

Section 1 . MSJ 2005 General Maths $\frac{1}{2}$ yearly

1. D 3.25kg

2. C

$$\begin{aligned} 3. & 5(x-3) - 2(x-4) \\ & = 5x - 15 - 2x + 8 \\ & = 3x - 7 \quad B \end{aligned}$$

4. $\frac{3}{4} \times 90 = 67.5$ D

5. $\frac{3}{15} = \frac{15}{x}$ $x = 75$ D

6. D

7. D

8. C

9. $A = 5000 \times 1.06^3$
 $= 5955.08$

Int = $5955.08 - 5000 = \$955.08$ B

10. C

11. D = \$1200

$$\begin{aligned} \text{Rep} &= 24 \times 180.50 \\ &= 4332 \end{aligned}$$

Total = 5332

Int = \$732 C

12. $6 \times 0.000437 \times 490 = \1.28 B

13. Kim = 100

Extra = 28m D

$$\begin{aligned} \text{Simon} &= \sqrt{60^2 + 40^2} \\ &= 72.11 \end{aligned}$$

14. $2\pi r = 15$

$$r = \frac{15}{2\pi}$$

$$= 2.38 \quad D$$

15. Rep = 48×600

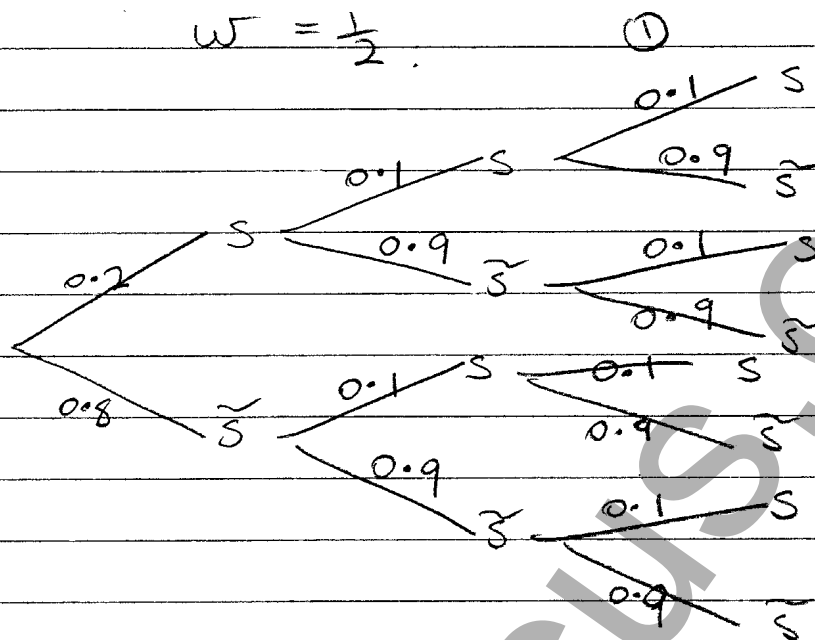
$$= 28800$$

Int = $28800 - 10000$

$$= 18800 \quad C$$

(16) a) $6(2-3w) = 2w+2$
 $12-18w = 2w+2$ ①
 $10 = 20w$
 $w = \frac{1}{2}$

b)



① mark for 2nd section

① mark for 3rd section

ii) $P(\bar{S}\bar{S}\bar{S}) = 0.8 \times 0.9 \times 0.9$
 $= 0.648$ $\frac{81}{125}$ ①

iii) $P(\text{stopped at least once}) = 1 - P(\bar{S}\bar{S}\bar{S})$
 $= 1 - 0.648$
 $= 0.352$ $\frac{44}{125}$ ①

iv) $P(S\bar{S}\bar{S}) + P(\bar{S}S\bar{S}) + P(\bar{S}\bar{S}S)$ ①
 $= 0.2 \times 0.9 \times 0.9 + 0.8 \times 0.1 \times 0.9 + 0.8 \times 0.9 \times 0.1$
 $= 0.306$ $\frac{153}{500}$ ①

v) i) 40 ①

ii) 65 ①

iii) $95 - 35 = 60$ ①

iv) $80 - 50 = 30$ ①

v) Class A is negatively skewed while Class B is symmetrical. ①

- 17 a) i) 1999 ①
 ii) 2000 ①
 iii) 1998 ①
 iv) Superannuation is increasing ①

b) i) $E = \frac{1}{2}mv^2$

$$= \frac{1}{2} \times 20 \times (-3)^2$$

$$= 90 \quad \text{①}$$

ii) $20 = \frac{1}{2} \times m \times 4^2$

$$20 = 8m$$

$$m = 2.5 \quad \text{①}$$

ii) $2E = mv^2$

$$v^2 = \frac{2E}{m} \quad \text{①}$$

$$v = \pm \sqrt{\frac{2E}{m}} \quad \text{①}$$

a) i) $A = \pi \times 9 \times 5 \quad \text{①}$
 $= 102.887 \dots$
 $= 103 \text{ cm}^2 \quad (3 \text{ sig fig}) \quad \text{①}$

ii) $V = Ah$
 $= 103 \times 3$
 $= 309 \text{ cm}^3 \quad \text{①}$

iii) $m = 309 \times 0.85$
 $= 262.65$
 $= 263 \text{ g} \quad \text{①}$

18 a) i) $r = 14.5 \div 2$
 $= 7.25 \text{ m} \quad \text{①}$

ii) $h = 13.5 + 7.25$
 $= 20.75 \text{ m} \quad \text{①}$

iii) $V = \frac{4}{3} \pi r^3 \div 2$
 $= \frac{4}{3} \times \pi \times 7.25^3 \div 2 \quad \text{①}$

$$= 1596.25 \dots \div 2$$

$$= 798.12815 \dots \quad \text{①} \quad = 798.1 \text{ m}^3 \quad (1 \text{ dec pl})$$

$$\begin{aligned}
 \text{iv) } V_{\text{cylinder}} &= \pi r^2 h \\
 &= \pi \times 7.25^2 \times 13.5 \\
 &= 2229.2545 \dots \quad \textcircled{1}
 \end{aligned}$$

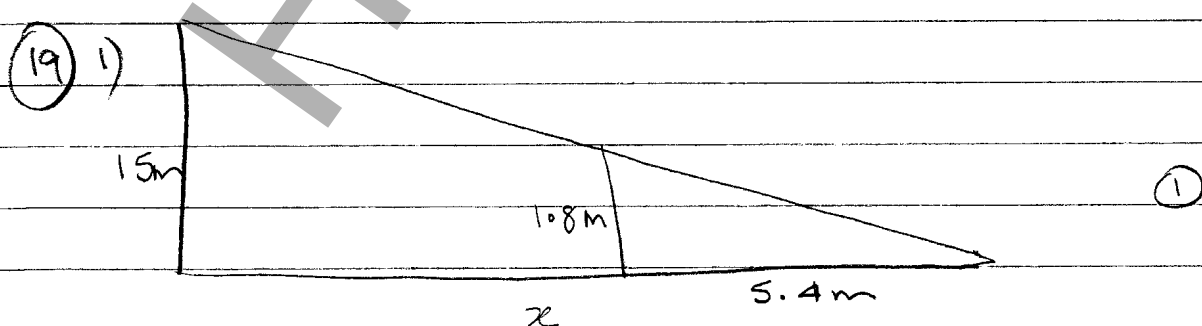
$$\begin{aligned}
 \text{Total } V &= 3027.3826 \dots \quad \textcircled{1} \\
 &= 3027.4 \text{ m}^3 \text{ (1 dec p')}
 \end{aligned}$$

| | | | |
|----|------------|------|----------------------------|
| b) | Min weight | = 14 | } (4) marks - 1 each error |
| | Lower Q | = 26 | |
| | Median | = 36 | |
| | Upper Q | = 47 | |
| | Max weight | = 61 | |

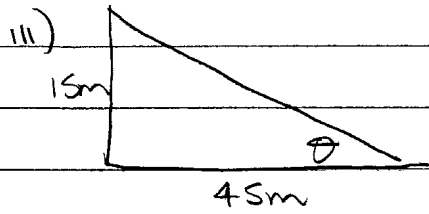
iii) Measure of Location is ⁽⁵⁷⁾ quite different with Median for Site A being much higher than Median for site B (36) ①

Both sites have a similar spread as indicated by Range for Site A (44) being similar to Range for site B (47) and IQR for A (19) also being very similar to IQR for B (21)

- ① for noting similar spread
- ① for supporting this with numerical evidence for either range or IQR.



ii) $\frac{x}{15} = \frac{5.4}{1.8}$ $x = 45$ ①
 $\therefore \text{Dist} = 45 - 5.4 = 39.6\text{m}$ ①



$$\tan \theta = \frac{15}{45} \quad \textcircled{1} \quad \frac{1.8}{5.4}$$

$$\theta = 18.4349 \dots \quad \textcircled{1}$$

$$= 18^\circ \text{ (nearest deg)}$$

19) i) 120 $\textcircled{1}$

ii) $\frac{36}{120} \times 100 = 30\% \quad \textcircled{1}$

iii) $\frac{12}{120} = \frac{1}{10} \quad \textcircled{1}$

c) i) $m = \frac{-8}{6}$

$$= -\frac{4}{3} \quad \textcircled{1}$$

ii) $y = -\frac{4}{3}x - 8 \quad \textcircled{1}$

(or use of incorrect m from i))

d) i) 72 m $\textcircled{1}$

ii) $32 + 16 = 48\text{m} \quad \textcircled{1}$

iii) 20 km/h
to 40

20 a) $A = 0.00075 \times 36372.93$

$$= \$272.80 \quad \textcircled{1}$$

$$B = \$36645.73 \quad \textcircled{1} \quad 36372.93 + 272.80$$

$$C = \$35145.73 \quad \textcircled{1} \quad 36645.73 - 1500$$

b) i) $6! = 720 \quad \textcircled{1}$

ii) $\frac{6!}{3!3!} = \frac{6 \times 5 \times 4 \times \cancel{3} \times \cancel{2} \times 1}{\cancel{3} \times \cancel{2} \times 1 \times \cancel{3} \times \cancel{2} \times 1}$

$$= 20 \text{ ways}$$

$\textcircled{1}$ for dividing by 3! once

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$$\begin{aligned} \text{a) i) } r &= \frac{0.06}{12} \\ &= 0.005 \quad \textcircled{1} \end{aligned}$$

$$\begin{aligned} \text{ii) } m &= 2000 & N &= m \left\{ \frac{(1+r)^n - 1}{r} \right\} \\ r &= 0.005 & &= 2000 \times \frac{1.005^{60} - 1}{0.005} \\ n &= 5 \times 12 & &= 5139540.06 \quad \textcircled{1} \\ &= 60 & & \end{aligned}$$

Advice is correct. They exceed the required amount by \$9540.06 $\textcircled{1}$

$$\begin{aligned} \text{iii) } \text{Int} &= 139540.06 - 60 \times 2000 \quad \textcircled{1} \\ &= \$19540.06 \quad \textcircled{1} \end{aligned}$$

$$\begin{aligned} \text{iv) } N &= 130000 & A &= \frac{N}{(1+r)^n} \\ r &= 0.005 & &= \frac{130000}{1.005^{60}} \quad \textcircled{1} \\ n &= 60 & &= \$96378.39 \quad \textcircled{1} \end{aligned}$$