

Name: .....



# 16+ Entry

## Mathematics Paper

### Specimen

#### Instructions

- Print your name in block capitals in the space at the top of the page.
- Answer all questions in the spaces provided.
- Do not use extra paper.
- Calculators are allowed, but **full** working should be shown for **all** questions.
- You are reminded of the need for clear presentation in your answers.
- Time allowed: 50 minutes

1 Find the value(s) of  $x$  that make each equation true:

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

.....

(ii)  $2(2x - 1)^3 - 24 = 226$

.....

(iii)  $2(2x + 7) - 5(3 - x) = -5$

.....

- 2 (i) Bob has completed 4 maths tests this year, and his mean score is 20. What must he score on his fifth test to increase his mean score to 24?

.....

- (ii) Jane has completed 4 laps of a track at an average speed of 20 km/h. At what average speed must she complete her fifth lap to increase her average speed to 24 km/h?

.....

**3** Ed has a card shop.

- (i) He buys a particular card for £1.20 and sells it for £1.68. Calculate his percentage profit on this card.

.....

- (ii) Ed's profit on "Good Luck" cards in 2018 was £360.  
This was a decrease of 20% on his profit in 2017.  
Work out Ed's profit on "Good Luck" cards in 2017.

.....

4 (i) Multiply out and simplify each expression below:

(a)  $(2x + 3y - 1)(x + 2y + 3)$

.....

(b)  $(3p - 2)(2q + 1)$

.....

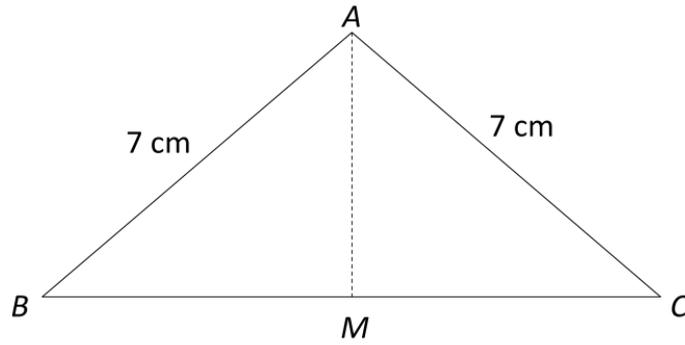
(ii) Factorise each of the expressions below:

(a)  $14p^2q - 21p^4q^3$

.....

(b)  $6mn - 4n + 21m - 14$

.....



**[Diagram NOT to scale]**

In the diagram,  $ABC$  is an isosceles triangle with  $AB = AC = 7\text{cm}$  and  $BC = 10\text{cm}$ .  $M$  is the midpoint of  $BC$ .

Find

(i) The length  $AM$ .

.....

(ii) The area of triangle  $ABC$ .

.....

**6 (i)** In a regular polygon, each interior angle is 8 times as big as each exterior angle. How many sides does the polygon have?

.....

**(ii)** In an isosceles triangle, one of the angles is four times as big as the other. What could the angles in the triangle be?

..... or .....

7 Every day, Jaideep rolls a six sided die to decide how he will get to school. If he rolls a 1 or a 2 he walks to school. Otherwise he gets the bus. If he walks, the probability that he's late is  $\frac{1}{4}$ , whereas if he takes the bus, the probability that he is late is  $\frac{3}{5}$ .

(i) Find the probability that he is late for school on any particular day.

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(ii) On what fraction of days that Jaideep is late for school has he taken the bus?

.....

8 Solve the simultaneous equations

$$2x = 5y - 7$$

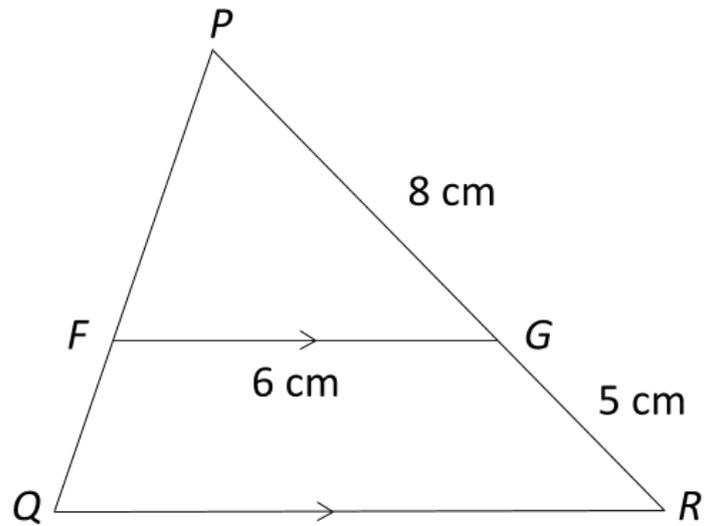
$$3y - 4x + 14 = 0$$

9 (i) Simplify  $3(2p^2q^3)^3$ .

(ii) Find  $p$  if  $3^p = \frac{\sqrt[3]{9}}{3}$ .

.....

.....



**[Diagram NOT to scale]**

In the diagram above,  $FG$  is parallel to  $QR$ .

- (i) Find the length  $QR$ .

.....

The area of triangle  $PFQ$  is  $16\text{cm}^2$ .

- (ii) Find the area of the trapezium  $FGRQ$ .

.....

**END OF QUESTION PAPER**

**GO BACK AND CHECK YOUR WORK**