

2010 CREDIT PAPER 2 SOLUTIONS

1	$84000 \times 0.75^3 = 35437.5$ 35400 to 3 significant figures	4	
2	$x(x-1)(x-1)$ $= x(x^2 - 2x + 1)$ $= x^3 - 2x^2 + x$	2	
3	<p>Mean = $\frac{808}{8} = 101$</p> <p>S.D = $\sqrt{\frac{20}{7}} = 1.69$</p> <p>1st machine puts a lower average number of pins in each box but is more consistent.</p> <p>On average 2nd machine puts more pins in a box but there is a greater spread of totals.</p>	3	
4	<p>A = 3 b= 5 and c= -7</p> $x = \frac{-5 \pm \sqrt{109}}{6}$ <p>$x = \frac{5.4}{6}$ or $x = \frac{-15.4}{6}$</p> <p>$x = 0.9$ or $x = -2.6$</p>	4	
5	<p>$x^2 = 1^2 - 0.5^2$</p> <p>$x^2 = 0.75$</p> <p>$x = 0.87\text{m}$</p> <p>b) area of rectangle $0.5 \times 1.13 = 0.565$</p> <p>area of triangle $0.5 \times 0.5 \times 0.87 = 0.2175$</p> <p>cross sectional area = 0.7825</p> <p>volume = 0.7825×2</p> <p> = 1.565 m^2</p>	2	3
6	<p>$C = \pi D$</p> <p> = 3.14×72</p> <p> = 226.19</p> <p>arc length = $\frac{140}{360} \times 226.19$</p> <p> = 87.96cm</p>	3	
7	<p>Scale factor for volume = 8</p> <p>Scale factor for length = 2</p>		

8	$H = 2 \times 12 = 24\text{cm}$ $\frac{DF}{\sin 64} = \frac{26.2}{\sin 34}$ $DF = \sin 64 \times \frac{26.2}{\sin 34} = 42.1\text{m}$ <p>perimeter = 114.7</p> $\frac{1000}{114.7} = 8.7 \quad \text{so at least 9 complete circuits}$	3	4
9	$5 - 20\% = 4$ $4 + 20\% = 4.8$ $4 : 4.8 = 40 : 48 = 5 : 6$	4	
10	$\text{Area} = \frac{1}{2} \times q \times r \times \sin P$ $12 = \frac{1}{2} \times 6 \times 5 \times \sin P$ $\sin P = \frac{12}{15} \quad P = \sin^{-1}(0.8)$ $= 53.1$ <p>obtuse angle $180 - 53.1 = 126.9^\circ$</p>		4
11	$h = \frac{kv}{b^2}$ <p>b)</p> $k = \frac{hb^2}{v}$ $= \frac{12 \times 8^2}{256}$ $\underline{k = 3}$ <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> $h = \frac{kv}{b^2}$ $= \frac{3v}{b^2}$ $= \frac{3 \times 600}{10^2}$ $= 18\text{cm}$ </div>	3	
12	<p>By Pythagoras</p> $(x+8)^2 = x^2 + (x+7)^2$ $x^2 + 16x + 64 = 2x^2 + 14x + 49$ $x^2 - 2x - 15 = 0$ $(x - 5)(x + 3) = 0$ $x = 5 \text{ or } x = -3$		

	$x = 5$ as cant be -3		
13	$D = 3 + 1.75 \times \sin 150$ $= 3.875\text{m}$	2	5
b)	maximum when $\sin 30h = 1$ $\text{max} = 3 + 1.75$ minimum when $\sin 30h = -1$ $\text{min} = 3 + (-1.75)$		
	Maximum difference = $4.75 - 1.25$ $= 3.5\text{m}$		2