Day 278 **B Tier 10-a-day: Model Solutions**

1 Symmetry

How many lines of symmetry does an isosceles trapezium have?

An isosceles trapezium has 1 line of symmetry

Answer: 1

2 Collecting like terms

Simplify $7x - 4y - 5x - 6y$

Collect the x terms: $7x - 5x = 2x$

Collect the y terms: $-4y - 6y = -10y$

Answer: $2x - 10y$

3 Fractions of amounts

A bag has 24 counters.

$\frac{1}{3}$ of the counters are red.

How many are not red?

$\frac{1}{3}$ of $24 = 24 \div 3 \times 1 = 8$

Not red: $24 - 8 = 16$

Answer: 16

4 Map scales

The scale of a map is 1 : 10,000.

Two towns are 30 cm apart on the map.

Work out the real distance between the towns.

Give your answer in kilometres.

$30 \times 10{,}000 = 300{,}000$ cm

100 000 cm = 1 km, so divide by 100 000

= 3 km

Answer: 3 km

5 Midpoint of a line segment

M is the midpoint of AB.

A is the point (9, 6) and M is the point (1, 5).

Find the coordinates of B.

From A to M, x changes by -8 and y changes by -1

Do the same change again from M to get to B: $x = 1 - 8 = -7$, $y = 5 - 1 = 4$

Answer: $(-7, 4)$

6 Reflection

The diagram shows triangle ABC on a grid.

(a) Write down the coordinates of the image of B after a reflection in the x-axis.

(b) Write down the coordinates of the image of A after a reflection in the line x = 1.

(a) B is at (3, 1). Reflect in the x-axis: $(3, -1)$

(b) A is at (4, 3). Reflect in the line x = 1: $(-2, 3)$

Answer: (a) $(3, -1)$ (b) $(-2, 3)$

7 Equation of a line

A straight line has gradient 3 and passes through the point (4, 5).

Find the equation of the line.

The equation is $y = 3x + c$

Substitute $x = 4$ and $y = 5$: $5 = 3 \times 4 + c$

$5 = 12 + c$

$c = 5 - 12 = -7$

Answer: $y = 3x - 7$

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8 Simplifying ratios

Write the ratio 5.6 m : 720 cm in its simplest form.

Change to the same units: 5.6 m = 560 cm
560 : 720
Divide both by 80 to get 7 : 9
Answer: 7 : 9

9 Fraction problems

A paddling pool is $\frac{1}{3}$ full.

110 litres of water are added.

The paddling pool is now $\frac{2}{3}$ full.

Work out the capacity of the paddling pool.

Fraction added = $\frac{2}{3} - \frac{1}{3} = \frac{1}{3}$

$\frac{1}{3}$ of the capacity = 110 litres
Whole capacity = 110 × 3 = 330 litres
Answer: 330 litres

10 Currency conversion

£1 = 1.2 euros
A holiday costs €96.
Work out the cost in pounds.

Divide by the rate: 96 ÷ 1.2
= £80
Answer: £80