OCR
Oxford Cambridge and RSA

H

GCSE (9–1) Mathematics

J560/05 Paper 5 (Higher Tier)

Practice Paper – Set 3

Time allowed: 1 hour 30 minutes

2016

You may use:
- Geometrical instruments
- Tracing paper

Do not use:
- a Calculator

J560/05

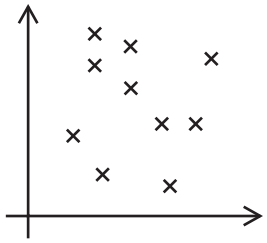
First name									
Last name									
Centre number						Candidate number				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document consists of **20** pages.

Answer **all** the questions

1 Describe the correlation shown in each of these scatter graphs.
Where there is correlation, state the strength.



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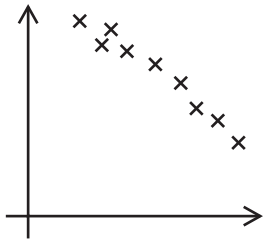

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..... **[3]**

2 **(a)** Tom invests £2000 at 5% per year simple interest.

How much interest has been paid after 6 years?

(a) £ ..... **[2]**

(b) Tom receives a 20% wage increase.
His new weekly wage is £360.

Calculate his weekly wage before the increase.

(b) £ ..... **[3]**

3 Demi gives her dog $\frac{2}{3}$ of a tin of food each day.

Work out the smallest number of tins of food that she needs to feed her dog for 10 days.

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

4 Adil, Katie and Rebecca share £160 in the ratio 2 : 5 : 3.

(a) How much does Rebecca receive?

(a) £ ..... **[2]**

(b) Katie says she receives 60% more than Rebecca.
Here is her reasoning.

I receive 5 parts and Rebecca receives 3 parts.

$$\frac{3}{5} = 60\%$$

So I receive 60% more than Rebecca.

(i) Explain what is wrong with Katie's reasoning.

.....

..... **[1]**

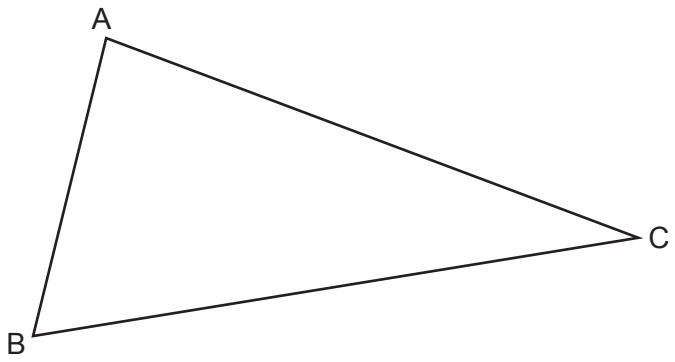
(ii) Complete the following to give the correct percentage.

I receive 5 parts and Rebecca receives 3 parts.

..... = ... %

So I receive ..... % more than Rebecca. **[2]**

5 ABC is a triangle.



(a) Construct the locus of points inside the triangle that are equidistant from BA and BC. Show all your construction lines. **[2]**

(b) Indicate the point on the locus inside the triangle which is 3cm from A. **[1]**

6 **(a)** The distance from the Sun to the Earth is approximately 150 000 000 km.

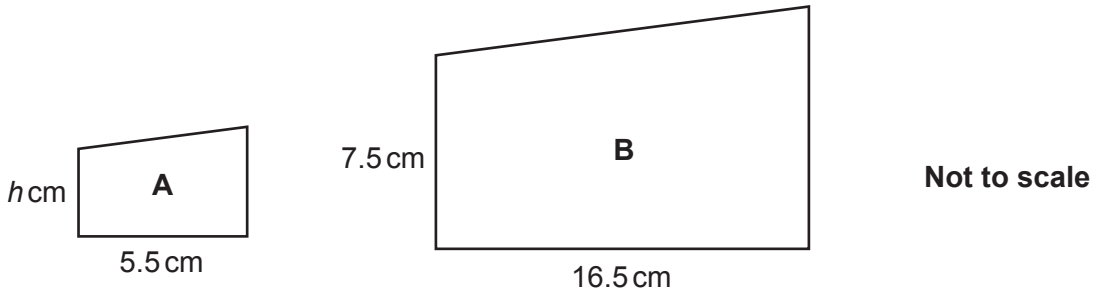
Write this distance in standard form.

(a) .....km **[1]**

(b) Light travels at 299 792 km per second.
Neil estimates that light takes approximately 20 minutes to reach the Earth from the Sun.

Show that his estimate is incorrect. **[4]**

7 Shape **A** is similar to shape **B**.

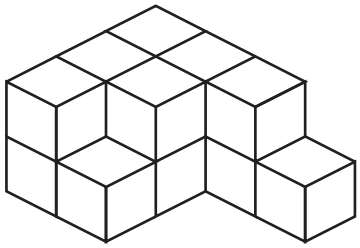


Not to scale

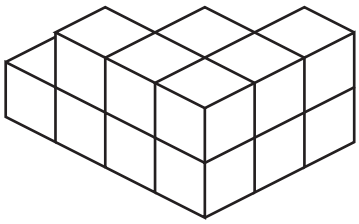
Work out the value of h.

h = ... **[3]**

8 The diagram shows two views of a solid made from 14 one-centimetre cubes.



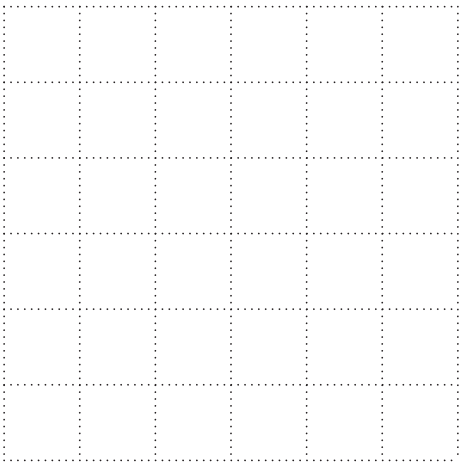
Front view



Rear view

Not to scale

(a) On the centimetre grid below, draw a plan of the solid.



[2]

(b) Work out the **smallest** number of cubes that need to be added to the solid to make a cube.

(b) ..... **[2]**

9 **(a)** Rearrange this formula to make x the subject.

$$y = \frac{2x}{5}$$

(a) ..... **[2]**

(b) Solve.

$$5x - 6 = 3x + 13$$

(b) $x =$ ..... **[3]**

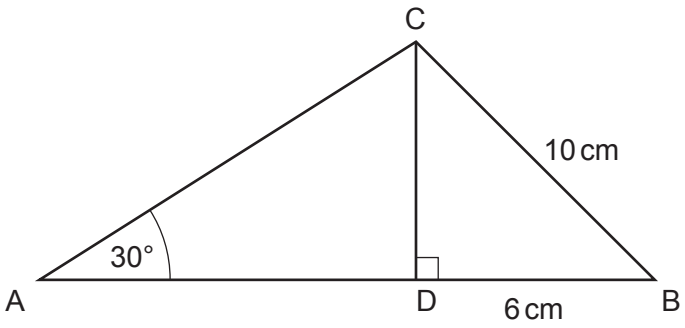
10 Danny sells pens and notebooks in his shop.
On Monday, he sold 5 pens and 8 notebooks for £44.50.
On Tuesday, he sold 10 pens and 3 notebooks for £37.

Work out the cost of a pen and the cost of a notebook.

pen £ .....

notebook £ ..... **[5]**

11 The diagram shows triangle ABC.
D is a point on AB such that DB = 6 cm.
BC = 10 cm, angle CAD = 30° and angle BDC = 90°.

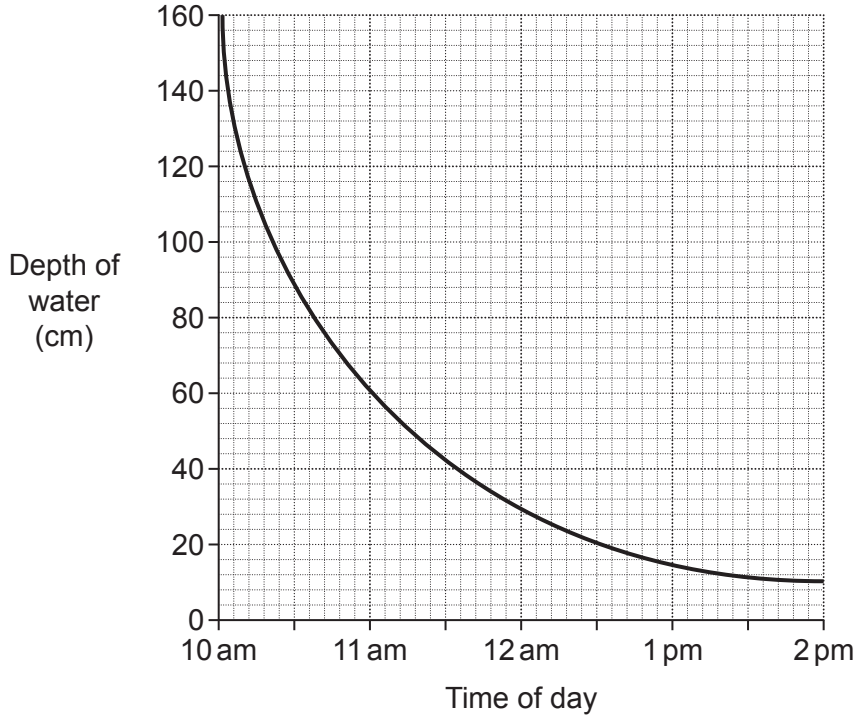


Not to scale

Work out the ratio length of AC : length of DB in its simplest form.

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

12 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.



(a) What fraction of the water is **left** in the tank at 12 30 pm?
Give your answer in its simplest form.

(a) ..... **[2]**

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

$160 \div 4$

$= 40$ cm/h

What error has Mike made?

.....

..... **[1]**

(c) 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]**

13 There are 5 blue sweets, 3 red sweets, 2 green sweets and no other sweets in a box.

Waleed chooses 3 sweets at random from the box and puts them in his pocket.

(a) Waleed calculates the probability of choosing 3 red sweets as

$$\frac{3}{10} \times \frac{3}{10} \times \frac{3}{10} = \frac{27}{1000}.$$

What incorrect assumption has he made?

..... **[1]**

(b) Show that the probability of Waleed choosing three sweets of the same colour is $\frac{11}{120}$. **[5]**

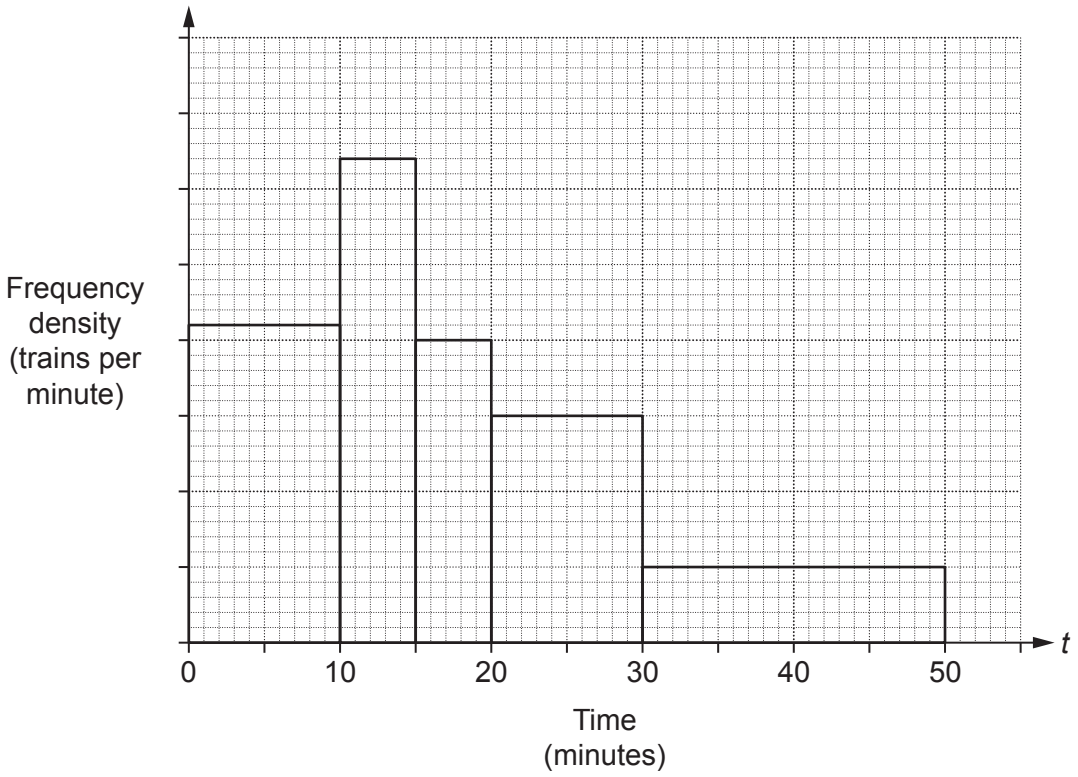
14 **(a)** Write $\frac{7}{11}$ as a recurring decimal.

(a) ..... **[2]**

(b) Convert $0.3\dot{6}$ to a fraction.
Give your answer in its lowest terms.

(b) ..... **[3]**

15 The histogram shows information about the times, in minutes, that trains arrived late at a station one day.



(a) David says that the range of times these trains arrived late is actually 48 minutes.

Could he be correct? Explain your reasoning.

.....

..... **[1]**

(b) 10 of these trains were between 30 minutes and 50 minutes late on that day.

Work out the number of trains that were at most 15 minutes late.

(b) ..... **[3]**

16 Sarah buys x apples and y oranges.

She buys
- at least 4 apples
- at most 9 oranges
- more oranges than apples.

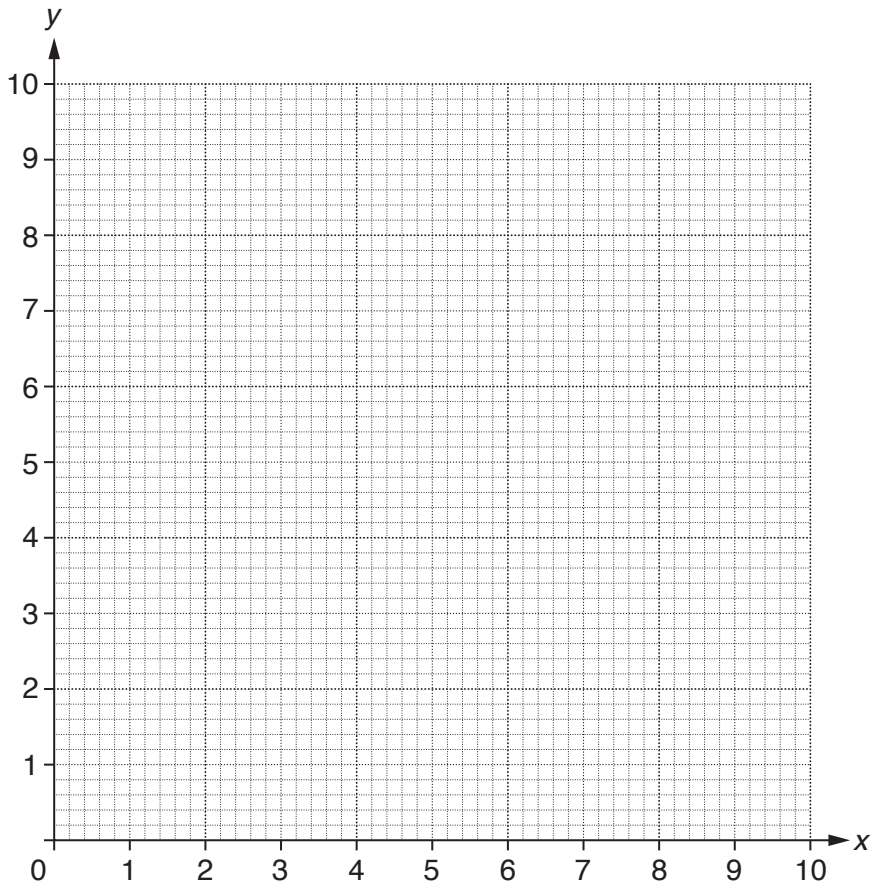
(a) (i) One of the inequalities for this information is $x \geqslant 4$.

Write down two more inequalities for this information.

(a)(i) .....

..... **[2]**

(ii) On the grid, show the region represented by the three inequalities in part **(a)(i)**. Shade the region that is **not** required.



[4]

(b) Apples cost 45p each and oranges cost 30p each.
Sarah spends £4.05 on apples and oranges.

How many apples and how many oranges does she buy?

(b) apples ..... , oranges ..... **[2]**

17 **(a)** Simplify.

(i) $3\sqrt{2} \times \sqrt{6}$

(a)(i) ..... **[2]**

(ii) $\dfrac{6}{\sqrt{2}}$

(ii) ..... **[2]**

(b) Evaluate.

$16^{\frac{1}{2}}$

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

18 Ryan is using the quadratic formula to solve an equation of the form

$$ax^2 + bx + c = 0.$$

After substituting values into the quadratic formula, he gets

$$x = \frac{-3 \pm 3\sqrt{5}}{2}.$$

(a) Find a set of possible values for a, b and c.

(a) $a =$ .....

$b =$ .....

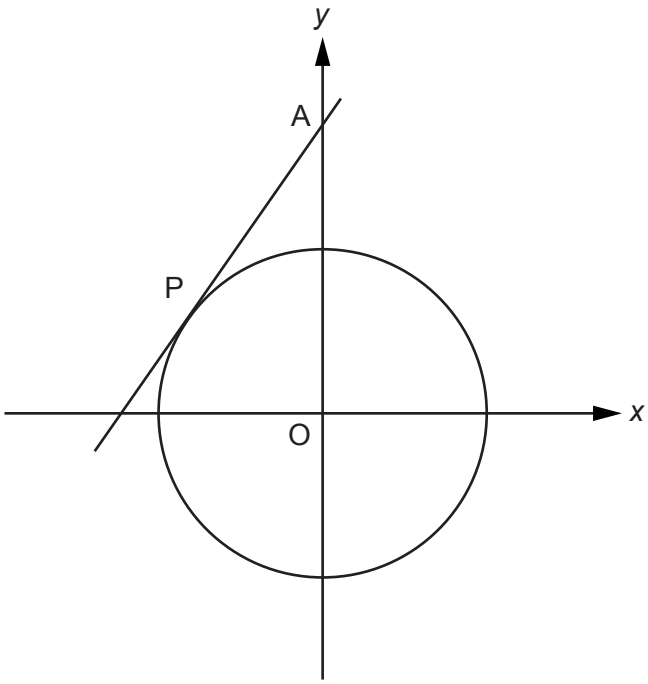
$c =$ ..... **[5]**

(b) Explain why there are other sets of possible values for a, b and c.

.....

..... **[1]**

19 The diagram shows the circle $x^2 + y^2 = 5$.



Not to scale

(a) Mandy says that the point (2, 1.5) lies inside the circle.

Is she correct?
Show how you decide.

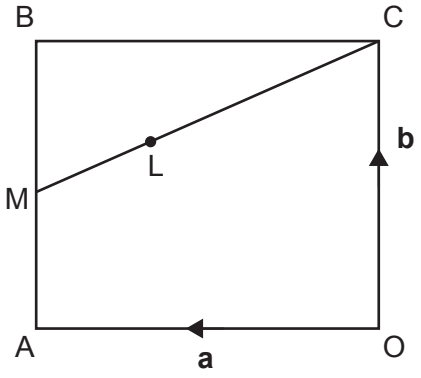
..... **[2]**

(b) The tangent to the circle at the point P ($^-2$, 1) intersects the y-axis at A.

Show that the area of the triangle APO is 5 square units. **[6]**

20 OABC is a square.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{b}$.
M is the midpoint of AB.

L is a point on MC such that LC = 2ML.



Not to scale

Use vectors to prove that point L lies on the line OB. **[5]**

END OF QUESTION PAPER

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