**Day 174** **B Tier 10-a-day: Model Solutions**

## 1 Continuing sequences

Here are the first four terms of a sequence.
45, 40, 35, 30
(a) Write down the next two terms.
(b) Describe the rule for continuing the sequence.

Each term is 5 less than the one before
30 − 5 = 25 and 25 − 5 = 20
**Answer: (a) 25, 20 (b) Subtract 5 each time**

## 2 Probability of not happening

The probability that it will rain on Saturday is 0.45.
Work out the probability that it will not rain on Saturday.

Probabilities add up to 1
1 − 0.45 = 0.55
**Answer: 0.55**

## 3 Surface area of cuboids

A cereal box measures 3 cm by 4 cm by 5 cm.
Work out the total surface area.

Top and bottom: 2 × 3 × 4 = 24
Front and back: 2 × 3 × 5 = 30
Two sides: 2 × 4 × 5 = 40
24 + 30 + 40 = 94
**Answer: 94 cm$^2$**

## 4 HCF and LCM

Find the (a) highest common factor (HCF), (b) lowest common multiple (LCM) of 20 and 45.

$20 = 2^2 \times 5$ and $45 = 3^2 \times 5$
(a) HCF: multiply the primes in both lists, using the smaller power: 5
(b) LCM: use the larger power of every prime: $2^2 \times 3^2 \times 5 = 180$
**Answer: (a) 5 (b) 180**

## 5 Enlargement

A rectangle is 6 m long and 10 m wide.
It is enlarged by scale factor 4.
(a) Write down the length and width of the enlarged rectangle.
(b) Work out the perimeter of the enlarged rectangle.

(a) 6 × 4 = 24 and 10 × 4 = 40
(b) Perimeter = 2 × (24 + 40) = 128
**Answer: (a) 24 m by 40 m (b) 128 m**

## 6 Where a line crosses the axes

A straight line has equation $y = -5x + 10$
(a) Write down the coordinates of the point where the line crosses the y-axis.
(b) Work out the coordinates of the point where the line crosses the x-axis.

(a) When x = 0, y = 10
(b) The line crosses the x-axis when y = 0: $-5x + 10 = 0$
$-5x = -10$
$x = 2$
**Answer: (a) (0, 10) (b) (2, 0)**

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## 7 Trigonometry: finding an angle

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

We know the adjacent (7 cm) and the hypotenuse (25 cm), so use cos

$\cos b = \frac{7}{25}$

$b = \cos^{-1}(\frac{7}{25}) = 73.740...$

b = 73.7° (1 d.p.)

**Answer: b = 73.7°**

## 8 Simple interest

Ravi invests £800 for 4 years.
The account pays 2% simple interest per year.
(a) Work out the interest earned each year.
(b) Work out the total amount in the account after 4 years.

(a) 2% of £800 = 800 ÷ 100 × 2 = £16
(b) Interest over 4 years: 4 × £16 = £64
Total = £800 + £64 = £864
**Answer: (a) £16 (b) £864**

## 9 Tree diagrams

A bag contains 2 mint sweets and 2 toffee sweets.
Amy takes one at random and does not replace it, then takes a second.
Work out the probability that both are mint.

P(first mint) = $\frac{1}{2}$

P(second mint) = $\frac{1}{3}$

P(both mint) = $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

**Answer: $\frac{1}{6}$**

## 10 Reverse repeated percentages

In a sale, the price of a sofa is reduced by 20%. (Calculator)
Two weeks later it is reduced by a further 5% of the new price.
The final price is £304.
Work out the original price of the sofa.

Multipliers: 0.8 and 0.95
Overall multiplier = 0.8 × 0.95 = 0.76
Original price = £304 ÷ 0.76 = £400
**Answer: £400**