Q	Working	Answer	Mark		Notes
1.	Correctly collect p terms in eqn Correctly collect constants in eqn	½ oe	3	M1 M1 A1	eg $4p + 3 = 5$ (not $7p - 3p + 3=5$)
					Total 3 marks
2.	14.9422 611-182 = 429 "429" x 0.0704 or 30.2016 "14.9422" + "30.2016" or 45.1438 "45.1438" x 5/100 or 2.25719 "45.1438" + "2.25719"	47.40(099)	7	B1 B1 M1 M1 M1 M1 A1	Allow working to 3 s.f. or better throughout M marks can be implied 45.14 x 1.05 or 47.50 or 2.25 Can be awarded in previous line At least 2 d.p.
					Total 7 marks
3. (a)		50°	3	B3	If B3 not gained: $PQS = 70°$ / $\angle PTR=60°$ / ext $\angle PTR=120°$: B2 If B2 not gained: $\angle PST = 60°$: B1
(b)		∠s on a straight line = 180° **or** ∠ sum of triangle = 180° **or** ext ∠ of Δ = sum of int opp ∠s **AND** Corresponding ∠s **or** alternate ∠s **or** allied **or** supp **or** included **or** interior **or** co-interior ∠s	2	B1 B1	
					Total 5 marks

4.	(a)	(i)	p^4	**1**	B1	
		(ii)	$-3a + 4b - 7$	**2**	B2	B1: 2 terms. subs include working: -B1
		(iii)	q^6	**1**	B1	
	(b)		$2x^2 + 3x$	**2**	B2	B1 each term. subs include working: -B1
	(c)	$y^2 + 2y - y - 2$		**2**	M1	3 terms correct or 4 terms correct ignoring sign
			$y^2 + y - 2$		A1	Incorrect subsequent work: -A1
						Total 8 marks
5.	(a)		10-19	**1**	B1	
	(b)		42/59 **or** 0.71(....) **or** 71(...)%	**2**	B2	B1 num, B1 denom 42:59 B1
	(c)	8x4.5 + 20x14.5 + 14x24.5 + 5x34.5 + 12x44.5		**3**	M1	≥ four *fx* attempted, consistent *x* within interval
		Midpoints 4.5 (or 5 or 4) etc			M1	dep (for midpoints 4 or 5 etc)
			1375(.5) **or** 1376		A1	ISW eg ÷59 23.3, 1405, 1346 (no working): SC B2 22.8, 23.8 : SC B1
						Total 6 marks
6.			No **or** not necessarily Some are (or may be) both	**2**	B1 B1	dep on 2nd B1
						Total 2 marks

7.	(a)	$8^2 + 15^2$ **or** 289 seen $\surd$		**3**	M1 M1 A1	tan$x$ = 15/8 dep on x used dep 8/cos$x$ Answer rounds to 17.0
			17cm			
	(b)		15/8 **or** 1.875 **or** 1.88 seen	**1**	B1	ISW
						Total 4 marks
8.	(a)		Kitchen chairs	**2**	B1	Or equivalent. Must be clear that overlap is intended eg "chairs that are part of / common to kitchen furniture" "furniture that is both a chair and in the kitchen"
			belonging to Angela or "her"		B1	
	(b)	(i)	1, 2, 3, 4, 5, 6, 7, 8, 9	**2**	B2	-B1 each omission or extra Any order, in a single list Ignore negative odd numbers
		(ii)	Yes - no common members	**1**	B1	Or eg "No odd numbers in P." "P is even numbers, or Q is odd numbers." Must refer to sets or odd or even
						Total 5 marks
9.		19.8 = 2π x r x 2.1 **or** 19.8 /(2π x 2.1) **OR** 2π x 19.8 x 2.1	1.5 or better 261(.3..)	**2**	M1A1 M1A1	Or 19.8 = 2π x 1.5 x 2.1
						Total 2 marks

10.	(a)		9.905×10^7 **or** 99 050 000 **or** 9.91×10^7 **or** 99 100 000	**2**	B2	B1 for digits 9905 or 991
	(b)	$9.7/100 \times 9.72 \times 10^7$	9.43×10^6 **or** 9 430 000 or better	**2**	M1 A1	
	(c)	Total = 5.988×10^8 **or** 598800000 (4.98×10^8 / her 5.988×10^8) x 100	83% or better	**3**	B1 M1 A1	Or 599000000 dep total clearly attempted
						Total 7 marks
11.	(a)	3 x (i) or otherwise equalize coeffs	½ , 1	**3**	M1 A1A1	Whole equations correct T & I: 3 or 0
	(b)		Her (½, 1)	**1**	B1f	
						Total 4 marks
12.	(a)		49	**1**	B1	
	(b)	(i) 2.5 x 3/2 oe	3.75	**2**	M1 A1	cao
		(ii) 1.5 x 2/3 oe	1	**2**	M1 A1	Or 1.5 - 0.5 cao
						Total 5 marks

13.	(a)	$2(-4) - 3$	-11	**2**	M1 A1	
	(b)	$2a - 3 = 5$ **or** $(5 + 3)/2$	4	**2**	M1 A1	
	(c)	$\sqrt{}(2 \times 6 - 3) + 1$	4	**2**	M1 A1	
	(d)		Negative **or** $x < 0$	**1**	B1	
	(e)	$y = 1 + \sqrt{x}$ $x = (y - 1)^2$ | $\sqrt{}$, +1 becomes -1, $(\ )^2$	$g^{-1} : x \rightarrow (x - 1)^2$ **or** $y = (x - 1)^2$	**3**	M1 M1 A1	Or $x = 1 + \sqrt{y}$ Or $g^{-1}(x) = (x - 1)^2$ **or** $(x - 1)^2$
						Total 10 marks
14.	(a)		$x(28 - 2x)$ seen	**1**	B1	Brackets essential
	(b)	(i)	$28 - 4x$	**2**	B1B1	Ignore "$y =$"
		(ii) "$28 - 4x$" = 0	$x = 7$	**2**	M1 A1	
		(iii)	negative coeff. of x^2 **or** ∩ shape **or** $\frac{d^2y}{dx^2} = -4$, which is negative	**1**	B1	Not "the value is negative." ft her $28 - 4x$
	(c)	$28 \times 7 - 2 \times 7^2$	98	**2**	M1 A1	ft his (ii) if working seen cao
						Total 8 marks

15.	(a)	$\pi \times 12^2 \times 110/360$				
			138(.2. . .)			
	(b)	$1/3 \times 2\pi r$ **or** $^{120}/_{360} \times 2\pi r$ seen + $2r$ seen				
			$\frac{2\pi r}{3} + 2r$ **or** $^2/_3\pi r + 2r$			
16.	(a)	(i)	**-a + b**	oe	**1**	B1
		(ii)	**2a**	oe	**1**	B1
		(iii)	**-2a + 2b**	oe	**1**	B1
	(b)		Parallel $QR = 2MN$ **or** lines in ratio 1:2 or 2:1		**2**	B1 B1
17.	(a)	One block of correct height, **or** $^{20}/_5$ **or** $^{14}/_5$ **or** $^8/_{20}$ seen			**2**	M1
			Correct blocks, height & width			A1
	(b)	½ x 14 **or** ¼ x 8 **or** 2.5x 2.8 **or** 5 x 0.4			**3**	M1 M1
			9			A1

	Or $\pi \times 12^2 \times 0.31$, Or $\pi \times 12^2 \div 3.3$ or better
	Or equivalent explanation

Total 5 marks

}	Simplification not required
}	Allow plain a, b
}	
	(b) marks dep (a)(i)&(iii) correct
	Without vector symbols unless "length" stated.

Total 5 marks

	8cm, 5.6cm or 0.8cm, any width
A1A1A1	
	Value "7" or "2" not enough

Total 6 marks

18.	(a)	$^2/_5$ and $^3/_5$ correctly placed ¾ and ¼ correctly placed Correct structure includes labels	**3**	B1 B1 B1	 Allow even if extra branches
	(b) $^3/_5 \times {}^3/_4$ **or** $^9/_{20}$ + $^2/_5$		**3**	M1	
				M1	dep
		$^{17}/_{20}$ **or** 0.85 oe		A1	
					Total 6 marks
19.	$5.\dot{1} - 0.5\dot{1}$ or $51.\dot{1} - 5.\dot{1}$ or $51.\dot{1} - 0.5\dot{1}$		**2**	M1	Or 1/90 seen
		23/45 **or** 46/90 **or** 460/900 oe		A1	
					Total 2 marks
					TOTAL FOR PAPER: 100 MARKS