"BETWEEN PAPERS" PRACTICE

SET 1 OF 1 - HIGHER ONLY

SUMMER 2018

QUESTIONS

NOT A "BEST" GUESS PAPER.

NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT! YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 OR PAPER 2 IT MAY STILL COME UP ON PAPER 3 ...

WE KNOW HOW IMPORTANT IT IS TO PRACTICE, PRACTICE, PRACTICE .... SO WE'VE COLLATED A LOAD OF QUESTIONS THAT WEREN'T EXAMINED IN THE OCR 9-1 GCSE MATHS PAPER 1 OR PAPER 2 BUT WE CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...

ENJOY!
MEL & SEAGER

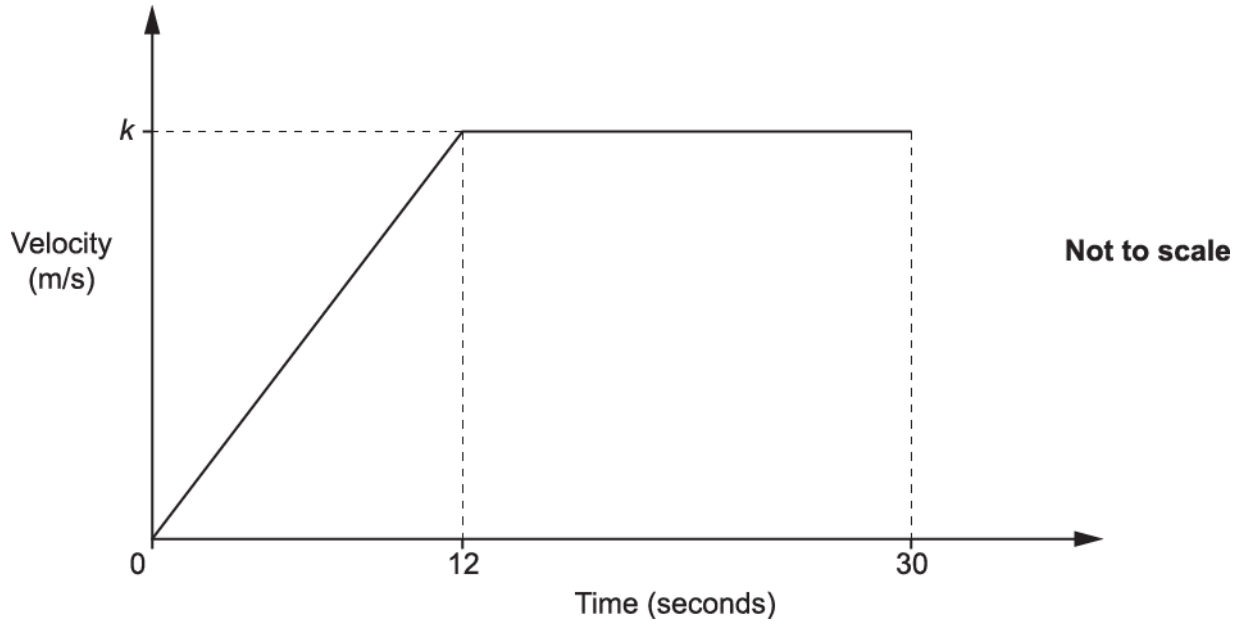
1. Use the quadratic formula to solve this equation.

$$x^2 + 5x + 1 = 0$$

Give your answers correct to 2 significant figures.

..... **[3]**

2(a). The graph below shows the velocity of a train during the first 30 seconds after it leaves a station.



Show that the train travels a total distance of $24k$ metres during the 30 seconds.

[3]

(b). A signal box is 410 metres from the station. At the end of this 30 second period, the train passes the signal box.

Find the value of k. Give your answer correct to 3 significant figures.

k =.....**[3]**

(c). You may use this formula.

$$s = ut + \frac{1}{2}at^2$$

i. A second train passes the station at a velocity of 13 m/s.
It accelerates at a constant rate after passing the station and 25 seconds later it passes the signal box. Find the acceleration.

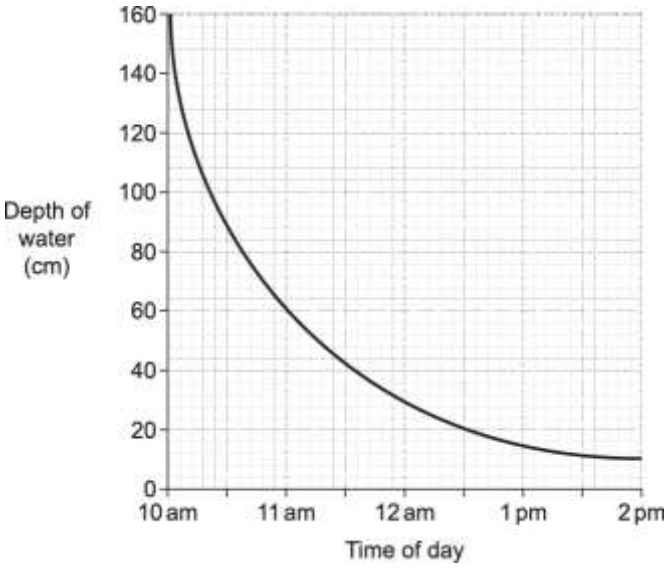
(i) .....m/s^2 **[3]**

ii. A third train passes the station at 15 m/s before accelerating at a constant rate of 0.4 m/s^2 until it passes the signal box.

Find, to the nearest second, the time taken for the train to pass the signal box.

(ii) .....seconds **[5]**

3(a). A tank in the shape of a cuboid rests on a horizontal surface.
The graph shows the depth of water, in cm, in the tank over a period of time.



This is how Mike worked out the average rate of change in the depth of water per hour between 10 am and 2 pm.

160 ÷ 4

= 40 cm/h

What error has Mike made?

[1]

(b). Mike estimates that the rate of change in the depth of water at 11 am is 45 cm/h.

Is his estimate reasonable?
Show your method.

[4]

4(a). Write $x^2 + 10x + 29$ in the form $(x + a)^2 + b$.

(a) .....**[3]**

(b). Write down the coordinates of the turning point of the graph of $y = x^2 + 10x + 29$.

(b) (..... , ...) **[1]**

5. The region **R** is defined by these three inequalities, where k is an integer.

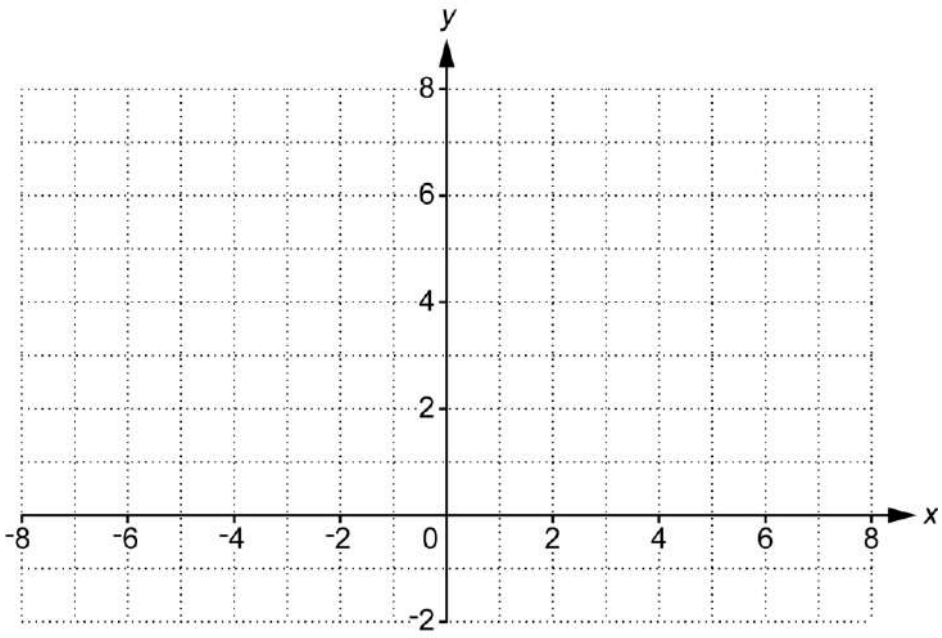
$2y > x + 4$

$x + y \leqslant 5$

$x \geqslant k$

Point P has integer coordinates.
Point P lies in the region **R**.
There are 16 possible positions for point P.

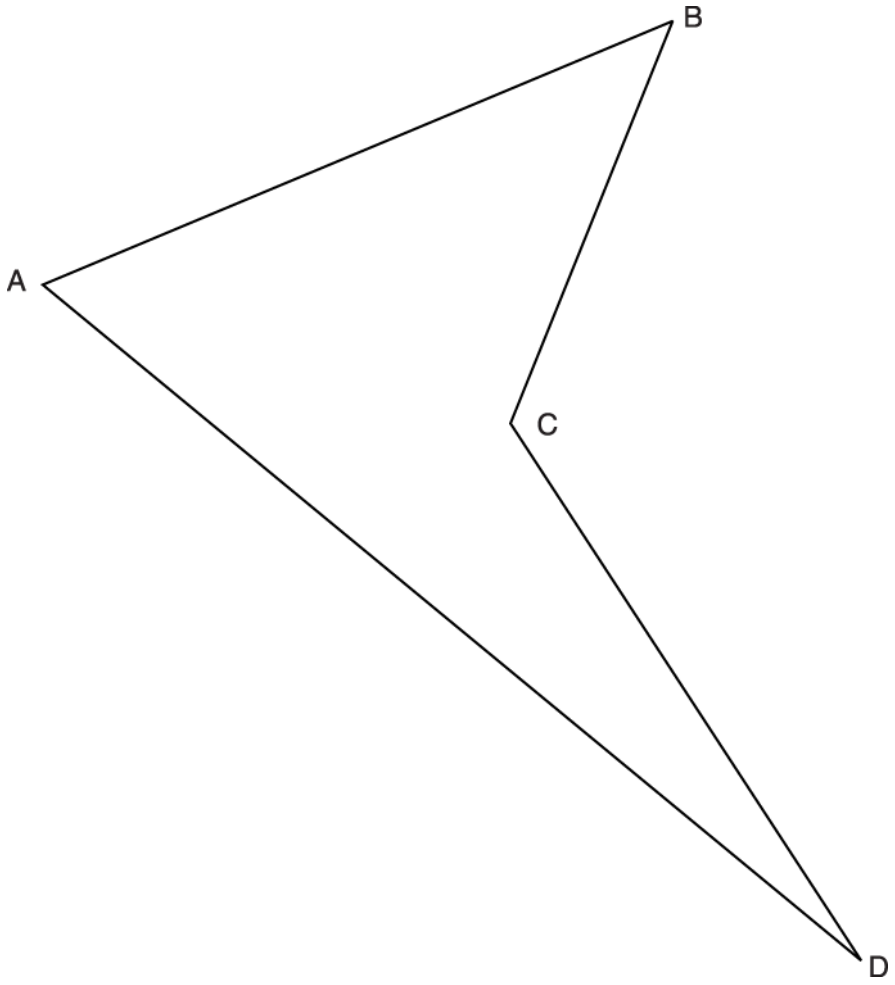
Find the value of k.
Use the grid to help you.



.....

[4]

6. The diagram shows a park ABCD.



Scale: 1 cm represents 100 m

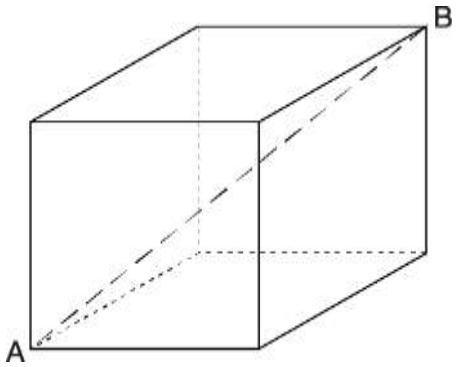
The council want to put a shed inside the park and it must be

- nearer to AB than AD
- less than 400 m from C.

Shade the region where they can put the shed.
You must show all your construction arcs.

[4]

7. * The diagonal, AB, of this cube has length 9 cm.



Work out the total surface area of the cube.
You may find it useful to call the length of the edges of the cube x.

..... cm^2 **[6]**

8. A circle has equation $x^2 + y^2 = 80$.

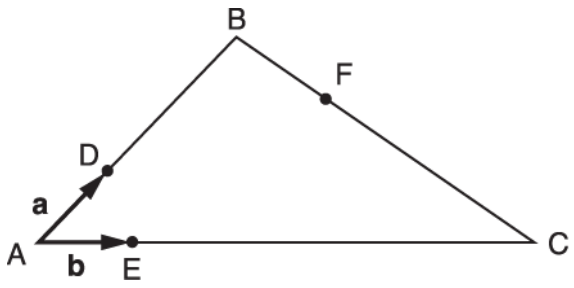
Show that the line with equation $y = \frac{1}{2}x + 10$ is a tangent to the circle.

[6]

9(a). In the diagram below, ABC is a triangle.

$\overrightarrow{AD} = \mathbf{a}$ and $\overrightarrow{AE} = \mathbf{b}$

- D is a point on AB such that AB = 4AD
- E is a point on AC such that AC = 4AE
- F is a point on BC such that BC = 4BF



Not to scale

Write these vectors in terms of **a** and **b** in their simplest form.

i. $\overrightarrow{AB}$

(i) ..... **[1]**

ii. $\overrightarrow{BC}$

(ii) ..... **[1]**

iii. $\overrightarrow{EF}$

(iii) ..... **[2]**

(b). What do your answers from **(a)(i)** and **(a)(iii)** tell you about AB and EF?

[1]

10. A circle has equation $x^2 + y^2 = 80$.

Colin says that the point (5, 7) lies outside the circle.

Is Colin correct?
Show your reasoning.

[2]

11. The mass of a sack of rice is 20 kg, correct to the nearest kilogram.
Salma uses this rice to fill small bags with 500 g of rice, correct to the nearest 10 grams.

Calculate the minimum number of small bags that Salma can fill.

..... **[3]**

12. Some boxes are to be loaded into a van.

Each box measures exactly 40 cm by 30 cm by 50 cm.
Each box weighs 40 kg, correct to the **nearest kilogram**.

The loading space in the van measures exactly 110 cm by 90 cm by 180 cm.
The maximum total weight of the boxes that can be loaded into the van is 890 kg, correct to the **nearest 10 kilograms**.

Work out the maximum number of boxes that can be loaded into the van without exceeding the weight limit.
Show clearly how you worked out your answer.

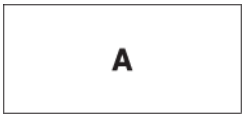
..... **[5]**

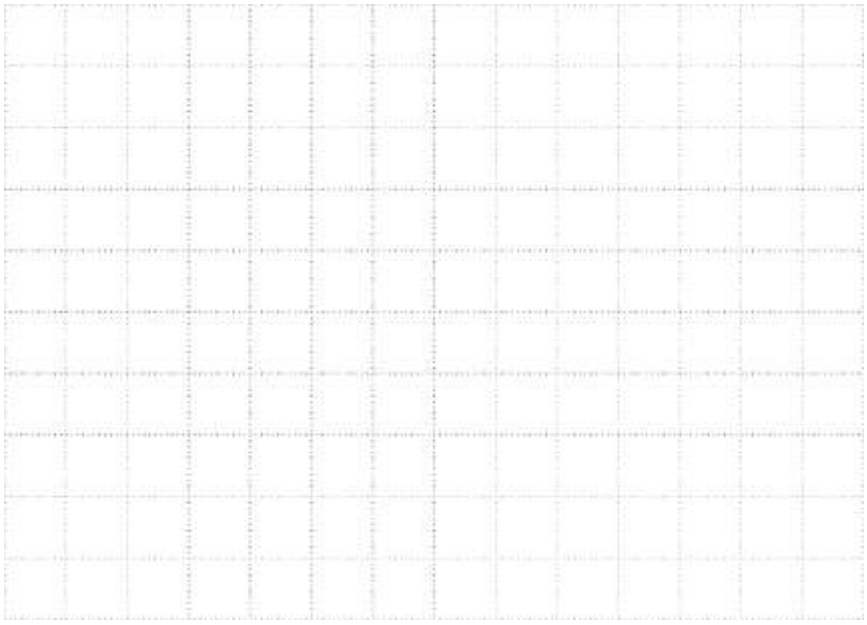
13. Kahli has a sewing box which is a cuboid measuring 15 cm by 35 cm by 10 cm.
She buys a pair of thin knitting needles which are 40 cm long.

Calculate whether a 40 cm knitting needle can fit in her sewing box.
Show how you decide.

[3]

14(a). Rectangle **A** is 4 cm long and 2 cm wide.
On the grid, draw a rectangle, **B**, that is **not** similar to **A**.
All the sides of the rectangle must lie on grid lines.



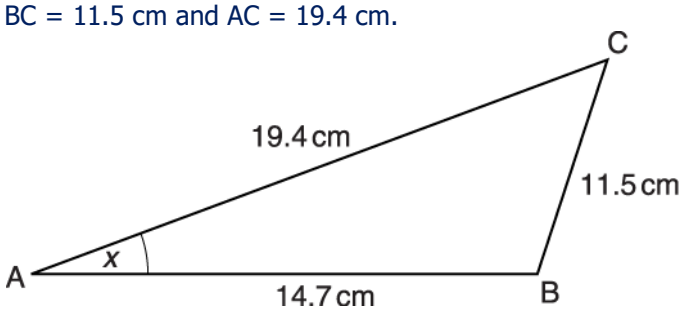


[1]

(b). Use values to explain why rectangles **A** and **B** are **not** similar.

[2]

15. The diagram shows a triangle ABC.
AB = 14.7 cm, BC = 11.5 cm and AC = 19.4 cm.



Not to scale

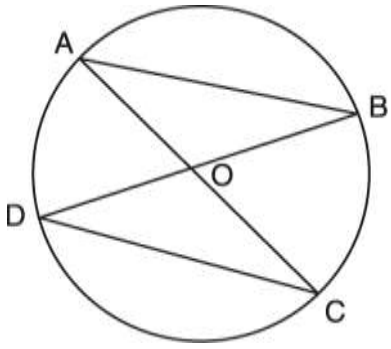
i. Show that triangle ABC is **not** a right-angled triangle.

[3]

ii. Calculate angle *x*.

(ii) ..... ° **[3]**

16. In the diagram AC and BD are diameters of the circle, centre O.

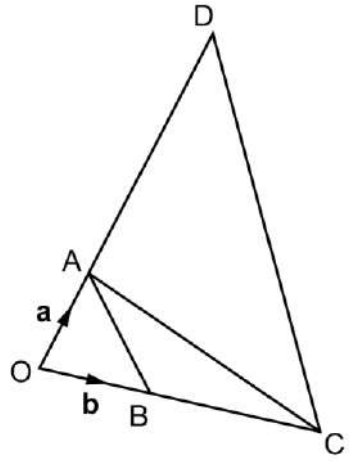


Not to scale

Prove that triangles OAB and ODC are congruent.

[3]

17. In the diagram, A is a point on OD and B is a point on OC.



Not to scale

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.

$OA = \frac{1}{4} OD$ and $OB = \frac{1}{3} OC$

E is the point such that $\overrightarrow{AE} = 3\mathbf{b} + 2\mathbf{a}$.
Show that ACED is a parallelogram.

[5]

END OF QUESTION PAPER