

(1)

$$7x + 5x + 18 = 90 \quad \textcircled{1} \text{ forming an equation}$$

$$12x = 72$$

$$x = 6 \quad \textcircled{1} \text{ solving equation}$$

$$7x = 42$$

$$5x + 18 = 48$$

$$\underline{\underline{42}} \quad \textcircled{1} \text{ correct answer}$$

(2)

$$35 = \frac{140}{A}$$

$\textcircled{1}$ substitution

$$\underline{\underline{A = 4 \text{ m}^2}}$$

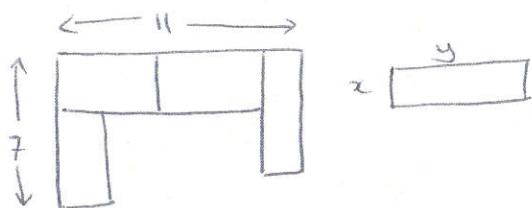
$\textcircled{1} \textcircled{1}$ units!

(3)

$$1 - (0.24 + 0.32) = 0.44 \quad \textcircled{1} \text{ subtraction from 1}$$

$$0.44 \div 2 = \underline{\underline{0.22}} \quad \textcircled{1} \text{ correct answer}$$

(4)



$$\text{Area of one} = 4 \times 3 = 12 \quad \textcircled{1}$$

$$\begin{array}{r} 2y + x = 11 \\ y + x = 7 \\ \hline \end{array} \quad \textcircled{1} \text{ process to find } x \text{ and } y$$

$$\begin{array}{l} y = 4 \\ x = 3 \end{array} \quad \textcircled{1} \text{ either correct}$$

$$\text{Total area} = 4 \times 12$$

$$= 48 \text{ cm}^2$$

~~$\textcircled{1}$ answer~~

$$\textcircled{1} \quad \text{Volume p.t} = 40 \times 100 \times 60 = 240000 \text{ cm}^3$$

$$\text{Litres needed} = 240000 / 1000 = 240 \quad \textcircled{1}$$

$$\text{Bags needed} = 240 / 8 = 30 \quad \textcircled{1}$$

$$\text{Cost} = 30 \times 2.5 = £75 > 70 \quad \text{Sally is wrong}$$

key fact
1 Litre = 1000cm³

(6)

a) Shant because he threw the coin most often. 1

b) He is right for his data.

But overall it looks as though the coin is three times more likely to land on heads.

Either conclusion (right or wrong) but must be supported by data

$$c) p(H) = \frac{3}{4} \quad \textcircled{1}$$

$$p(\text{Heads twice}) = \frac{3}{4} \times \frac{3}{4} = \frac{9}{16} \quad \textcircled{1}$$

(7)

a) $\cos 30 = \sqrt{3}/2 \quad \textcircled{1}$

b) $\sin 30 = \frac{x}{12} \Rightarrow x = 12 \times 0.5 = \underline{\underline{6\text{cm}}} \quad \textcircled{1} \text{ answer}$

(8)

a) Mass Saturn = $0.3 \times 1.899 \times 10^{27}$ 1 multiplying
 $= 3 \times 10^{-1} \times \underline{\underline{2 \times 10^{27}}} \quad \textcircled{1} \text{ estimation}$
 $= \underline{\underline{6 \times 10^{26} \text{ kg}}} \quad \textcircled{1}$

b) overestimate since only value that has been rounded (1.899) has been rounded up (to 2).

1

1
Total Heads = 300

Total Tails = 100

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9) Total at end 10 games = $35 \times 10 = 350$ ① total for 10
 Total at end 11 games = $33 \times 11 = 363$
 $\text{or } 11 \text{ games}$

Points scored in 11th game = $363 - 350$ ① subtracting
 $= \underline{\underline{13}}$

Yes Jordan is right. ① conclusion

10) a) $R : y$ ① tries to identify scale factor

$\begin{matrix} 1 : 6 \\ \times 5 \\ \boxed{5} \end{matrix} \quad \begin{matrix} 30 \\ \times 5 \end{matrix}$ $\frac{5}{\text{red beads}}_{\text{counters}}$
 ① Answer

b) $R : y$
 $1 : 2$
 $15 : 30$ $15 - 5 = \underline{\underline{10}}$ ①

c) ①

.....

11) $125^{\frac{2}{3}} = [(125)^{\frac{1}{3}}]^2 = 5^2 = \underline{\underline{25}}$ ① correct answer

~~8) $\frac{37.5}{30} < 40$~~

12) Total Distance = $50 \times 3 + 150 = 300$ miles

Total Time = $3 + \frac{150}{30} = 8$ hours

Average speed = $\frac{300}{8} = 37.5 < 40$ ①

Sean is wrong.

(13)

$$M = \sqrt{\frac{k^3 + 1}{4}}$$

$$m^2 = \frac{k^3 + 1}{4} \quad \textcircled{1}$$

$$4m^2 = k^3 + 1 \quad \textcircled{1}$$

$$k = \sqrt[3]{4m^2 - 1} \quad \textcircled{1}$$

(14)

$$\frac{x+2}{3x} + \frac{x-2}{2x} = 3$$

$$\frac{2x+4+3x-6}{6x} = 3 \quad \textcircled{1} \text{ common denominator with numerators multiplied appropriately}$$

$$5x - 2 = 18x \quad \left. \begin{array}{l} \\ \end{array} \right\} \textcircled{1} \text{ solving}$$

$$-2 = 13x$$

$$\textcircled{1} \quad \cancel{y_{13}} = \cancel{x}$$

(15)

$$\frac{2x^2 - 3x - 5}{x^2 + 6x + 5} = \frac{(2x-5)(x+1)}{(x+5)(x+1)} \quad \textcircled{1}$$

$$= \frac{2x-5}{x+5} \quad \textcircled{1}$$

(16)

y is directly proportional to x Graph D

(1) atleast
(1) two

y is inversely proportional to x Graph A

(1) fully
correct

y is proportional to square of x Graph B

y is inversely proportional to \sqrt{x} Graph C

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FPP \rightarrow

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RQ is common to both triangles

$SQ = TR$ since $PQ \cong PR$ and

both S & T are midpoints
of PQ & PR respectively

1

$\angle PQR = \angle PRQ$ since PQR is isosceles

1

hence $QTR \cong RSQ$ congruent by SAS

1

18

$$\text{Hemisphere} = \frac{250\pi}{3} = \frac{1}{2} \times \frac{4}{3}\pi r^3$$

1

$$\Rightarrow 500 = 4r^3$$

$$\Rightarrow r^3 = 125$$

$$\Rightarrow r = 5$$

1

$$SA = \pi r^2 + \frac{1}{2} \times 4\pi r^2$$

1

$$= 25\pi + 2\pi \times 25$$

$$= 75\pi$$

1

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$$\frac{(6-\sqrt{5})(6+\sqrt{5})}{\sqrt{31}} = \frac{36-5}{\sqrt{31}} = \frac{31}{\sqrt{31}} = \underline{\underline{\sqrt{31}}}$$

$$\begin{aligned} (n+1)^2 - n^2 &= \underline{\underline{n^2 + 2n + 1 - n^2}} \quad \text{① correct expression} \\ &= 2n+1 \\ &= (n) + (n+1) \quad \left. \right\} \quad \text{① clearly shown} \end{aligned}$$

"n is $n"$

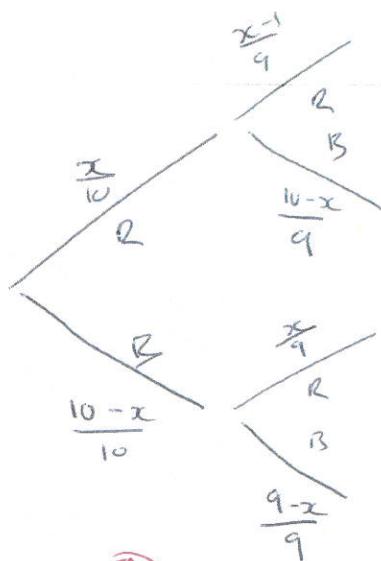
6/

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① Tree diagram with
any these probabilities

$$\begin{aligned}
 & p(\text{one of each}) \quad ① \\
 & = \frac{x}{10} \times \frac{10-x}{9} \\
 & + \quad ① \\
 & \frac{10-x}{10} \times \frac{x}{9} \\
 & = \frac{x(10-x)}{90} + \frac{x(10-x)}{90} \\
 & = \frac{x(10-x)}{45} \quad ①
 \end{aligned}$$

① Simplifying
the algebra.

22

$$\vec{CG} = \vec{CB} + \vec{BG} = 6\vec{b} + 5\vec{a} - \vec{b} = 5\vec{a} + 5\vec{b} \quad ①$$

$$\vec{CK} = \vec{CA} + \frac{1}{3}\vec{AB} \quad ①$$

$$= 3\vec{a} + \frac{1}{3}(-3\vec{a} + 6\vec{b}) \quad ①$$

$$= 3\vec{a} + -\vec{a} + 2\vec{b}$$

$$= 2\vec{a} + 2\vec{b} \quad ①$$

$$= \frac{2}{5}(5\vec{a} + 5\vec{b}) = \frac{2}{5}\vec{CG} \quad \square \quad ①$$

23

$$M_{AB} = \frac{4}{2} = 2 \quad ①$$

M_L = gradient of
line we want

$$M_L M_{AB} = -1 \Rightarrow M_L = -\frac{1}{2} \quad ①$$

hence

$$y = -\frac{1}{2}x + c \quad ①$$

$$-1 = -\frac{1}{2} \times 5 + c$$

$$-1 = -2.5 + c$$

$$1.5 = c$$

$$\underline{\underline{y = -\frac{1}{2}x + 1.5}} \quad ①$$