23	(a)	$6\times(-4)^3+k\times(-4)^2-26\times-4-24=0$ or $6\times(-4)^3+19\times(-4)^2-26\times-4-24$		2	M1 correct substitution of $x = -4$ into equation. Must be equal to zero (or implied by later working) or if substituting $x = -4$ and $k = 19$ into the expression we do not need it = 0 for this mark. Condone missing brackets around the –4
		$16k=304$ or $k=\frac{304}{16}$ and $k=19$ or $-384+304+104-24=0$ and shown			A1 completion to show clearly that $k = 19$ either by completing equation correctly (must see at least one line of working after the first line) and $k = 19$ or for $-384+304+104-24=0$ and comment (eg shown, or #)
	(b)	$(6x^2.....)$		4	M1 for a start to find the quadratic factor.
		$(6x^2-5x-6)$			M1 for a correct 3 term quadratic
		$(3x+2)(2x-3)$ or $(3x+2)(2x-3)(x+4)$			M1 dependent on the 2nd M1 being awarded for correct factorisation of the quadratic. Do not allow fractions or decimals eg $(x-1.5)$ or $\left(x+\frac{2}{3}\right)$ (ie) **or** a correct use of the quadratic formula. Implied by $-\frac{2}{3}$ and $\frac{3}{2}$ as two of the solutions (Allow –0.67 or better for $-\frac{2}{3}$)
			–4, $-\frac{2}{3}$, $\frac{3}{2}$		A1 oe (–0.67 or better for $-\frac{2}{3}$) dep on all 3 method marks being awarded. Do not ISW. Mark the answer on the answer line. If no answer on the answer line mark the final line of their working.
		wr			**Total 6 marks**

Question	Working	Answer	Mark	Notes

24	eg $\frac{0.5N+12.5}{N}$ or $\frac{N+25}{2N}$ or $\frac{p}{2p-25}$ or $\frac{25+y}{2y+25}$ oe		6	M1 for the probability that the first sweet is pink (N = number of sweets, p = number of pink sweets, y = number of yellow sweets) It must be seen as an expression in one letter and may be see in an equation
	eg $\frac{0.5N+12.5}{N}\times\frac{0.5N+11.5}{N-1}=\frac{7}{19}$ or $\frac{N+25}{2N}\times\frac{N+23}{2N-2}=\frac{7}{19}$ or $\frac{p}{2p-25}\times\frac{p-1}{2p-26}=\frac{7}{19}$ or $\frac{y+25}{2y+25}\times\frac{y+24}{2y+24}=\frac{7}{19}$ oe			M1 for a correct equation for 2 pink sweets. Must be expressed using one variable. This mark implies the 1st M1
	eg $2.25N^2 - 235N - 2731.25 = 0$ or $9N^2 - 940N - 10925 = 0$ or $9p^2 - 695p + 4550 = 0$ or $9y^2 - 245y - 7200 = 0$			M1 a correct 3 term quadratic for N or p or y (allow any letter) condone missing =0
	eg $(9N + 95)(N - 115)$ or $(9p-65)(p-70)$ or $(9y + 160)(y - 45)$ oe			M1 dep on 2nd M1 for a correct method to solve their 3 term quadratic – if factorising allow brackets that multiply giving 2 correct terms, if formula used then allow one error. Working must be shown if the equation is incorrect. Seeing or using $N = 115$ or $p = 70$ or $y = 45$ implies the 3rd and 4th Method marks
	$\frac{45}{115}\times\frac{44}{114}$			M1 for a correct calculation for the probability of 2 yellow sweets May be implied by a correct answer
	wr	$\frac{66}{437}$		A1 oe eg 0.151(029…) The correct answer will gain full marks if at least 2 method marks have been awarded.
	PTO for SC			

	SC for yellow is 25 more than pink M0M1M1M1M0A0			
	$\frac{0.5N-12.5}{N}\times\frac{0.5N-13.5}{N-1}=\frac{7}{19}$ or $\frac{N-25}{2N}\times\frac{N-27}{2N-2}=\frac{7}{19}$ or $\frac{y-25}{2y-25}\times\frac{y-26}{2y-26}=\frac{7}{19}$ or $\frac{p}{2p+25}\times\frac{p-1}{2p+24}=\frac{7}{19}$			M1 for a correct equation for 2 pink sweets. Must be expressed using one variable.
	$2.25N^2+240N-3206.25=0$ or $9N^2+960N-12825=0$ $9y^2+255y-7800=0$ $9p^2+705p+4200=0$			M1 a correct quadratic for N, p or y condone missing =0
	$[N=]\frac{240\pm\sqrt{(240)^2+4\times2.25\times3206.25}}{2\times2.25}$ or $[N=]\frac{-960\pm\sqrt{960^2+4\times900\times12825}}{2\times9}$ or $[y=]\frac{255\pm\sqrt{255^2+4\times9\times7800}}{2\times9}$ $[p=]\frac{-705\pm\sqrt{705^2-4\times9\times4200}}{2\times9}$ or			M1 dep on 2nd M1 for a correct method to solve their 3 term quadratic – if factorising allow brackets that multiply giving 2 correct terms, if formula used then allow one error. Working must be shown
	wr			**Total 6 marks**

Quest	Working	Ans	Mark	Notes
25	$0.5\times8\times11\times\sin115\,(=39.877...)$		5	M1 for a correct method to find the area of triangle *ABC*
	$AC^2=11^2+8^2-2\times11\times8\cos115\,(=259.38...)$ or $AC=\sqrt{11^2+8^2-2\times11\times8\cos115}\,(=16.105...)$			M1 for a correct method to find the length of AC^2 or *AC*
	$\angle CAD=\sin^{-1}\left(\dfrac{\sin(53)\times15}{"16.105..."}\right)[=48.059...]$ **AND** $\angle ACD=180-"48.059"-53\,(=78.94...)$ or $16.105...^2=AD^2+15^2-2\times AD\times15\cos53$ or $AD^2=16.105...^2+15^2-2\times16.105...\times15\cos"78.9..."$ $\left\{\sqrt{"16.105..."^2-11.979\ldots^2}\ \textbf{or}\ "16.105..."\cos\left[\sin^{-1}\left(\dfrac{\sin(53)\times15}{"16.105..."}\right)\right][=10.76...]\right\}$ **AND** $\left\{\sqrt{15^2-11.979\ldots^2}\ \textbf{or}\ 15\cos53[=9.027...]\right\}$			M1 for a correct method to find the angle *ACD* or Finding AD^2 NB $2\times15\cos53=18.054\ldots$ the length *AD* (19.79…) For splitting triangle *ACD* into 2 triangles with perpendicular *CE* where *E* is on *AD* and finding the lengths *AE* (10.76…) and *ED* (9.027…)
	$\frac{1}{2}\times15\times"16.105..."\sin("78.94...")+"39.877.."$ or $\frac{1}{2}\times"19.79..."\times15\sin(53)+"39.877.."$ or $\frac{1}{2}\times"16.105..."\times"19.79..."\left(\dfrac{\sin(53)\times15}{"16.105..."}\right)+"39.877.."$ or $\frac{1}{2}\times15\sin53\times"10.76..."+\frac{1}{2}\times15\sin53\times"9.027..."+"39.877..."$			M1 dependent on all 3 M marks being awarded. For a fully correct method to find the area NB 15 sin 53 = 11.979…
		158.42		A1 for awrt 158 (allow 159)
	cas			**Total 5 marks**

Question	Working	Answer	Mark	Notes
26	eg $\frac{6(x+3)+4(x-2)}{(x-2)(x+3)}$		5	M1 writing the addition part as a correct fraction over a common denominator – need not be expanded and may be 2 separate fractions. Allow one sign error in numerator if expanded
	eg $\frac{10(x+1)}{(x-2)(x+3)}$ or $\frac{10x+10}{x^2+x-6}$ oe			A1 a correct single fraction with numerator and denominator simplified – numerator and / or denominator may be factorised. This implies the 1st M1
	$\frac{(5x-5)(x-2)}{(x+1)(x-1)}$ or $\frac{(5x-10)(x-1)}{(x+1)(x-1)}$			M1 for numerator **or** denominator factorised correctly into 2 brackets
	$\frac{5(x-1)(x-2)}{(x+1)(x-1)}$ or $\frac{5(x-2)}{(x+1)}$ oe			M1 for numerator **and** denominator fully factorised correctly including factor of 5 taken out (could be implied by further cancelling) This implies the 2nd M1
		$\frac{50}{x+3}$		A1 dep on M3
ALT	$\frac{(5x-5)(x-2)}{(x+1)(x-1)}$			M1 for numerator **or** denominator factorised correctly
	$\frac{5(x-1)(x-2)}{(x+1)(x-1)}$ or $\frac{5(x-2)}{(x+1)}$			M1 for numerator **and** denominator fully factorised correctly including factor of 5 taken out (could be implied by further cancelling)
	$\frac{30(x+3)+20(x-2)}{(x+1)(x+3)}$ oe			M1 for multiplying each part and writing the addition as a correct fraction over a common denominator – need not be expanded and may be 2 separate fractions. Allow one sign error in numerator if expanded
	$\frac{50x+50}{(x+1)(x+3)}$ or $\frac{50(x+1)}{(x+1)(x+3)}$			M1 for numerator **and** denominator fully factorised correctly (could be implied by further cancelling)
		$\frac{50}{x+3}$		A1 dep M3
	wr			**Total 5 marks**