Day 128 **B Tier 10-a-day: Model Solutions**

1 Scaling a recipe

Here are the amounts needed to make a smoothie for 2 people.
200 g of yoghurt, 120 ml of juice
Work out the amounts needed to make a smoothie for 9 people.

For 1 person: 200 ÷ 2 = 100 g and 120 ÷ 2 = 60 ml
For 9 people: 100 × 9 = 900 and 60 × 9 = 540
Answer: 900 g of yoghurt, 540 ml of juice

2 Simplifying expressions

Simplify fully
(a) 5c × 4d
(b) 8a × 6a

(a) Multiply the numbers: 5 × 4 = 20, then the letters: c × d = cd
(b) 8 × 6 = 48 and a × a = a^2
Answer: (a) 20cd (b) 48a^2

3 Angles in parallel lines

In the diagram, AB is parallel to CD.
(a) Work out the size of angle p.
(b) Give a reason for your answer.
The diagram is not drawn accurately.

Angle p and the 73° angle are corresponding angles (F shape)
p = 73°
Corresponding angles are equal
Answer: (a) p = 73° (b) Corresponding angles are equal

4 Fractions of amounts

Work out
(a) $\frac{1}{4}$ of 48
(b) $\frac{1}{3}$ of £21

(a) 48 ÷ 4 = 12, then 12 × 1 = 12
(b) 21 ÷ 3 = 7, then 7 × 1 = 7
Answer: (a) 12 (b) £7

5 Expanding brackets

Expand
(a) 9(5x − 9)
(b) 4x(x + 8)

(a) 9 × 5x = 45x and 9 × (−9) = −81
(b) 4x × x = $4x^2$ and 4x × 8 = 32x
Answer: (a) 45x − 81 (b) $4x^2$ + 32x

6 Isosceles triangles and Pythagoras

Triangle ABC is isosceles with AB = AC = 13 cm.
The base BC = 10 cm.
(a) Work out the perpendicular height of the triangle.
(b) Work out the area of the triangle.

(a) The height splits the base in half: 10 ÷ 2 = 5
$h^2 = 13^2 - 5^2 = 169 - 25 = 144$, so h = 12
(b) Area = ½ × 10 × 12 = 60
Answer: (a) 12 cm (b) 60 cm^2

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7 Venn diagrams

The Venn diagram shows information about 23 children at a party.
One of them is chosen at random.
Find the probability that the person chose Pizza or Burgers or both.

Inside the circles = 13 + 3 + 2 = 18
Total = 23
P = 18 out of 23
Answer: $\frac{18}{23}$

8 Compound percentages

Priya invests £800 in a savings account. (Calculator)
The account pays 4% compound interest per year.
Work out the amount in the account after 3 years.
Give your answer to the nearest penny.

Multiplier = 1 + 4% = 1.04
Amount = 800×1.04^3
= £899.89
Answer: £899.89

9 Solving quadratic equations

Solve $x^2 - 12x + 36 = 0$

Factorise: $(x - 6)(x - 6) = 0$
Either $x - 6 = 0$ or $x - 6 = 0$
Answer: x = 6

10 Pythagoras' theorem

Work out the length of d. (Calculator)
Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

Use Pythagoras: $a^2 + b^2 = c^2$, where c is the longest side
$d^2 + 9^2 = 13^2$
$d^2 = 169 - 81 = 88$
$d = \sqrt{88} = 9.381...$
d = 9.4 cm (1 d.p.)
Answer: d = 9.4 cm