Day 114 **B Tier 10-a-day: Model Solutions**

1 Negative numbers

Work out
(a) $-8-(-5)$
(b) $(-5)\times(-3)$

(a) Subtracting a negative is the same as adding: $-8+5=-3$
(b) Negative × negative = positive: $5\times3=15$
Answer: (a) -3 (b) 15

2 Expanding brackets

Expand
(a) $4(x+7)$
(b) $3(2y+7)$

(a) $4\times x=4x$ and $4\times7=28$
(b) $3\times2y=6y$ and $3\times7=21$
Answer: (a) $4x+28$ (b) $6y+21$

3 Rates

Femi types at 45 words per minute.
(a) How many words does Femi type in 12 minutes?
(b) How long does Femi take to type 1620 words?

(a) $45\times12=540$
(b) $1620\div45=36$ minutes
Answer: (a) 540 words (b) 36 minutes

4 Surface area of cuboids

An open box (no lid) is a cuboid measuring 7 cm by 8 cm by 5 cm.
The base is 7 cm by 8 cm.
Work out the total area of card needed to make the box.

Base: $7\times8=56$
Two long sides: $2\times7\times5=70$
Two short sides: $2\times8\times5=80$
$56+70+80=206$
Answer: 206 cm^2

5 Equations with brackets

Solve $6(3x-2)=-84$

Divide both sides by 6: $3x-2=-14$
Add 2 to both sides: $3x=-12$
Divide both sides by 3
Answer: $x=-4$

6 Simple interest

Farah invests £4000 for 6 years.
The account pays 2.5% simple interest per year.
(a) Work out the interest earned each year.
(b) Work out the total amount in the account after 6 years.

(a) 2.5% of £4000 = $4000\div100\times2.5=$ £100
(b) Interest over 6 years: $6\times$ £100 = £600
Total = £4000 + £600 = £4600
Answer: (a) £100 (b) £4600

Day 114 **B Tier 10-a-day: Model Solutions**

7 Area of a triangle using sine

In triangle PQR, PQ = 5 m, QR = 18 m and angle PQR = 55°. (Calculator)
Work out the area of the triangle.
Give your answer correct to 1 decimal place.

Area = ½ab sin C
Area = ½ × 5 × 18 × sin 55°
= 36.862...
= 36.9 m^2 (1 d.p.)
Answer: 36.9 m^2

8 Standard form calculations

Work out $(12.4 \times 10^7) \div (4 \times 10^2)$
Give your answer in standard form.

Divide the numbers: 12.4 ÷ 4 = 3.1
Subtract the powers: 7 − 2 = 5
3.1×10^5
Answer: 3.1×10^5

9 Speed unit conversion

A bird flies at 30 metres per second.
Work out this speed in kilometres per hour.

In 1 hour (3600 s) it travels 30 × 3600 = 108,000 m
108,000 m = 108 km
Answer: 108 km/h

10 Currency conversion

£1 = 1.1 euros
A holiday costs €220.
Work out the cost in pounds.

Divide by the rate: 220 ÷ 1.1
= £200
Answer: £200