Question 1 — Consumer Arithmetic **(7 marks)**

(a) In one particular week Jarrah works his usual 36 ordinary hours, plus 4 hours on Saturday and 3 hours on Sunday. Calculate his total gross pay for the week. (3 marks)

Solution
Ordinary pay = 36 × \$24.80 = \$892.80
Saturday pay = 4 × \$24.80 × 1.5 = \$148.80
Sunday pay = 3 × \$24.80 × 2 = \$148.80
Total gross pay = \$892.80 + \$148.80 + \$148.80 = \$1190.40

Specific behaviours
✓ correct ordinary pay, \$892.80
✓ correct Saturday and Sunday penalty-rate pay, \$148.80 each
✓ correct total gross pay, \$1190.40

(b) A cordless drill in the store is priced at \$253.00, and this price includes GST charged at 10%. Calculate the amount of GST included in this price. (2 marks)

Solution
The GST-inclusive price is 110% of the GST-exclusive price, so GST = GST-inclusive price ÷ 11
GST = \$253.00 ÷ 11 = \$23.00

Specific behaviours
✓ correct method, dividing the GST-inclusive price by 11
✓ correct amount of GST, \$23.00

(c) The store sells wood screws in a box of 200 for \$18.60, or in a box of 500 for \$42.50. Determine, with calculations, which box size offers the better value for money. (2 marks)

Solution
Box of 200: \$18.60 ÷ 200 = \$0.093 per screw (9.3 cents)
Box of 500: \$42.50 ÷ 500 = \$0.085 per screw (8.5 cents)
The box of 500 is better value, since its unit price of 8.5 cents per screw is lower than the box of 200's unit price of 9.3 cents per screw.

Specific behaviours
✓ correct unit price calculated for both box sizes
✓ correct conclusion with supporting reasoning — box of 500 is better value

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Question 2 — Measurement & Geometry **(7 marks)**

(a) Calculate the volume of the tank, in m^3, correct to two decimal places. (2 marks)

Solution
$V = \pi r^2 h$, where $r = 1.2$ m and $h = 3.5$ m
$V = \pi \times 1.2^2 \times 3.5$
$V = 15.83$ m^3

Specific behaviours
✓ correct substitution into $V = \pi r^2 h$
✓ correct volume, 15.83 m^3

(b) The outside of the tank is to be painted, including the curved side and the circular top, but not the circular base on which it stands. Calculate the total area to be painted, in m^2, correct to two decimal places. (3 marks)

Solution
Curved surface area $= 2\pi rh = 2\pi \times 1.2 \times 3.5 = 26.39$ m^2
Top circle area $= \pi r^2 = \pi \times 1.2^2 = 4.52$ m^2
Total painted area $= 26.39 + 4.52 = 30.91$ m^2

Specific behaviours
✓ correct curved surface area, 26.39 m^2
✓ correct area of the top circle, 4.52 m^2
✓ correct total painted area, 30.91 m^2

(c) A scale model of the tank is built for a farm field day, with every linear dimension $\frac{1}{5}$ of the actual tank's dimensions. Calculate the volume of the scale model, in m^3, correct to two decimal places. (2 marks)

Solution
Volume scale factor $= (\frac{1}{5})^3 = \frac{1}{125}$
Model volume $= 15.83$ $m^3 \div 125 = 0.13$ m^3

Specific behaviours
✓ correct volume scale factor, 1/125
✓ correct model volume, 0.13 m^3

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Question 3 — Linear Equations & Graphs (8 marks)

(a) Write an equation for Maya's total cost, C, in dollars, to make n cups of coffee on a market day. (1 mark)

Solution
C = 80 + n
Specific behaviours
✓ correct equation, C = 80 + n

(b) Write an equation for Maya's total revenue, R, in dollars, from selling n cups of coffee. (1 mark)

Solution
R = 5n
Specific behaviours
✓ correct equation, R = 5n

(c) State the gradient and the vertical intercept of the cost equation in part (a), and explain what each one represents in this context. (2 marks)

Solution
Gradient = 1: each additional cup of coffee sold increases Maya's total cost by $1.00, the cost of ingredients per cup.
Vertical intercept = 80: this is Maya's fixed cost of $80 per market day, which she pays even if she sells no coffee.
Specific behaviours
✓ correctly identifies and interprets the gradient as $1.00 ingredient cost per cup
✓ correctly identifies and interprets the vertical intercept as the $80 fixed cost

(d) Determine algebraically the number of cups of coffee Maya must sell on a market day to break even. (2 marks)

Solution
At break-even, R = C
5n = 80 + n
4n = 80
n = 20 cups
Specific behaviours
✓ correct equation formed, 5n = 80 + n
✓ correct solution, n = 20 cups

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(e) On average, Maya sells 45 cups of coffee on a market day. Determine her profit on an average market day. (2 marks)

Solution
Revenue = 5 × 45 = \$225
Cost = 80 + 45 = \$125
Profit = \$225 − \$125 = \$100

Specific behaviours
✓ correct revenue and cost for 45 cups
✓ correct profit, \$100

TOP RANKED TUTORING

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