<table>
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<th>Qu.</th>
<th>Part</th>
<th>Answers</th>
<th>Mark</th>
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<tr>
<td>1</td>
<td>(a)</td>
<td>(i) $80 \div 100 \times 8800$ or $8800 - 20 \div 100 \times 8800$&lt;br&gt;(ii) $$5500$</td>
<td>1</td>
<td>M2 for $8800 \div 1.6$ or M1 for ‘cost’ $\times 160 \div 100 = 8800$ oe</td>
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<tr>
<td></td>
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<td>3</td>
<td>M2 for $$5720$ or M1 for ‘cost’ $\times 160 \div 100 = 8800$ oe</td>
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<tr>
<td></td>
<td></td>
<td>(i) $$5720$</td>
<td>2</td>
<td>7040 divided by $(13 + 3) \times 13$</td>
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<tr>
<td></td>
<td>(b)</td>
<td>(ii) $$6527$</td>
<td>4FT</td>
<td>M2 for their $5720 \times 1.045^3$ oe or M1 for their $5720 \times 1.045^3$ oe (up to 2-year stage)</td>
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<td></td>
<td></td>
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<td></td>
<td>A1 for their 6527.47(….) soi</td>
</tr>
<tr>
<td>2</td>
<td>(a)</td>
<td>$50 &lt; x \leq 60$</td>
<td>1</td>
<td>M1 for midpoints 5, 15, 25, … Seen</td>
</tr>
<tr>
<td></td>
<td>(b)</td>
<td>46</td>
<td>4</td>
<td>M1 dep for $\sum$freq $\times$ mid-points or mid-points $\pm 0.5$</td>
</tr>
<tr>
<td></td>
<td>(c)</td>
<td>0, 9, 19, 31, 46, 62, 70, 76, 79, 80</td>
<td>2</td>
<td>M1 dep on 2nd M mark for their 3680 $\div 80$</td>
</tr>
<tr>
<td></td>
<td>(d)</td>
<td>Axes correct scales&lt;br&gt;9 or 10 points plotted&lt;br&gt;Smooth curve or series of ruled lines</td>
<td>1</td>
<td>B1 for 2 or 3 errors</td>
</tr>
<tr>
<td></td>
<td>(e)</td>
<td>(i) 45 to 48&lt;br&gt;(ii) 33 to 35&lt;br&gt;(iii) 12 to 14</td>
<td>1</td>
<td>B1 for 66 to 68 students identified on the vertical axis</td>
</tr>
<tr>
<td></td>
<td>(f)</td>
<td>4.2 cm, 7.5 cm, 1.3 cm</td>
<td>1</td>
<td>B3 for 2 correct</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>B2 for 1 correct</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>If B0 then SC2 for frequency densities 0.63, 1.125 and 0.2 seen. SC1 for 2 of them.</td>
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<td>0580</td>
<td>2</td>
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### Question 3

(a) \( p = -4.84 \quad q = 3 \quad r = 9.67 \)

(b) 10 points plotted correctly half square accuracy. Smooth curve within 1mm of points.

(c) Line \( y = x + 3 \) drawn
\(-1.7\) to \(-1.6\), \(0.6\) to \(0.7\), 

(d) \( a = -1, \quad b = -3, \quad c = 2 \)

(e) Tangent drawn
\(1.6\) to \(2.5\)

### Question 4

(a) \( \sqrt{(11.7^2 + 4.6^2)} \)
\(12.571(\ldots)\) or \(12.572\)

(b) (i) \(181.(\ldots)\) cm\(^2\) or \(181.7\) or \(182\) cm\(^2\)
(ii) \(259.(\ldots)\) cm\(^3\) or \(259.3\) cm\(^3\)

(c) (i) \(54.0(\ldots)\) cm or \(54\) cm
(ii) \(132^\circ\) or \(131.7^\circ(\ldots)\)
| (d) | Drawing of the net of the cone | 1 | Reasonable accuracy for their angle (acute and ±2°) and \( l = 12 \text{ cm to 13 cm.} \) |
| (a) | (i) Accurate plan of the plot of land | 3 | B1 for angle \( DAB = 75° \) (± 2)  
B1 for \( AB = 12 \text{ cm and } BD = 13 \text{ cm} \) Accuracy 2 mm  
B1 for \( BC = 11 \text{ cm and } DC = 10 \text{ cm} \) Accuracy 2 mm  
1 mark for each angle  
2 B1 for correct (±2°) without arcs  
2 B1 for correct without arcs \( 88° \) to \( 92° \) to \( AD \), \( \leq 2 \text{ mm from midpoint of } AD \). |
| | (ii) \( ADB = 63° \pm 2°, BCD = 76° \pm 2° \) | 3 |  
M2 for \( (ADB = ) \ inv \sin \frac{24 \sin 75}{26} \) or  
M1 for \( \frac{24}{\sin ADB} = \frac{26}{\sin 75} \)  
Without working is 0  
M3 for \( (BCD = ) \ inv \cos \frac{20^2 + 22^2 - 26^2}{2 \times 20 \times 22} \) or  
M2 for \( (cos BCD = ) \frac{20^2 + 22^2 - 26^2}{2 \times 20 \times 22} \) or  
M1 for \( 26^2 = 20^2 + 22^2 - 2 \times 20 \times 22 \times \cos BCD \)  
B1 for \( ABD = 42 \)  
M1 \( 0.5 \times 24 \times 26 \sin(\text{their } ABD) + 0.5 \times 20 \times 22 \sin(\text{their } BCD) \) Can be from correct accurate values from the scale drawing. |
| | (iii) Bisector of angle \( DAB \) with 2 pairs of arcs  
(iv) Bisector of \( AD \) with 2 pairs of arcs  
(v) Correct region shaded | 1 | |
| (b) | (i) \( ADB = 63.1° \) | 3 |  
M1 \( \frac{24}{\sin ADB} = \frac{26}{\sin 75} \)  
Without working is 0  
B1 for \( AB = 12 \text{ cm and } BD = 13 \text{ cm} \) Accuracy 2 mm  
B1 for \( BC = 11 \text{ cm and } DC = 10 \text{ cm} \) Accuracy 2 mm  
1 mark for each angle  
2 B1 for correct (±2°) without arcs  
2 B1 for correct without arcs \( 88° \) to \( 92° \) to \( AD \), \( \leq 2 \text{ mm from midpoint of } AD \). |
| | (ii) \( BCD = 76.3° \) | 2 |  
B1 for correct without arcs \( 88° \) to \( 92° \) to \( AD \), \( \leq 2 \text{ mm from midpoint of } AD \). |
| | (iii) \( 492 \text{ m}^2 \) | 1 |  
1FT Dependent on at least B1 in parts (iii) and (iv) |
6 (a) Axes drawn correctly.
(b) Triangle (1, 1), (4, 3), (2, 4) drawn
(c) Reflection in \( y = -x \) \((-1, -1), (-3, -4), (-4, -2)\)
(d) Rotation to \((1, -1), (4, -3), (2, -4)\)
(e) Reflection in \( x \)-axis \((y = 0)\)
(f) (i) Triangle at \((-2, 1), (-8, 3), (-4, 4)\)
   (ii) Stretch
   \[ \text{[Stretch factor =]} -2 \text{ } y \text{-axis invariant} \]
(g) Triangle at \((2, 1), (6, 2), (7, 4)\)

1 1 2FT 2 1
1 Ignore missing labels.
2 B1 for reflection in \( y = x \).
2FT B1 for rotation 90° clockwise about origin.
2 B1 for reflection.
3 1 mark for each correct coordinate.
1 1
2 B1 for 2 vertices correct.

7 (a) \(-0.8 \text{ oe}\)
(b) \(\frac{2 - 3x}{3x + 2}\)
(c) \(\frac{4}{x + 1}\)
(d) 19 683
(e) \(x = -2\)

1 2 2 2 2
1 B1 for \(\frac{4}{3x + 2} - 1\)
2 B1 for \(y + 1 = \frac{4}{x} \text{ or } \frac{4}{y + 1}\)
2 B1 for \(3^9 \text{ seen}\)
2 M1 for \(3^x = \frac{1}{9} \text{ oe}\)
8  (a) \[133 = 0.5(x + x + 4) \times (2x - 1) \text{ oe}
\]
\[(x + 2)(2x - 1)\]
\[2x^2 + 3x - 2 \text{ [\(= 133\)]} \]
\[2x^2 + 3x - 135 = 0\]

(b) \[(i) x = 7.5 \text{ and } x = -9\]

(ii) 14

(c) 15.1

M1 Substitution into trapezium formula
M1 Dependent for RHS simplified. (Can be first step for 2 marks)
A1 A1

3  M1 for \((2x - 15)(x + 9)\) or \[\frac{-3 \pm \sqrt{3^2 - 4 \times 2 \times (-135)}}{2 \times 2}\]
A1 for 7.5 or -9
M1 for use of positive solution. (Only follow through for 1 positive and 1 negative solution in part (i)

2FT M2 for \((AD =) \frac{\text{their}14}{\sin 68}\) or
M1 for \(\sin 68 = \frac{\text{their}14}{AD}\)

9  (a) \[p = -16 \text{ (ii) } q = 81 \text{ (iii) } r = \frac{9}{19} \text{ (iv) } s = 1000\]
\[(v) t = 65 536 \text{ (vi) } u = -64 536\]

(b) \[(i) 11 - 3n \text{ (ii) } n^2 \text{ (iii) } \frac{n}{2n + 1}\]
\[(iv) (n + 1)^3 \text{ (v) } 4^{n-1} \text{ (vi) } (n + 1)^3 - 4^{n-1}\]

(c) 46

(d) 12

6  1 for each

M1 for their (b)(ii) = -127

2  M1 for clear attempt to find \(n\). (e.g. from result for 9)
If zero, SC1 for 11 seen.