $k = \ldots$



(b) Find the equation of the tangent to the circle at A, giving your answer in the form $y = mx + c$

The tangent is perpendicular to the radius at (7,3)

The radius has gradient

- Use this to find the gradient of the tangent.
- From here, there are a couple of ways to complete the question.