Name: .....

LATYMER UPPER SCHOOL
INDEPENDENT & CO-EDUCATIONAL

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) $\dfrac{3x+1}{2} - \dfrac{1}{3} = x$

.....

(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:

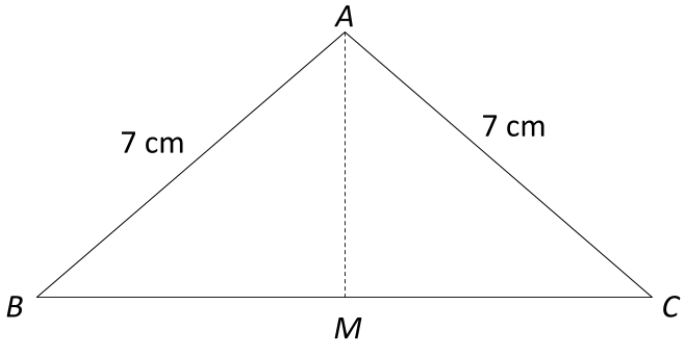
(**a**) $14p^2q - 21p^4q^3$

.....

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

.....

5



[Diagram NOT to scale]

In the diagram, ABC is an isosceles triangle with $AB = AC = 7$cm and $BC = 10$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.

.....

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

.....

8 Solve the simultaneous equations

$$2x = 5y - 7$$

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

.....

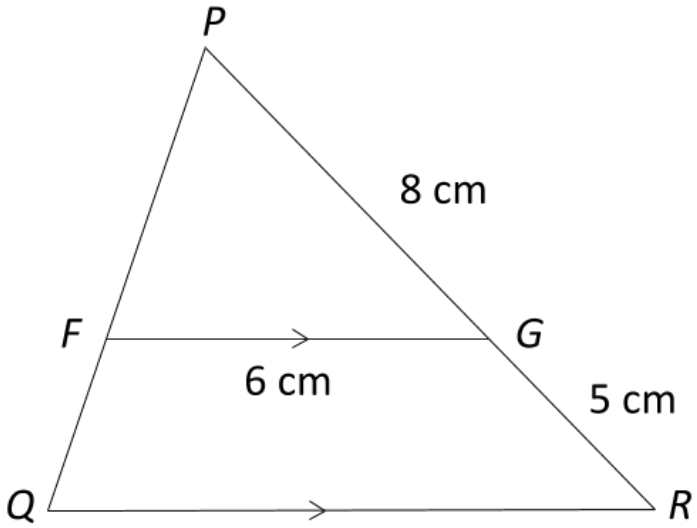
9 (**i**) Simplify $3\left(2p^2q^3\right)^3$.

.....

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

.....

10



[Diagram NOT to scale]

In the diagram above, FG is parallel to QR.

(**i**) Find the length QR.

.....

The area of triangle PFG is 16cm^2.

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

.....

END OF QUESTION PAPER

GO BACK AND CHECK YOUR WORK