Qn	Working	Answer	Mark	Notes
1	$8.5^2 + 5.6^2$ (= 103.61)		3	M1
	$\sqrt{8.5^2 + 5.6^2}$			M1
		10.2		A1 Accept 10.1 to 10.2 or better
				Total 3 marks

2	3 hours 36 mins = 216 (mins) or 3.6 (hours) or $3\frac{36}{60}$ oe (hours)		3	M1
	2470 ÷ 3.6 or 2470 ÷ $3\frac{36}{60}$ or 2470 ÷ 216 × 60			M1 Allow 2470 ÷ 3.36 (=735 or better)
		686		A1 Accept 686.1 or better
				Total 3 marks

3	$30 = \frac{27}{1.2x}$		3	M1 Or for $\frac{27}{30}$ (= 0.9)
	$1.2x = \frac{27}{30}$ or $36x = 27$ or 22.5 ÷ 30			M1
		0.75 oe		A1
				Total 3 marks

4	0.4 × 75(= 30) oe		4	M1 M2 for 0.6 × 75(= 45) oe
	75 – 30 (= 45)			M1
	(T-Shirt =) $\frac{45-12}{2}$ or (Bag =) $\frac{45+12}{2}$ oe or t + (t + 12) = 45 oe			M1 (T-shirt = £16.50)
		28.5(0)		A1
				Total 4 marks

5	e.g. (EF =) 12cos40 (= 9.19...) **or** (FD =) 12sin40 (= 7.71...) **and** (EF =) $\sqrt{12^2 - "7.71"^2}$ (= 9.19...)			M2	complete method to find EF (if not M2 then M1 for a correct statement involving EF e.g. $\frac{EF}{12} = \cos 40$)
	e.g. $\frac{"9.19"}{EG} = \tan 28$ or $\tan 62 = \frac{EG}{"19.9"}$ **or** $\frac{"9.19"}{FG} = \sin 28 (= 19.5...)$ **and** $"19.5"^2 - "9.19"^2 (= 298.9...)$			M1	(dep on M2) for a correct trig statement involving EG **or** complete method to find FG **and** a correct start to Pythagoras process
		17.3	4	A1	accept 17.2 – 17.3
					Total 4 marks

6	20 000 × 0.813 oe			M2	M1 for 20 000 × 0.81 oe (= 16 200) or 20 000 × 1.19 oe (= 23 800) or 20 000 × 1.193 oe (= 33 703.18)
		10 629		A1	Accept 10 628 → 10 629
					Total 3 marks

7	$\pi \times 7.2^2 \div 2$ (= 81.4....)			M1	allow 81.3 – 81.5 for area of semi circle
	"81.4" ÷ 6 (= 13.5...) **or** 12 × 6 (= 72) **or** "81.4" ÷ 12 (= 6.7...)			M1	(dep) allow 13.5 – 13.6 for the number of boxes needed (NB: 12 × 6 = 72 alone is 0 marks)
		No with correct figures	3	A1	
					Total 3 marks

8 (a)		3.74 × 107	2	B2	B1 for 37 400 000 (oe but not in standard form) or 3.74 x 10^n ($n \neq 7$) or 3.7 x 107 or 3.8 x 107
(b)		11	1	B1	Allow 11 →11.1
					Total 3 marks

9	28 × 5 (= 140) **OR** 26.5 × 2 (= 53)		M1	or 87
	(28 × 5 − 26.5 × 2) ÷ (5 – 2)		M1	for a complete method
		29	A1	
				Total 3 marks

10	10 × 5 + 30 × 11 + 50 × 8 + 70 × 19 + 90 × 9 (50 + 330 + 400 + 1330 + 810)		3	M2	Correct products using midpoints (allowing one error) with intention to add. M1 for products using frequency and a consistent value within the range (allowing one error) with intention to add. or correct products using midpoints without addition (allow 1 error)
		2920		A1	N.B. 2920 ÷ 52 (=56.2..) scores M2A0
					Total 3 marks

11	20.40 ÷ (1 – 0.15)			M2	for a complete method eg 20.40 ÷ (1 – 0.15) for 20.40 ÷ (100 – 15) (= 0.24) (M1) **or** e.g. 0.85x = 20.40
		24	3	A1	
					Total 3 marks

12	$\frac{h}{2}$ × (7+12) × 10 = 608 oe		3	M2 M1 for $\frac{h}{2}$ × (7 + 12) × 10
		6.4		A1
				Total 3 marks

13	(a)	$\frac{2(4-3x)}{10} - \frac{5(3x-5)}{10} = -3$ oe eg or 2(4 – 3x) – 5(3x – 5) = – 3 x 2 x 5		3	M1 Correct fractions over common denominator as an equation or Multiplying both sides by 10
		8 – 6x – 15x + 25 = −30 oe			M1 A correct equation with no denominators or brackets
			3		A1 dep on M1
	(b)	(5y + 8)(y – 5) (≤0) or (y =) $\frac{--17 \pm \sqrt{(-17)^2 - 4 \times 5 \times -40}}{2 \times 5}$		3	M1 Correct method to solve 3 term quadratic – factorising or correct use of formula
		−1.6, 5 oe			A1 Correct critical values
			−1.6 ≤ y ≤ 5 oe		A1 Condone change of variable in place of y throughout this question.
					Total 6 marks

14	$1.5 \times 2 \times 8$ (= 24 (cm^3))			M1	for finding the volume of the cuboid
	e.g. ($V =$) $\frac{5.73 \times 1000}{19.32}$ (= 296.58...) **or** ($M =$) 19.32 × "24" (= 463.68)			M2	complete method to find the volume of statue **or** the mass of one block, could work in g or kg (if not M2 then award M1 for correct use of density formula e.g. $19.32 = \frac{5.73 \times 1000}{V}$ **or** $19.32 = \frac{M}{"24"}$)
	e.g. "296.58" ÷ "24" (= 12.3576...) **or** "5730" ÷ "463.68" (= 12.3576...)			M1	could work in g or kg
		13	5	A1	cao
					Total 5 marks

15	0.42 ÷ 0.6 (= 0.7) oe			M1	(indep)
	1 – "0.7" (= 0.3) oe **OR** 1 – 0.6 (= 0.4) oe			M1	(indep)
	"0.3" × "0.4" oe **OR** 1 – (0.42 + 0.6 × "0.3" + "0.4" × "0.7") oe			M1	for a complete method
		0.12	4	A1	oe
					Total 4 marks

16	180 – 2 × 66 (= 48) (360 – "48") ÷ 2 (= 156) 180 – "156" (= 24) 360 ÷ "24"		3	M1 Could be marked on diagram M1ft Final stage of calculation
	Alt : 180 – 2 × 66 (= 48) 360 ÷ (0.5 × "48")			M1 Could be marked on diagram M1ft Final stage of calculation
	Alt:180 – 2 × 66 (= 48) (360 – "48") ÷ 2 (= 156) $\frac{180(n-2)}{n}$ = "156" "24"n = 360 or $\frac{180(15-2)}{15}$ (= 156)			M1 Could be marked on diagram M1ft Final stage of calculation or embedded correct answer.
		15		A1
				Total 3 marks

17	e.g. $x = 0.57272....$ **and** $100x = 57.272....$ **OR** e.g. $10x = 5.7272....$ **and** $1000x = 572.72....$			M1	For 2 recurring decimals with correct algebraic labels that when subtracted give a whole number or terminating decimal eg 56.7 or 567 etc e.g. $100x = 57.272....$ **and** $x = 0.57272....$ **OR** $1000x = 572.72....$**and** $10x = 5.7272....$ **with intention to subtract.** (If recurring dots not shown then showing at least the digits 57272, ie 5sf)
	e.g. $100x - x = 57.272.... - 0.57272.... = 56.7$ **and** $\frac{56.7}{99} = \frac{63}{110}$ **or** $1000x - 10x = 572.72.... - 5.7272.... = 567$ **and** $\frac{567}{990} = \frac{63}{110}$	Shown	2	A1	for completion to $\frac{63}{110}$
					Total 2 marks

18 (a)		$\frac{3}{10}, \frac{7}{12}, \frac{5}{12}, \frac{7}{12}, \frac{5}{12}$	2	B2 $\frac{3}{10}$ B1 for $\frac{3}{10}$ oe B1 for all other correct probabilities 2d.p truncated or rounded (e.g 0.58 or 0.41 or 0.42)	
(b)	$\frac{7}{10}$ x $\frac{5}{12}$ or $\frac{3}{10}$ x $\frac{7}{12}$ oe		3	M1ft	
	$\frac{7}{10}$ x $\frac{5}{12}$ + $\frac{3}{10}$ x $\frac{7}{12}$ oe			M1ft	
		$\frac{56}{120}$ oe		A1	$\frac{7}{15}$ eg $\frac{7}{15}$ or 0.46....(2 dp truncated or rounded)
(c)	$\frac{3}{10}$ x $\frac{5}{12}$ x x = $\frac{3}{100}$ oe		3	M1ft	A correct equation involving the unknown probability
	x = $\frac{3}{100}$ ÷ $\frac{15}{120}$ (= $\frac{6}{25}$) oe			M1ft	Isolating or calculating the value of x
		25		A1	Dep on M1
					Total 8 marks

19	eg $5 \times 2x + 10 \times x = 160$ **OR** $160 \div 2$ (= 80) [freq of one bar] **OR** $40 \times 5 + 20 \times 10$ (= 400) [total no. of sml squares] **OR** $160 \div 16$ (= 10) [students per $1cm^2$] **OR** $1cm^2 = 10$ students **OR** **e.g.** 5 small squares = 2 students oe			M1	for setting up an appropriate equation **OR** finding the area of the 2nd or 3rd bar **OR** finding the total number of small squares **OR** for finding the number of students per $1cm^2$ **or** $1cm^2 = 10$ students **OR** other appropriate scale e.g. 5 small squares = 2 students
	'x' = 8 **OR** 8 or 16 seen in the correct position on the vertical scale **OR** $160 \div$ "400" (= 0.4 oe)			M1	for finding frequency density **OR** method to find the frequency of the 1st, 4th or 5th bar (1st is 108, 4th is 90, 5th is 12)
	"7.2" × 15 + 160 + "6" × 15 + "2.4" × 5 **OR** 160 + "0.4" × (18 × 15 + 15 × 15 + 5 × 6)			M1	(dep on at least M1) for a complete method to find the total frequency (allow one error or one repeat but no omission)
		370	4	A1	
					Total 4 marks

20	(ASF =) $\frac{13^2}{9^2}$ or $\frac{9^2}{13^2}$		4	M1	Correct SF for area. Accept 1.442 (= 2.07 or 2.09) or better for ASF or 0.692 (= 0.47 or 0.48) or better for ASF
	eg A + "($[13]^2/9^2$)" A = 1800			M1ft	Dep on previous M1
	eg "$\frac{250}{81}$" A = 1800			M1ft	
		583.2		A1	Awrt 583
					Total 4 marks

21	$CB = 13\sin 40$ (= 8.3562...)			M1	
	$\frac{1}{2}\times 6\times "8.35..."\times \sin ACB = 22$			M1	
	Acute version of $ACB = \sin^{-1}\left(\frac{22}{\frac{1}{2}\times 6\times "8.35..."}\right)$ (= 61.35…)			M1	
	ACB = 180 – "61.353…" (= 118.647...)			M1	
	$AB^2 = 6^2 + "8.35..."^2 - 2\times 6\times "8.35..."\times \cos "118.64"$ (= 153.98...)			M1	
		12.4	6	A1	accept 12.3 – 12.5
					Total 6 marks

						Edexcel averages: scores of candidates who achieved grade:							
Qn	**Paper**	**Question**	**Skill tested**	**Max score**	**Mean %**	**ALL**	**9**	**8**	**7**	**6**	**5**	**4**	**3**
1	**2HR**	Q04	Trigonometry and Pythagoras' Theorem	3	92	2.76	2.99	2.98	2.92	2.90	2.60	2.29	2.03
2	**2HR**	Q05	Measures	3	88	2.65	2.99	2.91	2.90	2.67	2.42	1.92	1.28
3	**2HR**	Q09	Measures	3	83	2.48	2.97	2.86	2.78	2.39	1.76	1.12	0.94
4	**2FR**	Q13	Applying Number	4	88	3.50	4.00	3.80	3.65	3.50	3.39	2.32	2.19
5	**1HR**	Q15	Trigonometry and Pythagoras' Theorem	4	79	3.15	3.89	3.70	3.60	2.89	2.06	1.14	0.53
6	**2HR**	Q08	Percentages	3	87	2.62	2.97	2.90	2.69	2.55	2.34	2.01	1.42
7	**1HR**	Q05	Mensuration of 2D shapes	3	80	2.39	2.90	2.75	2.65	2.23	2.00	1.01	0.69
8	**2HR**	Q10	Standard form	3	84	2.52	2.93	2.78	2.62	2.47	2.03	1.64	1.59
9	**1HR**	Q08	Statistical measures	3	78	2.35	2.95	2.83	2.42	2.21	1.50	0.65	0.58
10	**2HR**	Q02	Statistical measures	3	78	2.34	2.85	2.71	2.38	2.09	1.52	1.40	1.11
11	**1HR**	Q07	Percentages	3	75	2.26	2.96	2.78	2.28	1.81	1.19	0.72	0.42
12	**2HR**	Q13	3D shapes and volume	3	72	2.16	2.90	2.73	2.22	1.94	0.96	0.15	0.08
13	**2HR**	Q19	Inequalities	6	63	3.80	5.56	4.65	3.80	2.64	1.82	1.06	0.39
14	**1HR**	Q09	Measures	5	66	3.29	4.66	4.07	3.10	2.29	1.61	0.83	0.50
15	**1HR**	Q16	Probability	4	67	2.66	3.77	3.44	2.46	1.78	1.02	0.63	0.53
16	**2HR**	Q12	Polygons	3	66	1.98	2.91	2.48	1.70	1.15	0.84	0.36	0.39
17	**1HR**	Q13a	Decimals	2	57	1.15	1.76	1.43	1.08	0.47	0.44	0.26	0.08
18	**2HR**	Q16	Probability	8	57	4.53	7.11	5.33	3.75	2.67	1.88	1.54	1.22
19	**1HR**	Q19	Graphical representation of data	4	54	2.15	3.44	2.72	1.52	1.11	0.53	0.18	0.14
20	**2HR**	Q20	Similarity	4	45	1.81	3.52	2.10	0.82	0.50	0.12	0.10	0.03
21	**1HR**	Q21	Trigonometry and Pythagoras' Theorem	6	25	1.48	3.13	1.60	0.72	0.41	0.28	0.05	0.03
				80	**68**	**54.03**	**73.16**	**63.55**	**52.06**	**42.67**	**32.31**	**21.38**	**16.17**

Suggested grade boundaries

Grade	9	8	7	6	5	4	3
Mark	68	58	47	37	26	19	15