

## 2010 Credit Paper 1

1.  $\frac{4}{10}$  of  $11.50 - 1.81$

$$= 11.50 \div 10 \times 4 - 1.81$$

$$= 1.15 \times 4 - 1.81$$

$$= 4.60 - 1.81$$

$$= \underline{\underline{\pounds 2.79}}$$

$$\begin{array}{r} 3 \quad 15 \\ 4 \cdot 60 \\ - 1.81 \\ \hline 2.79 \end{array}$$

2.  $\frac{2}{5} \div 1\frac{1}{10}$

$$= \frac{2}{5} \div \frac{11}{10}$$

$$= \frac{2}{5} \times \frac{10}{11}$$

$$= \frac{20}{55}$$

$$= \underline{\underline{\frac{4}{11}}}$$

3.  $t = \frac{7s + 4}{2}$

$$2t = 7s + 4$$

$$2t - 4 = 7s$$

$$\frac{2t - 4}{7} = s \Rightarrow s = \underline{\underline{\frac{2t - 4}{7}}}$$

4a)  $x^2 - 4x = 2x + 7$

$$x^2 - 4x - 2x - 7 = 0$$

$$x^2 - 6x - 7 = 0$$

b)  $(x - 7)(x + 1) = 0$

$$x - 7 = 0 \quad \text{or} \quad x + 1 = 0$$

$$\therefore \underline{\underline{x = 7}} \quad \text{or} \quad \underline{\underline{x = -1}}$$

5a)  $P(\text{black}) = \frac{4}{9}$ ,  $P(\text{white}) = \frac{5}{9}$

b)  $\frac{5}{9} \times 27$

$$= 27 \div 9 \times 5$$

$$= 3 \times 5$$

$$= \underline{\underline{15 \text{ marbles}}}$$

6.  $100\% + 20\% \text{ extra.}$

$$120\% = 900\text{g}$$

$$20\% = 900 \div 6$$
$$= 150\text{g}$$

$$100\% = 150 \times 5$$
$$= \underline{\underline{750\text{g}}}$$

7a)  $y = mx + c$

at  $(2, 7)$

$$7 = 2m + c$$

b)  $y = mx + c$

at  $(4, 17)$

$$17 = 4m + c$$

c)  $2m + c = 7$  ①

$$- 4m + c = 17$$
 ②

$$\hline -2m = -10$$

$$\underline{\underline{m = 5}}$$

Sub  $m = 5$  into ①

$$2(5) + c = 7$$

$$10 + c = 7$$

$$c = 7 - 10$$

$$\underline{\underline{c = -3}}$$

$$y = 5x - 3.$$

d) gradient = 5.

$$\begin{aligned} 8a) \quad & \sqrt{2} \times \sqrt{18} \\ & = \sqrt{2 \times 18} \\ & = \sqrt{36} \\ & = \underline{\underline{6}} \end{aligned}$$

$$\begin{aligned} b) \quad & \sqrt{2} + \sqrt{18} \\ & = \sqrt{2} + \sqrt{9 \times 2} \\ & = \sqrt{2} + 3\sqrt{2} \\ & = \underline{\underline{4\sqrt{2}}} \end{aligned}$$

$$\begin{aligned} c) \quad & \frac{\sqrt{2} \times \sqrt{18}}{\sqrt{2} + \sqrt{18}} \\ & = \frac{6}{4\sqrt{2}} \end{aligned}$$

$$\begin{aligned} & = \frac{6}{4\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} \\ & = \frac{6\sqrt{2}}{4 \times 2} \\ & = \frac{3\sqrt{2}}{4} \end{aligned}$$

$$\begin{aligned} 9a) \quad & y = \frac{1}{3}x + 2 \\ \text{on } x\text{-axis, } & y = 0 \\ & \frac{1}{3}x + 2 = 0 \\ & \frac{1}{3}x = -2 \\ & x = \underline{\underline{-6}} \\ & B \underline{\underline{(-6, 0)}} \end{aligned}$$

$$b) \quad y < 0 \text{ when } x < -6$$

10a)

$$1^3 + 2^3 + 3^3 + 4^3 + 5^3 = \frac{5^2 \times 6^2}{4}$$

$$b) \quad 1^3 + 2^3 + \dots + n^3 = \frac{n^2 + (n+1)^2}{4}$$

$$\begin{aligned} c) \quad 1^3 + 2^3 + 3^3 + \dots + 9^3 & = \frac{9^2 \times 10^2}{4} \\ & = \frac{81 \times 100}{4} \\ & = \frac{8100}{4} \\ & = \underline{\underline{2025}} \end{aligned}$$

$$\begin{aligned} \text{ii. } A_1 & = \frac{1}{2} \times \frac{x}{2} \times 1 \\ & = \frac{x}{4} \end{aligned}$$

$$\begin{aligned} A_2 & = \frac{1}{2} \times (x-1) \times 3 \\ & = \frac{3}{2}(x-1) \end{aligned}$$

$$\therefore \frac{x}{4} = \frac{3}{2}(x-1) \quad (\times 4)$$

$$x = \frac{12}{2}(x-1)$$

$$x = 6(x-1)$$

$$x = 6x - 6$$

$$6 = 6x - x$$

$$6 = 5x$$

$$x = \underline{\underline{\frac{6}{5}}}$$

2010 Credit Paper 2

1. Weight =  $84000 \times (0.75)^3$   
 $= 35437.5$   
 $= \underline{\underline{35400 \text{ (to 3SF)}}$

2.  $x(x-1)^2$   
 $= x(x-1)(x-1)$   
 $= x(x^2 - 2x + 1)$   
 $= \underline{\underline{x^3 - 2x^2 + x}}$

3a) mean,  $\bar{x} = \frac{808}{8} = 101$

$x$	$x - \bar{x}$	$(x - \bar{x})^2$
102	1	1
102	1	1
101	0	0
98	-3	9
99	-2	4
101	0	0
103	2	4
102	1	1

$\Sigma(x - \bar{x})^2 = 20$

$s = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n - 1}}$

$= \sqrt{\frac{20}{7}}$

$= 1.690 \dots$

$= 1.69$

b) • The second machine had, on average two more pins

• The second machine has higher standard deviation and hence greater variation in numbers.

4.  $a = 3, b = 5, c = -7$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-5 \pm \sqrt{5^2 - 4(3)(-7)}}{2 \times 3}$

$= \frac{-5 \pm \sqrt{25 + 84}}{6}$

$= \frac{-5 \pm \sqrt{109}}{6}$

$x = \frac{-5 + \sqrt{109}}{6}$  or  $x = \frac{-5 - \sqrt{109}}{6}$

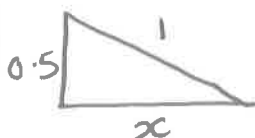
$x = 0.907 \dots$

$x = -2.573 \dots$

$x = 0.9$

$x = -2.6$

5a) *Answer:*



$x^2 = 1^2 - 0.5^2$

$x^2 = 1 - 0.25$

$x^2 = 0.75$

$x = \sqrt{0.75}$

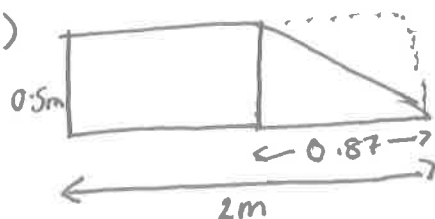
$x = 0.866 \dots$

$x = 0.87$  to 2dp.

b)  $A_{tri} = \frac{1}{2}(0.87)(0.5)$   
 $= \underline{\underline{0.22m^2}}$

$A_{rec} = 2 \times 0.5$   
 $= \underline{\underline{1m^2}}$

Total Area =  $1 - 0.22$   
 $= \underline{\underline{0.78m^2}}$



Volume = Area  $\times$  height

$= 0.78 \times 2$

$= 1.56m^3$

## 2010 Credit Paper 2

6.  $AL = \frac{x}{360} \times \pi \times d$        $r = 36$   
 $d = 72.$

$$= \frac{140}{360} \times \pi \times 72$$

$$= 87.964 \dots$$

$$= \underline{\underline{87.9 \text{ cm.}}}$$

7. Scale factor: length

$$\text{enlarge (vol)} = \frac{1600}{200}$$

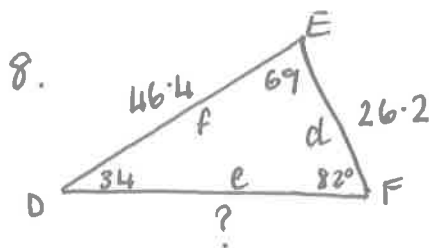
$$= 8$$

$$\text{Scale factor (length)} = \sqrt[3]{8}$$

$$= 2$$

$$\text{Salon bottle} = 2 \times 12$$

$$= \underline{\underline{24 \text{ cm}}}$$



Method #1

$$\frac{d}{\sin D} = \frac{e}{\sin E} = \frac{f}{\sin F}$$

$$\frac{e}{\sin 64} = \frac{46.4}{\sin 82}$$

$$e = \frac{46.4 \sin 64}{\sin 82}$$

$$e = 42.113 \dots$$

$$e = \underline{\underline{42.1 \text{ m.}}}$$

Method #2

$$e^2 = d^2 + f^2 - 2df \cos E$$

$$= (26.2)^2 + (46.4)^2 - 2(26.2)(46.4) \cos 64$$

$$= 1773.561 \dots$$

$$= 1773.6$$

$$e = \sqrt{1773.6}$$

$$e = \underline{\underline{42.1 \text{ m}}}$$

$$\text{Perimeter} = d + e + f$$

$$= 46.4 + 26.2 + 42.1$$

$$= \underline{\underline{114.7 \text{ m}}}$$

$$1000 \div 114.7 \text{ m} = 8.718 \dots$$

They must run 9 circuits to cover 1000m.

9. Sugar: fruit = 5:4

$0.80 \times \text{Sugar}$	$1.20 \times \text{fruit}$
$= 0.80 \times 5$	$1.2 \times 4$
$= \underline{\underline{4}}$	$= \underline{\underline{4.8}}$

$$4 : 4.8$$

$$= 40 : 48$$

$$= \underline{\underline{5 : 6}}$$

10.

$$A = \frac{1}{2} ab \sin C$$

$$= \frac{1}{2} qr \sin P$$

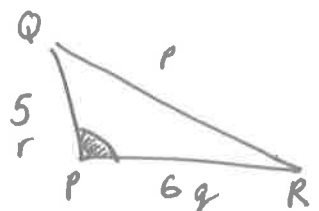
$$12 = \frac{1}{2} (6)(5) \sin P$$

$$24 = 30 \sin P$$

$$\sin P = \frac{24}{30}$$

$$P = \sin^{-1}\left(\frac{12}{15}\right)$$

$$P = 53.1^\circ \text{ (acute)}$$



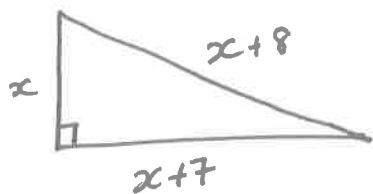
$\therefore$  Obtuse angle

$$= 180 - 53.1$$

$$= \underline{\underline{126.9^\circ}}$$

11 a) No longer in course.

12



$$(x+8)^2 = (x+7)^2 + x^2$$

$$x^2 + 16x + 64 = x^2 + 14x + 49 + x^2$$

$$x^2 + 16x + 64 = 2x^2 + 14x + 49$$

$$0 = x^2 - 2x - 15$$

$$0 = (x-5)(x+3)$$

$$\text{either } x-5=0 \quad x+3=0$$

$$\underline{x=5} \quad \text{or} \quad \underline{x=-3}$$

$$\therefore \underline{\underline{x = 5\text{cm}}}$$

13a)  $D = 3 + 1.75 \sin 30h^\circ$

When  $h=5$

$$D = 3 + 1.75 \sin 150^\circ$$

$$D = 3.875$$

$$\underline{\underline{D = 3.9\text{m}}}$$

b)  $\text{max} = 1.75, \text{min} = -1.75$

(Values from  $1.75 \sin 30h$ )

$$\begin{aligned} \text{max depth} &= 3 + 1.75 \\ &= 4.75\text{m} \end{aligned}$$

$$\begin{aligned} \text{min depth} &= -1.75 + 3 \\ &= 1.25\text{m} \end{aligned}$$

$$\begin{aligned} \text{difference} &= 4.75 - 1.25 \\ &= \underline{\underline{3.5\text{m}}} \end{aligned}$$