Day 212 **B Tier 10-a-day: Model Solutions**

1 Types of number

Here is a list of numbers.
57, 12, 84, 94, 24, 18, 20, 41
From the list, write down
(a) a multiple of 7
(b) an odd number that is not prime

(a) 84 (7 × 12) is in the 7 times table
(b) 57 is odd but has more than two factors
Answer: (a) 84 (b) 57

2 Forming expressions

A pencil costs p pence.
A pen costs 30 pence more than a pencil.
(a) Write an expression, in terms of p, for the cost of a pen.
(b) Write an expression, in terms of p, for the total cost of 3 pencils and 3 pens. Give your answer in its simplest form.

(a) A pen costs 30p more than a pencil: p + 30
(b) 3 pencils cost 3p and 3 pens cost 3(p + 30)
3p + 3p + 90
Collect like terms: 6p + 90
Answer: (a) p + 30 (b) 6p + 90 pence

3 Rates

Amy types at 60 words per minute.
(a) How many words does Amy type in 8 minutes?
(b) How long does Amy take to type 1440 words?

(a) 60 × 8 = 480
(b) 1440 ÷ 60 = 24 minutes
Answer: (a) 480 words (b) 24 minutes

4 Fractions in simplest form

What fraction of £4.50 is 30p?
Give your answer in its simplest form.

£4.50 = 450 pence
$\frac{30}{450} = \frac{1}{15}$
Answer: $\frac{1}{15}$

5 Similar shapes

The two triangles are similar.
(a) Write down the scale factor of the enlargement from the smaller triangle to the larger triangle.
(b) Work out the value of b.
The diagram is not drawn accurately.

(a) Scale factor = 18 ÷ 6 = 3
(b) b = 9 × 3 = 27
Answer: (a) 3 (b) b = 27 cm

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6 Wages and overtime

Mohammed is paid £10 per hour for a 37 hour week. (Calculator)
Overtime is paid at time and a half.
In one week he works 3 hours of overtime.
Work out his total pay for that week.

Normal pay: 37 × £10 = £370
Overtime rate: £10 × 1.5 = £15 per hour
Overtime pay: 3 × £15 = £45
Total: £370 + £45 = £415
Answer: £415

7 Area of an isosceles trapezium

An isosceles trapezium has parallel sides of length 21 cm and 5 cm.
Each sloping side is 10 cm long.
(a) Work out the perpendicular height of the trapezium.
(b) Work out the area of the trapezium.

(a) The difference in the parallel sides is 21 − 5 = 16, so each end sticks out 8
$h^2 = 10^2 - 8^2 = 100 - 64 = 36$, so h = 6
(b) Area = ½ × (21 + 5) × 6 = 78
Answer: (a) 6 cm (b) 78 cm^2

8 Pay and overtime

Chloe earns £12 per hour for the first 35 hours worked each week.
Any extra hours are paid at double time.
Last week Chloe worked 43 hours.
Work out Chloe's total pay for last week.

Normal pay: 35 × £12 = £420
Overtime rate: 2 × £12 = £24 per hour
Overtime pay: 8 × £24 = £192
Total = £420 + £192 = £612
Answer: £612

9 Prisms and density

A prism has volume 195 m^3.
The area of its cross-section is 39 m^2.
Work out the length of the prism.

Volume = area of cross-section × length
Length = 195 ÷ 39 = 5
Answer: 5 m

10 Factorising quadratics

Factorise $x^2 - 12x + 32$

Find two numbers that multiply to give 32 and add to give −12
The numbers are −8 and −4
Answer: (x − 8)(x − 4)