Edexcel Paper 2H 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

---

Question 1

Calculate $\dfrac{707 + 7007}{7 \times (600 - 7^2)} - 7 + 5$

Use your calculator!

Type this exactly as it appears.

Question 2

$\left(x^{-\frac{8}{3}}\right)^{\frac{5}{4}} \equiv \dfrac{1}{\sqrt[3]{x^k}}$, where k is some constant. Find the value of k.

$(a^p)^q \equiv a^{pq}$

$a^{-n} \equiv \dfrac{1}{a^n}$

$a^{\frac{m}{n}} \equiv \sqrt[n]{a^m} \equiv \left(\sqrt[n]{a}\right)^m$

Question 3

(a) y is directly proportional to x^2. When $x = 11$, $y = 605$. Find the value of x when $y = 720$.

$y = kx^2$

(b) p is inversely proportional to q. When $p = 14.5$, $q = 2$. Find the value of q when $p = 580$.

$pq = k$

Question 4

(a) Factorise $17x^2 + 2x - 19$ $(17x + \square)(x - \square)$

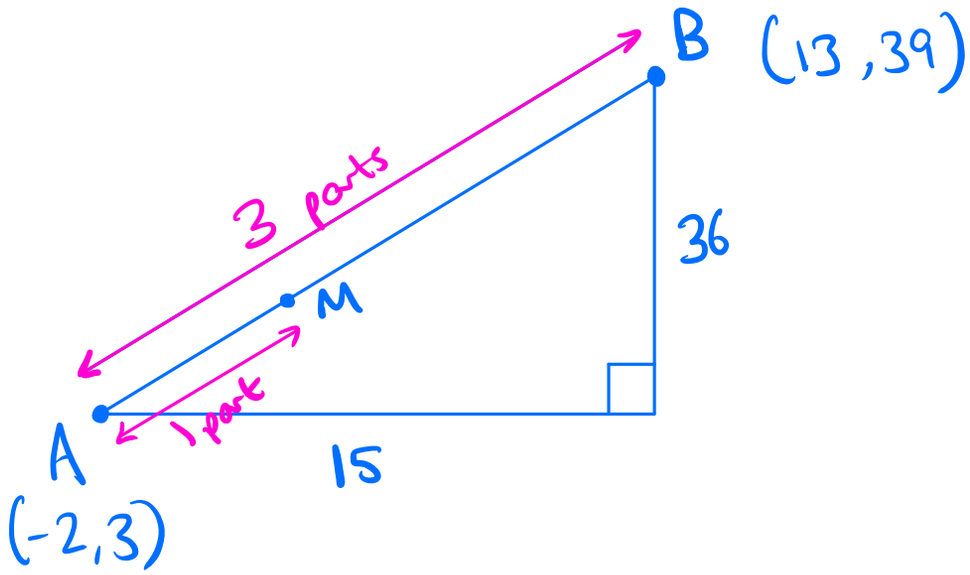
(b) Expand and simplify $(8t + 3)(8t - 3) - (5t + 1)(5t - 9)$

$(64t^2 - 9) - (25t^2 - 40t - 9)$

$\equiv$

Question 5

The point M lies on the line segment AB
AB:AM is 3:1
A has coordinates (–2, 3) and B has coordinates (13, 39).
Find the coordinates of M.



Question 6

Here are the equations of four lines.

Parallel lines have the same gradient

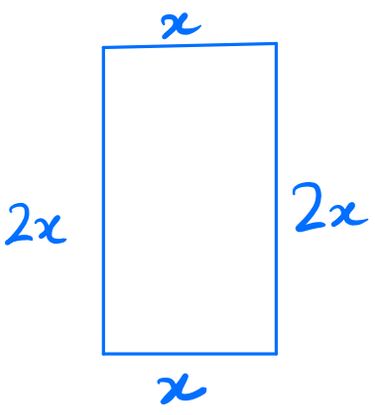
(a) Circle the equations of the two parallel lines.

$y = -2x + 4$ $\quad$ $y = \frac{1}{2}x + 4$ $\quad$ $-2x + y + 8 = 0$ $\quad$ $3x - 6y - 7 = 0$

(b) Find the equation of the line that passes through the point (–8, –5) and is parallel to those you circled in (a).

Question 7

A rectangle's length is double its width. The perimeter of this rectangle is 330 cm.
Work the area of the rectangle, giving your answer in m^2.



Say width = x cm. Then length = $2x$ cm.

Perimeter = $6x$ = 330 cm

$\Rightarrow \quad x =$

Then find the area — making sure you convert from cm^2 to m^2 if needed.

NOTE: $1m^2$ is not $100cm^2$

..... m^2

Question 8

A force of x newtons initially acts on an area of 15 cm^2.

The force is increased by 20% while the area is reduced until the pressure has doubled.

By how much is the area reduced?

Initial pressure = $\frac{x}{15}$ N/cm^2

Later pressure = $\frac{1.2x}{\text{new area}}$ N/cm^2 = 2 × initial pressure

$\Rightarrow$ $\frac{1.2x}{\text{new area}} = \frac{2x}{15}$ (×0.6 on each side)

So new area = ... cm^2

i.e. a reduction of ..... cm^2

..... cm^2

Question 9

List all the integer solutions of $x^2 < 6x + 27$

$x^2 < 6x + 27$

$\Rightarrow \quad x^2 - 6x - 27 < 0$

Factorise

$\Rightarrow \quad \square < x < \square$

The integer solutions are ...

Question 10

$p = 0.30$ correct to 2 decimal places
$q = 1.2$ correct to 1 decimal place

Find the error interval for $q - p$

	UB	LB
p	0.305	0.295
q	1.25	1.15

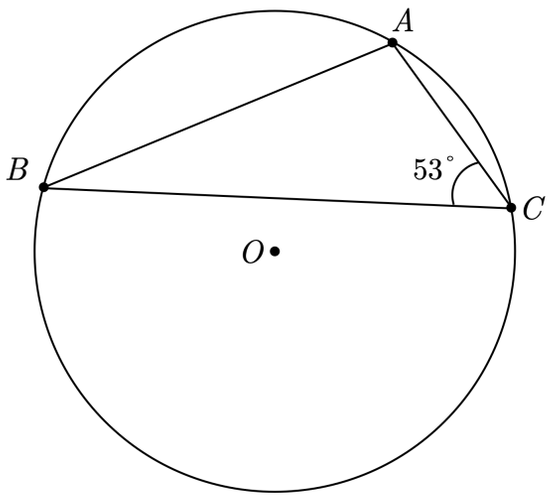
Upper bound for q - p

Lower bound for q - p

Error interval ____ < q - p < ____

Question 11

The diagram shows a circle, with centre O, and points A, B, and C marked on the circumference.



Given that angle $ACB = 53^\circ$, calculate the size of angle OAB.

- Use "the angle at the centre is twice the angle at the circumference."
- Also, what kind of triangle is triangle OAB?

Question 12

George buys a new car. The car's value decreases by a fixed percentage each year.
After 3 years, the car is worth £14,580, and after after 5 years, it is worth £11,809.80
Work out the value of the car two years after George bought it.

Car	Value
when new	
after 1 year	
after 2 years	
after 3 years	£14580
after 4 years	
after 5 years	£11,809.80

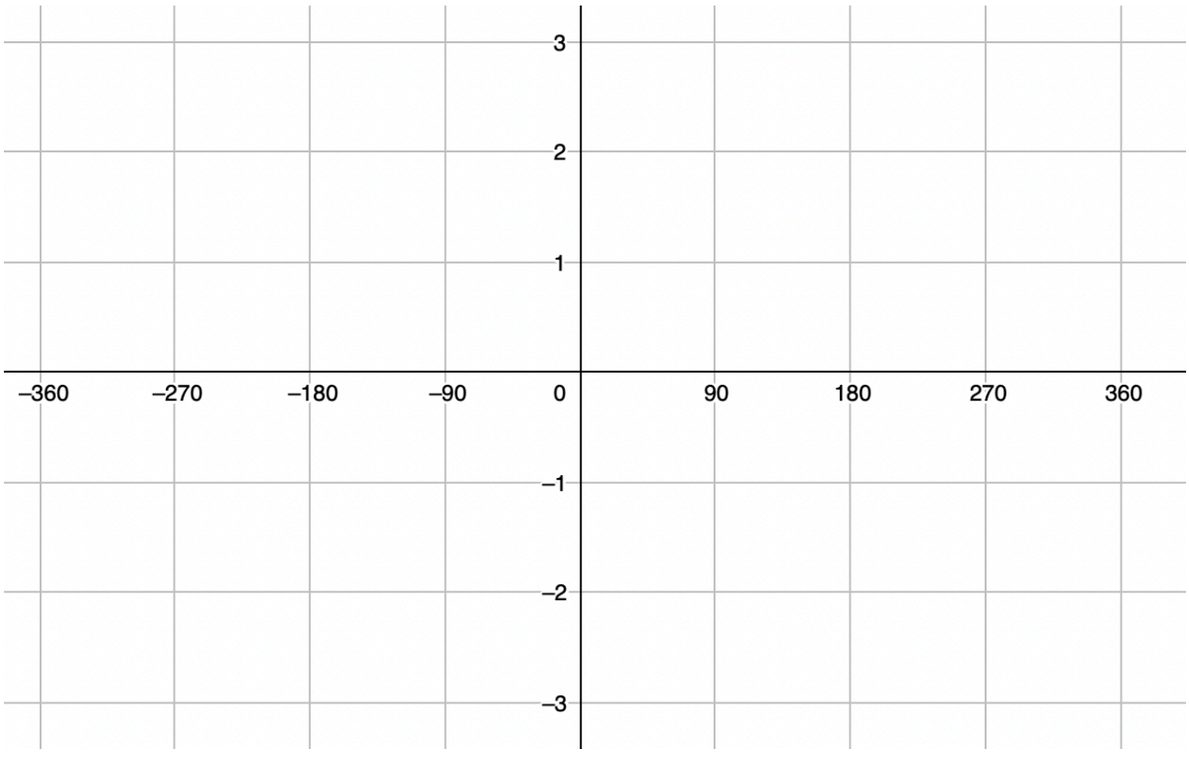
(Each year: $\times r$; from 3 years to 5 years: $\times r^2$)

$r^2 = \ldots \quad \Rightarrow r = \ldots$

$$\text{Year 2 value} = \frac{\text{Year 3 value}}{r} = \ldots$$

Question 13

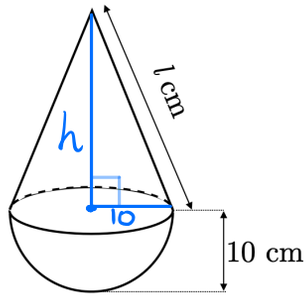
On the grid, sketch the graph of $y = \cos x^\circ + 1$ for $-360^\circ \leq x \leq 360^\circ$



$y = f(x) + a$ is a translation of $y = f(x)$ by a units in the positive y-direction.

Question 14

A hemisphere of radius 10 cm and a cone are attached to form a solid. The circular base of the cone perfectly fits onto the circular face of the hemisphere. The solid has a volume of 1200π cm^3.



Find l, the slant height of the cone.
Round your answer to 3 significant figures.

Volume of hemisphere = $\frac{2}{3}\pi r^3$ = [ ]

Volume of cone = $\frac{1}{3}\pi r^2 h$ = [ ] ← This will be an expression in terms of h.

So [ ] + [ ] = 1200π

Solve to find h.

Then use Pythagoras to find l.

Question 15

A laptop costs £1249 in the UK and €1399 in Europe. The laptop costs $1648.90 in the United States.

You are given the following exchange rates:

$1 = £0.75 and $1 = €0.84

In which location is the laptop cheapest?

UK

£	$
0.75	1
1249	→

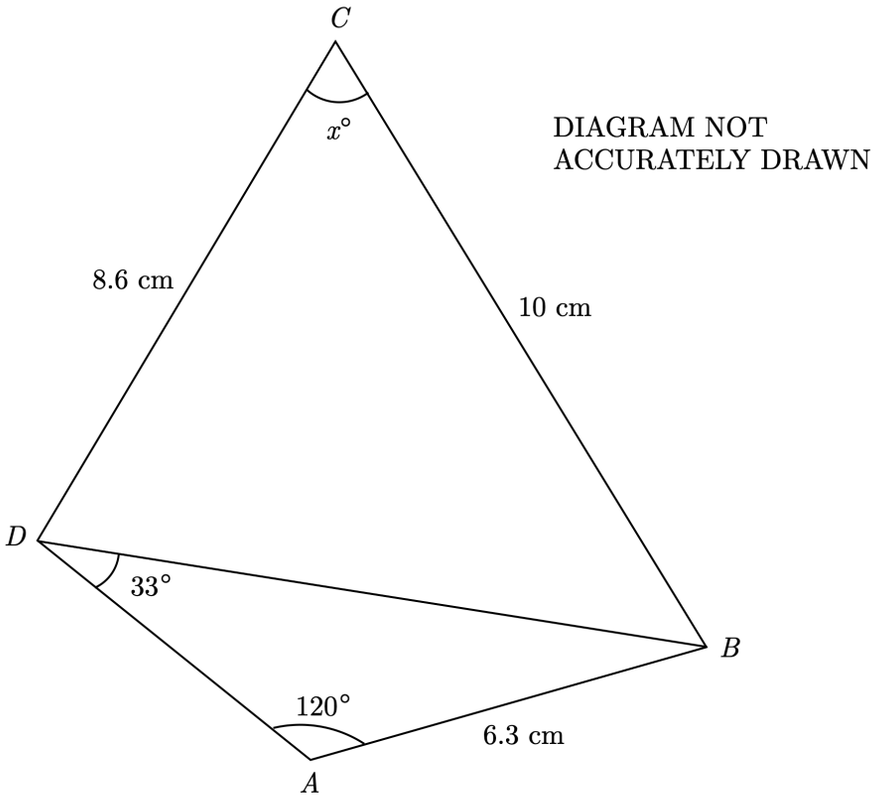
Europe

€	$
0.84	1
1399	→

USA $1648.90

Question 16

$ABCD$ is a quadrilateral.



Find the value of x.

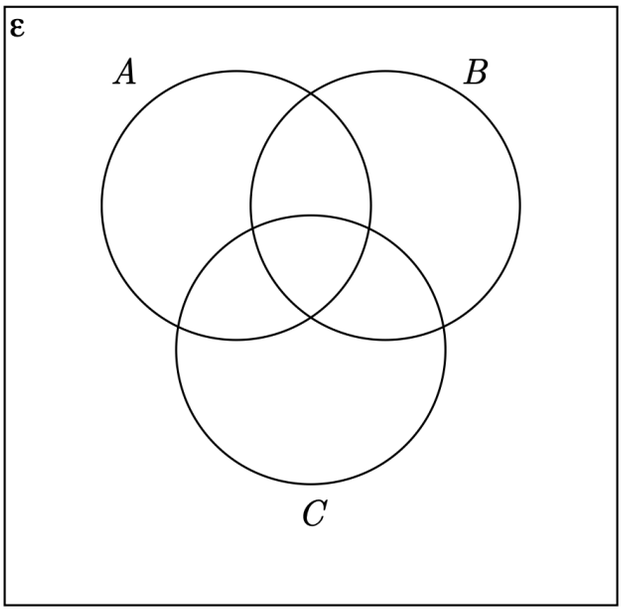
Find BD Use the sine rule

Find x Use the cosine rule

Question 17

$\varepsilon = \{\text{prime numbers between 1 and 40}\}$
$A = \{2, 7, 17\}$
$B = \{2, 5, 17, 37\}$
$C = \{3, 13, 23, 31, 37\}$

(a) Complete the Venn digram for this information.

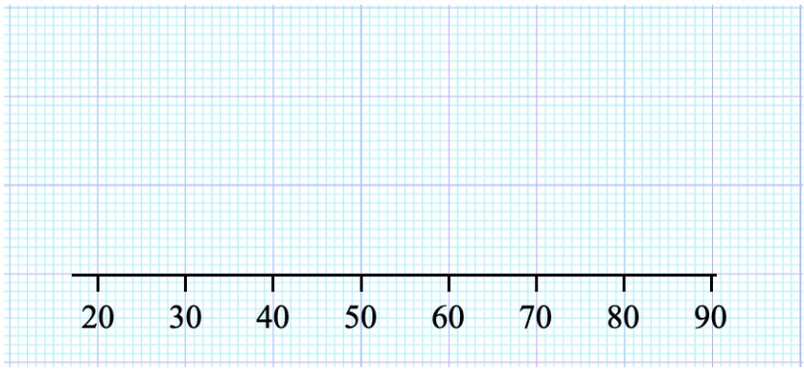


(b) A number is chosen at random from ε. Find the probability that the number is a member of B ∪ C.

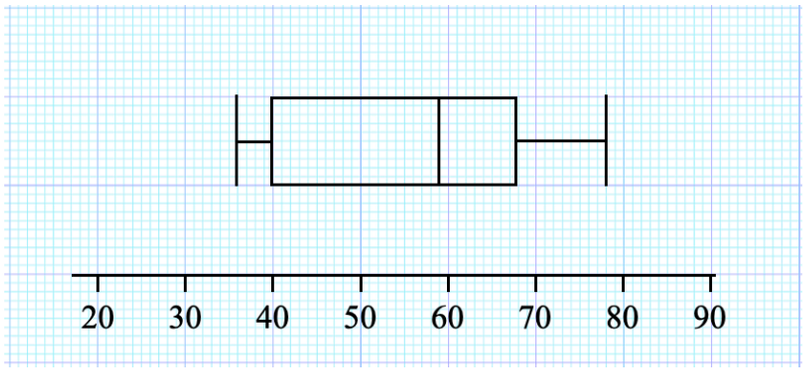
Question 18

A group of Year 10 students sit a test. The lowest mark achieved is 22. The median mark achieved is 50. The range in marks is 54. The upper quartile 68 and the interquartile range was 38.

(a) Draw a box plot showing this information.



(b) This box plot shows the marks achieved by Year 11 students on the same test.



For these Qs:

① Compare an average – in this case, the median

② Compare a measure of spread – either the range or the IQR

Compare the distribution of marks obtained by Year 10 with the distribution of marks obtained by Year 11.

Question 19

$f(x) = \frac{x+3}{7}$ and $g(x) = px + 5$ where p is a constant.

Given that $g(3) = 11$, find an expression for $f^{-1}g(x)$

Find p

$g(3) = 3p + 5 = 11$

$\Rightarrow \quad p = \square$ so $g(x) = \square$

Find $f^{-1}(x)$

$f(x) = \frac{x+3}{7} \Rightarrow f(f^{-1}(x)) = \frac{f^{-1}(x)+3}{7}$

$\Rightarrow \quad x = \frac{f^{-1}(x)+3}{7}$

$\Rightarrow \quad \square = f^{-1}(x)$

Find $f^{-1}(g(x))$

Question 20

Lucy estimated the number of rooks in a colony as follows:

First she caught 80 rooks and attached a ring to one of the legs of each rook. She then released them back into the colony.

After they had enough time to mix, Lucy caught 55 rooks. Some of these rooks were birds that she had previously attached rings to. Lucy used this information to estimate that there were 440 rooks in the colony.

Of the 55 rooks she caught, how many had rings attached?

If there were 440 rooks, Lucy must have captured $\frac{80}{440} = \frac{2}{11}$ of the total population initially.

So $\frac{2}{11}$ of the rooks would have rings.

...