

2023 Sec 1E FTE Paper 2 Mark Scheme

1	Largest = 728 649 999 m ²	[B1]	Swapped answers – max 1m
	Smallest = 728 550 000 m ²	[B1]	

2a	$30abc + 3ab - 18bc$	
	$= 3b(10ac + a - 6c)$	[B1]
2b	$4y + 3(2z - 6)$	
	$= 4y + 6z - 18$	[M1 – Expand, see either 6z or 18]
	$= 2(2y + 3z - 9)$	[A1]

3	After discount = $\frac{95}{100} \times 268.35$	[M1 – discount]	118% on discounted price – max 2m
	$= 254.9325$		
	Total amount = $254.9325 \times 1.1 \times 1.08$	[M1 – finding service charge OR GST]	
	$= 302.86$	[A1 – to 2 dp]	

4a	$HCF = 2^2 \times 7$	[B1]	
4b	$k = 11$	[B1]	
4c	Find LCM = $2^4 \times 5^2 \times 7^2 \times 11$	[M1 – for attempt to find LCM]	
	$q = 2^2 \times 5^2$		B2 awarded if student can obtain 100 by observation.
	$= 100$	[A1]	

5	$\angle DEA = 360 - (5x + 15)$ (angles at a pt.)	[M1]	Poor presentation – deduct 1m if student get full marks for question
	$= 360 - 5x - 15$		
	$= 345 - 5x$		

Adding an additional parallel line at point E

$$\begin{aligned} \angle DEA &= 26 + 180 - (3x - 29) \text{ (alt angles) (int. angle)} \\ &= 26 + 180 - 3x + 29 \\ &= 235 - 3x \\ \angle DEA &= 345 - 5x = 235 - 3x \\ 2x &= 110 \\ x &= 55 \end{aligned}$$

[M1 – alt angle used]
[M1 – int angle used]
[M1 – form correct equation]
[A1]

6a 5 km [B1]

6b 1.5 hours [B1, reject 1h 30min]

6c Gradient = $\frac{\text{Rise}}{\text{Run}}$
= 20 [B1]

20 km/h represents the speed of Daniel travelling from home to supermarket. [B1]

Other accepted answers:
"Rate of change of distance"
"Distance travelled per hour".

7a $3a \times 4b - 2c$
 $= 12ab - 2c$ [B1]

7b $p - 3(q - 2p)$
 $= p - 3q + 6p$ [M1 – expand, see either 3q or 6p]
 $= 7p - 3q$ [A1]

7c $\frac{5x-1}{6} + \frac{7(x+3)}{8}$
 $= \frac{4(5x-1)}{24} + \frac{21(x+3)}{24}$ [B1 – change to same denominator]
 $= \frac{20x-4}{24} + \frac{21x+63}{24}$
 $= \frac{20x-4+21x+63}{24}$ [M1 – attempt to expand numerator]
 $= \frac{41x+59}{24}$ [A1]

8a $p = -2$ [B1]

8b $q = 2$ [B1]

8c Drawing the line [B1]

8d $x = -0.5$ [B1 – must show dotted line on grid]

8e Label R on graph [B1 – must see "R" on grid]

$R = (0.5, 0)$ [B1]

8d) If students calculated using the equation of graph without showing dotted line on grid → 0m

If students rounded exact value(s) for answer to 3s.f. for this question → deduct overall 1m from Qn 9

9a Area of Triangle $ABC = \frac{1}{2} \times 8.66 \times 10$
 $= 43.3 \text{ cm}^2$ [B1]

9b S.A of base $= 43.3 \times 6$ [M1]
 $= 259.8 \text{ cm}^2$

Volume of prism $= \text{Base area} \times \text{Height}$
 $= 259.8 \times 63$
 $= 16367.4 \text{ cm}^3$ [A1]

9c Surface area of sides $= 63 \times 10$ [M1]
 $= 630 \text{ cm}^2$

Total S.A $= 259.8 \times 2 + 630 \times 6$
 $= 4299.6 \text{ cm}^2$ [A1]

9d $500 \text{ cm}^2 = \$1.12$
 $1 \text{ cm}^2 = 1.12 \div 500$ [M1]
 $= 0.00224$
 Total cost $= 0.00224 \times 4299.6$
 $= \$9.63$ [A1 – no FT]

9d) Alternative Answer:

$\frac{4299.6}{500} \approx 8.5992$ [M1]
 ≈ 9 (whole number)

Cost $= 1.12 \times 9$
 $= \$10.08$ [A1]

9e Volume of cylinder $= \pi r^2 h$
 $= \pi (8^2)(4.5)$ [M1]
 $= 904.77868 \text{ cm}^3$
 Number of cylinders $= 16367.4 \div 904.77868$ [M1*]
 $= 18.0899$
 ≈ 18

***9e) Alternative for 2nd M1:**

Volume required for 20 cylinders $= 904.77868 \times 20$
 $= 18095.573$

Difference $= 18095.573 - 16367.4$ [M1]
 $= 1728.173$

Will not be able as there are only 18 such cylinders [A1 – must state “18 cylinders” or “short of 1728.173 cm^3 ”]

10a March and April [B1]

10b Temperature difference = $31.0 - 30.1$
 $= 0.9^{\circ}\text{C}$ [B1]

10c 14 [B1]

10d Percentage = $\frac{22+18+19+12+11+14}{181} \times 100\%$
 $= 53.0\%$ (to 3 s.f) [B1]

10e Disagree [B1]

The y axis of the graph **starts from 10 instead of 0.** [B1]
The height of the bars should not be used to compare the number of times.

If students circled disagree
without attempt to explain
→ 0m

10f Agree. From the graph, in January 2023, the number of rainy days is the highest and the temperature is the lowest in 2023.

[B1 – Agree + comparison done for only 1 month]

While in May 2023, the number of rainy days is the lowest, resulting in the highest maximum temperature. This proves that the trend of number of rainy days is linked to the daily maximum air temperature.

[B1 – Comparing at least 2 different months]