Paper 3H

Q	Working	Answer	Mark		Notes
1.	$\frac{5.8}{3.12}$		2	M1	For 5.8 or 3.12 seen
		1.8589...		A1	For first 5 figures
					Total 2 marks
2.	$10x + 15 = 30$ **or** $2x + 3 = 6$ $10x = 30 - 15$ **or** $2x = 6 - 3$		3	M1	For $10x + 15$ **or** $2x + 3 = 6$
				M1	For isolating x term in $ax + b = c$
		1½		A1	For 1½ oe inc $^3/_2$
					Total 3 marks
3.	$\frac{15}{18} - \frac{8}{18}$		2	M1	For clear attempt to express with common denominator - at least one correct
		$\frac{7}{18}$		A1	cao
					Total 2 marks
4.		correct enlargement	3	B3	B2: for translation of correct shape or 2 vertices correct B1: for one side correct length or for enlargement scale factor 2, centre (2,1)
					Total 3 marks

5.	(a)	0.45 + 0.12		**2**	M1	For 0.45 + 0.12 **or** 1 - (0.45 + 0.12) **or** 1 - 0.45 - 0.12 **or** 0.43
			0.57		A1	For 0.57 oe as final answer
	(b)	250 x 0.12 **or** 250 x 0.1		**2**	M1	For 250 x 0.12 **or** 250 x 0.1
			30		A1	cao
						Total 4 marks
6.	(a)		3 (3p + 5)	**1**	B1	cao
	(b)		q (q - 4)	**1**	B1	cao
	(c)		(x + 2) (x - 5)	**2**	B2	(B1 for one correct factor or signs reversed)
						Total 4 marks
7.	(a)	$\left(\frac{9+5}{2}\right)\times 6$		**2**	M1	
			42		A1	cao
	(b)	"42" x 15		**2**	M1	
			630		A1	ft from (a)
						Total 4 marks

8.	(a)	eg $\frac{15}{100}$ x 240 **or** 36 240 - "36"		M1 M1	Or M2 for $\frac{100-15}{100}$ x 240 dep on first M1
		204	3	A1	cao
	(b)	0.85 oe seen $\frac{663}{0.85}$		B1 M1	For $\frac{663}{0.85}$ **or** $\frac{663}{1-0.15}$
		780	3	A1	cao
					Total 6 marks
9.	(a)	$2x < 8$		M1	
		$x < 4$	2	A1	For $x < 4$ as final answer
	(b)	1, 2, 3	2	B2	(B1 for two correct and none wrong or three correct and one wrong)
					Total 4 marks
10.	(a)	15 x 8 + 25 x 38 + 35 x 28 + 45 x 4 + 55 x 2 =120 + 950 + 980 + 180 + 110 = 2340 2340 ÷ 80		M1 M1 M1	For products m x f where m is consistent inc end points (dep)for use of midpoints (15,25... or 15.5,25.5,...) (dep on 1st M1) for adding and ÷ 80
		29.25	4	A1	Accept 29, 29.2, 29.3 if first two M1s scored (If 15.5,25.5... used, mean = $\frac{2380}{80}$ = 29.75)

	(b)		8, 46, 74, 78, 80	1	B1	cao
	(c)		Points correct Curve or line segments	2	B1 B1	±½ sq ft from sensible table ft from points if 4 or 5 points correct **or** if points are plotted consistently within each interval at the correct heights
	(d)	use of 40 (or 40.5) on graph or 40^{th} (or 40.5^{th}) stated	~29	2	M1 A1	For use of 40 (or 40.5) on graph or 40^{th} (or 40.5^{th}) stated If M1 scored, ft from cumulative frequency graph If no working, follow through only from correct curve
						Total 9 marks
11.		$h^2 = \frac{W}{l}$	lh^2	2	M1 A1	
						Total 2 marks
12.	(a)	30 : 1200 **or** 1200 : 30 oe	1 : 40	3	M2 A1	For 30 : 1200 **or** 1200 : 30 oe [M1 for 12(00...) : 30(00...) **or** 30(00...) : 12(00...) oe] Accept 1 : 0.025, 1 : $^1/_{40}$ oe, $n = 40$ ft if M1 scored SC B2 for 1 : 2.5, 1 : 4, 1 : 0.4, 1 : 400, 1 : 25, 1 : 250

	(b)	95 x "40" **or** 3800 "3800" ÷ 100		3	M1 M1	
			38		A1	ft from their *n*
	OR	$\frac{95}{30}$ x 12		3	M1	(dep)
			38		M1 A1	
						Total 6 marks
13.	(a)	$\frac{360}{18}$		2	M1	
			20		A1	cao
	(b)	"20" x (180 - 18) **or** ("20" - 2) x 180		2	M1	
			3240		A1	ft from (a)
						Total 4 marks

14.	$2(x-1)+2x+3=4$ or $\frac{2(x-1)+2x+3}{4}=1$ or $\frac{2(x-1)}{4}+\frac{2x+3}{4}=1$ $2x-2+2x+3=4$ or $\frac{2x-2+2x+3}{4}=1$ or $\frac{2x-2}{4}+\frac{2x+3}{4}=1$ $4x=3$	¾	**4**	M1 M1 M1 A1	Clear attempt to multiply both sides by 4 (or multiple) **or** expressing LHS with a denominator of 4 or a multiple of 4 (dep) expanding brackets **or** M2 for $\frac{x}{2}-\frac{1}{2}+\frac{2x}{4}+\frac{3}{4}=1$ (M1 if one error) (dep on first M1) reducing to form $ax = b$ using a correct method **or** $\frac{x}{2}+\frac{2x}{4}=1+\frac{1}{2}-\frac{3}{4}$ oe
					Total 4 marks
15.	(a) $\frac{10}{\sqrt{5}}\times\frac{\sqrt{5}}{\sqrt{5}}$	$2\sqrt{5}$	**2**	M1 A1	Accept $10 = k5$ **or** $\sqrt{20}$ Accept $k = 2$
	(b) $25+(5\sqrt{3})+(5\sqrt{3})+(\sqrt{3})^2$	$28+10\sqrt{3}$	**2**	M1 A1	Accept $a = 28$, $b = 10$
					Total 4 marks

16.	(a)	Angle of elevation identified 50 tan 19°	17.2	3	B1 M1 A1	On diagram or implied by working 17.2 or better (17.2163...)
	(b)	$50^2 + 27^2$ or 56.8(2...) **or** $50^2 +$ "17.2"^{2} **or** value rounding to 52.88.. $\sqrt{\text{"56.8"}^2 + \text{"17.2"}^2}$ **or** $\sqrt{\text{"52.9"}^2 + 27^2}$	59.3 - 59.4	3	M1 M1 A1	 For 59.3 - 59.4
						Total 6 marks
17.	(a)	$(x + 4)(x + 1) - 15 = 35$ $x^2 + 5x + 4 - 15 = 35$	$x^2 + 5x - 11 = 35$	3	M1 B1 A1	For $(x + 4)(x + 1) - 15 = 35$ **or** $(x + 1)(x + 4) = 50$ For $x^2 + 5x + 4$ **or** $x^2 + x + 4x + 4$ For $x^2 + 5x + 4 - 15 = 35$ **or** $x^2 + 5x + 4 = 50$ **or** simpler
	OR	$(x+1)(x-1)+5(x-2)=35$ $x^2 + x - x - 1 + 5x - 10$	$x^2 + 5x - 11 = 35$	3	M1 B1 A1	For $(x+1)(x-1)+5(x-2)=35$ For $x^2 + x - x - 1 + 5x - 10$ **or** simpler For $x^2 + 5x - 1 - 10 = 35$
	(b)	$\frac{-5 \pm \sqrt{5^2 - 4 \times -46}}{2}$ $\frac{-5 \pm \sqrt{209}}{2}$	4.73	3	M1 M1 A1	 May be implied by an answer of 4.75 For 4.73 or better (4.7284...) Accept 4.73 and -9.73 or better
						Total 6 marks

18.	(a)	$\frac{9.4}{\sin 123°} = \frac{AC}{\sin 35°}$ $AC = \frac{9.4 \sin 35°}{\sin 123°}$	**3**	M1 M1	
		6.43		A1	For 6.43 or better (6.4287...)
	(b)	½ x 9.4 x "6.43" x sin $x°$ **or** ½ x AB x "6.43" x sin 123° **or** ½ x AB x 9.4 x sin 35°	**3**	M1 B1	For clear attempt to use "½absin$C$" For x = 22 or AB = 4.2 or better (4.1987...) appropriate for their form of ½absin$C$ If M0, award for x = 22 or AB = 4.2 or better (may be shown on diagram)
		11.3		A1	11.3 or better (11.3188); ft from (a)
					Total 6 marks
19.	(a)	$\frac{3}{6} \times \frac{2}{6}$	**2**	M1	
		$\frac{6}{36}$		A1	
	(b)	$\frac{1}{6} \times \frac{1}{6} + \frac{3}{6} \times \frac{3}{6} + \frac{2}{6} \times \frac{2}{6}$ $= \frac{1}{36} + \frac{9}{36} + \frac{4}{36}$	**4**	M1 M1 M1	1 correct product All 3 correct products Summing at least 2 correct products
		$\frac{14}{36}$		A1	

	OR BB BA BN BA BN BA AB AA AN AA AN AA NB NA NN NA NN NA AB AA AN AA AN AA NB NA NN NA NN NA AB AA AN AA AN AA	$\frac{14}{36}$	4	M3 A1	List of all 36 combinations M2 for 1 omission M1 for 15 or more combinations
					Total 6 marks
20.	(a)	16	1	B1	cao
	(b) $x^3 - 7x + 9 = 11 - x$ **or** $-x + 11$ oe seen line $x + y = 11$ drawn	~ -2.3, - 0.3, 2.6	3	M1 M1 A1	May be implied by line $x + y = 11$ Accept coordinates ft from candidate's line if first M1 scored, line has negative gradient and there are 3 points of intersection
					Total 4 marks
21.	(a) $\frac{2512}{157}$ **or** 16 **or** $\frac{157}{2512}$ **or** 0.0625 $\sqrt{16}$ **or** 4 **or** $\frac{1}{4}$	6.5	3	M1 M1 A1	 For $\sqrt{16}$ **or** 4 **or** $26^2 \times \frac{157}{2512}$ (42.25) cao

(b) 4^3 or 64

8320

2	M1		
	A1	cao	

Total 5 marks

22.

$$\frac{2}{x-1}+\frac{x-11}{(x-1)(x+4)}$$

$$\frac{2(x+4)+(x-11)}{(x-1)(x+4)}$$

or $\frac{2(x+4)}{(x-1)(x+4)}+\frac{x-11}{(x-1)(x+4)}$

$$\frac{2x+8+x-11}{(x-1)(x+4)}$$

$$\frac{3x-3}{(x-1)(x+4)}$$

$$\frac{3(x-1)}{(x-1)(x+4)}$$

$$\frac{3}{(x+4)}$$

6	B1	For factorising x^2+3x-4
	B1	For correct single fraction even if unsimplified, or for correct sum of two fractions with the same denominator ft from incorrect factorisation
	B1	For expanding brackets correctly in numerator
	B1	For simplifying their numerator
	B1	For factorising a correct numerator
	B1	cao

SC If no denominator, award 3rd B1 for $2x+8+x-11$ **or** $2x^2+6x-8+x^2-11x-x+11$ and 4th B1 for $3x-3$ **or** $3x^2-6x+3$

Total 6 marks

TOTAL FOR PAPER: 100 MARKS