

Revision F4 (Topics 11-17) [55] MARKSCHEME

- 1.
- (a) When $x = 2$, $2^3 + 10 \times 2 - 50 < 0$
 When $x = 3$, $3^3 + 10 \times 3 - 50 > 0$ substitutes both 2 and 3 into equation [M1]
 Since there is a sign change there is a root between 2 and 3 [R1]
- (b) Substitutes a value between 2 and 3 into $x^3 + 10x - 50$ [M1]
 Substitutes 2.8 to get < 0 and 2.9 to get > 0 [M1]
 Substitutes 2.85 to get > 0 [M1]*
 Answer is $x = 2.8$ [A1] dep*
- 2.
- $\frac{\theta}{360} \times \pi \times 12^2 = 98$ M1
or $\pi \times 12^2 + 98$ or inverse
- $98 \times 360 \div (\pi \times 12^2)$ M1
360 + their (4.6) or inverse
- 77.9 to 78.15 A1
- [3]
- 3.
- (a) Median marked at 40 on boxplot B1
 Quartiles at 28 and 54 and box B2
Plotting either quartile correctly B1
- Whiskers to extremes at 10 and 80 B1
 $\pm \frac{1}{2}$ square throughout
- (b) 26 B1
- [5]
- 4.
- (a) $2x - 20 = x + 12$ allow one error M1
or $\frac{1}{2}x - \frac{1}{4}x = 3 + 5$ allow one error
or $\frac{1}{4}x$ or 8 in $\frac{1}{4}x = 8$
- $x - 20 = 12$ or $2x = x + 32$ A1
or $\frac{1}{4}x = 8$
- $(x =) 32$ A1
- (b) $(x + a)(x + b)$ M1
 $ab = \pm 14$
- $(x + 7)(x - 2)$ A1
 -7, 2 *from two linear factors* B1ft
- [6]

5.

(a) $\frac{22}{48} \times \frac{21}{47}$ M1

$\frac{77}{376}$ or 0.205 (accept 0.20 or better) A1

(b) $\frac{32}{48} \times \frac{31}{47}$ or $\frac{16}{48} \times \frac{15}{47}$ M1

Combination of two girls or two boys

$\frac{62}{141} + \frac{5}{47}$ M1

Adding two correct products

$\frac{77}{141}$ or 0.546 A1

$\frac{1232}{2256}$

Alternative answer all SC3

$\left(\frac{22}{48}\right)^2 = \frac{484}{2304} = \frac{121}{576} = 0.210$

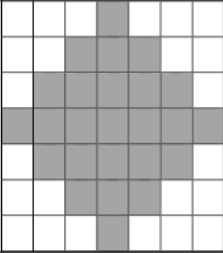
$\left(\frac{32}{48}\right)^2 + \left(\frac{16}{48}\right)^2 = \frac{5}{9} = 0.5\dot{5}$

[5]

6.

(a)	(i)	70.71[0678...]	3 1 A01.1 2 A03.1a	M2 for $8 \times \frac{1}{2} \times 5 \times 5 \times \sin 45$ or M1 for $\frac{1}{2} \times 5 \times 5 \times \sin 45$	
	(ii)	85 – 85.4	5 2 A01.3b 3 A03.1b	M4 for $(2 \times 5 \cos 22.5)^2$ or $(2 \times 5 \sin 67.5)^2$ or M3 for $2 \times 5 \cos 22.5$ or $2 \times 5 \sin 67.5$ or M2 for $5 \cos 22.5$ or $5 \sin 67.5$ or M1 for $\cos 22.5 = \frac{x}{5}$ or $\sin 67.5 = \frac{x}{5}$	9.238... 4.619...
(b)		64 : 1 or $1 : \frac{1}{64}$	2 2 A03.2	M1 for making the link to, and using, enlargement eg $\left(\frac{1}{8}\right)^2$ or 8^2 soi	

7.

(a)	19	1 1 A02.3a		
(b)		1 1 A02.3b		
(c)	13 25	2 2 A02.1a	M1 for 13 or 25	FT their bottom layer in (b) and their number of cubes in (a)
(d)	$2n^2 - 2n + 1$ oe	4 2 A01.3b 2 A02.1a	M3 for expression with $2n^2 - 2n$ oe or M2 for expression with $2n^2$ or M1 for expression with n^2 or first differences	

8.

- (a) 15×1.4 or 30×1.1 M1
Sight of 21 or 33 indicates M1
- 21 and 33 A1
- (b) (Good) attempt at cutting off area M1
Calculation of 16 mins ($\frac{4}{5} \times 20$ mins)
or 4 mins ($\frac{1}{5} \times 20$ mins)
... M1
- $T = 64$ A1
must be correct

[4]

9.

- Vol Hemisphere = $\frac{1}{2} \times \frac{4}{3} \times \pi \times 6^3$ M1
 $\frac{1}{2} \times \frac{4}{3} \times \pi \times 6^3 = \frac{1}{3} \times \pi \times r^2 \times 27$ M1, M1
- 144π A1
 $(3 \times 4 \times 6^3 \times \pi) \div (2 \times 3 \times 27 \times \pi) = r^2$ or...
- $\frac{1}{3} \times \pi \times r^2 \times 27 =$ their 144π M1
 $\dots (4 \times 6^3) \div (2 \times 27) = r^2$ A1
- (r =) 4 A1
 $(r =) 4$

[4]

10.

48	P1 Identifies that $16 \div 8 = 2$ so $PL = 2NP$ P1 Process to find area of LMN $8 \times (2+1)^2 (=72)$ P1 Completes process to find area of LQM '72' - 16 - 8 A1 48 cao
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