1(a)	**Alternative method 1** large rectangle – 4 squares		
	$x(x + 5)$	M1	
	$x^2 + 5x - 400 = 1000$ or $x^2 + 5x - 400 - 1000 = 0$ or $x^2 + 5x = 1000 + 400$ with M1 seen	M1dep	400 may be seen as 4×10^2 or 4×100 oe equation with brackets expanded and 400 and 1000 seen
	$x^2 + 5x - 1400 = 0$ with M2 seen	A1	must have = 0
	Alternative method 2 three vertical rectangles		
	$(x + 5)(x - 20)$ or $(2 \times)10(x - 15)$	M1	$(x - 20)$ may be seen as $(x - 10 - 10)$ $(x - 15)$ may be seen as $(x + 5 - 10 - 10)$
	$x^2 - 20x + 5x - 100 + 20x - 300 = 1000$ or $x^2 - 15x - 100 + 20x - 300 = 1000$ with M1 seen	M1dep	oe equation with brackets expanded and 100 and 300 and 1000 seen allow 150 seen twice for 300
	$x^2 + 5x - 1400 = 0$ with M2 seen	A1	must have = 0

1(a) cont	**Alternative method 3** three horizontal rectangles		
	$x(x-15)$ or $(2\times)10(x-20)$	M1	$(x-20)$ may be seen as $(x-10-10)$ $(x-15)$ may be seen as $(x+5-10-10)$
	$x^2-15x+20x-400=1000$ with M1 seen	M1dep	oe equation with brackets expanded and 400 and 1000 seen allow 200 seen twice for 400
	$x^2+5x-1400=0$ with M2 seen	A1	must have = 0
	Alternative method 4 central rectangle + four outer rectangles		
	$(x-15)(x-20)$ or $(2\times)10(x-15)$ or $(2\times)10(x-20)$	M1	$(x-20)$ may be seen as $(x-10-10)$ $(x-15)$ may be seen as $(x+5-10-10)$
	$x^2-20x-15x+300+20x-300+20x-400=1000$ or $x^2-35x+300+20x-300+20x-400=1000$ with M1 seen	M1dep	oe equation with brackets expanded and 300 seen twice and 400 and 1000 seen allow 150 seen twice for one of the 300s allow 200 seen twice for 400
	$x^2+5x-1400=0$ with M2 seen	A1	must have = 0
	Additional Guidance		
	If 1st M1 seen award M1 even if expression is not subsequently used		
	For M1 allow multiplication signs eg $x\times(x+5)$		M1
	$x(x+5)=x^2+5x$ $1000+400=1400$ $x^2+5x=1400$ (previous line shows 1000 and 400) $x^2+5x-1400=0$		M1 M1 A1
	$x(x+5)=x^2+5x$ $x^2+5x=1400$ (equation does not have 1000 and 400) $x^2+5x-1400=0$		M1 M0 A0
	Only equation seen is $x^2+5x-1400=0$ the maximum mark is M1		

1(b)	No and valid reason	B1	eg No and x cannot be negative (in this context)
	Additional Guidance		
	If neither box is ticked condone if No is clearly stated in working lines		
	Yes or both boxes ticked		B0
	Allow 'it' to represent x		
	No and x is (only) 35		B1
	No and it cannot be –40		B1
	No and the width would be negative		B1
	No and the width should be positive		B1
	No she put –40		B1
	No and you can't have two answers		B0
	No and the answers are too big		B0
	No and it should be 40 (and –35)		B0

Q	Answer	Mark	Comments
2	**Alternative method 1** Shows algebraically that the angles are equal		
	$4x + 40$	M1	may be embedded or on the diagram
	$x + 2(2x + 20)$ or $x + 4x + 40$	M1	
	$x + 4x + 40 = 5x + 40$ and Yes	A1	
	Alternative method 2 Derives and solves an equation for angles at a point and substitutes into $5x + 40$ or $x + 2(2x + 20)$		
	$4x + 40$	M1	may be embedded or on the diagram or implied eg implied by $10x + 80 = 360$
	$x + 2(2x + 20) + 5x + 40 = 360$ or $x + 4x + 40 + 5x + 40 = 360$ or $(x =) 28$	M1	oe equation eg $10x + 80 = 360$ $(x =) 28$ may be on the diagram
	$140 + 40 = 180$ and Yes or $28 + 152 = 180$ and Yes	A1	oe must obtain $(x =) 28$ from one expression and substitute $(x =) 28$ into a different expression
	Alternative method 3 Assumes line is a diameter. Derives and solves an equation for angles on a line using $5x + 40$ and substitutes into $x + 2(2x + 20)$ or $x + 2(2x + 20) + 5x + 40$		
	$5x + 40 = 180$	M1	
	$(x =) (180 - 40) \div 5$ or $(x =) 28$	M1dep	oe $(x =) 28$ may be on the diagram
	$28 + 152 = 180$ and Yes or $28 + 152 + 140 + 40 = 360$ and Yes	A1	oe must obtain $(x =) 28$ from one expression and substitute $(x =) 28$ into a different expression

2 cont	**Alternative method 4** Assumes line is a diameter. Derives and solves an equation for angles on a line using $x + 2(2x + 20)$ and substitutes into $5x + 40$ or $x + 2(2x + 20) + 5x + 40$		
	$x + 2(2x + 20) = 180$ or $x + 4x + 40 = 180$	M1	
	$(x =)\ (180 - 40) \div 5$ or $(x =)\ 28$	M1dep	oe $(x =)\ 28$ may be on the diagram
	$140 + 40 = 180$ and Yes or $28 + 152 + 140 + 40 = 360$ and Yes	A1	oe must obtain $(x =)\ 28$ from one expression and substitute $(x =)\ 28$ into a different expression
	Alternative method 5 Assumes line is a diameter. Derives and solves two equations for angles on a line/angles at a point		
	$5x + 40 = 180$ or $x + 2(2x + 20) = 180$ or $x + 4x + 40 = 180$ or $x + 2(2x + 20) + 5x + 40 = 360$ or $x + 4x + 40 + 5x + 40 = 360$	M1	
	$(x =)\ (180 - 40) \div 5$ or $(x =)\ 28$	M1dep	oe $(x =)\ 28$ may be on the diagram
	Obtains $(x =)\ 28$ from two equations for angles on a line/ angles at a point and Yes	A1	

	Additional Guidance	
2 cont	Choose the scheme that favours the student	
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts	
	Correct response with other incorrect work	M1M1A0
	Alt 1 $2(2x + 20) = 4x + 20$ followed by $x + 4x + 20$ Alt 1 $x + 4x + 20$ with $2(2x + 20) = 4x + 20$ not seen Apply marks in a similar way in alts 2, 4 and 5	M0M1 M0M0
	$(x =)$ 28	M1M1
	Allow $(x =)$ 28 to be embedded	M1M1
	No method marks scored with a value of x $(\neq 28)$ substituted into $5x + 40$ and $x + 2(2x + 20)$ giving the same value	M0M0A0
	Yes can be implied eg Alt 1 $x + 4x + 40 = 5x + 40$ and It is a diameter	M1M1A1

Q	Answer	Mark	Comments
3(a)	**Alternative method 1 – horizontal split**		
	$x(x-2)$ and $3(x-5)$	M1	oe may be seen as two areas
	$x^2-2x+3x-15$ (= 75)	M1dep	oe expression with all brackets expanded
	$x^2-2x+3x-15=75$ and $x^2+x-90=0$ or $x^2+x-15=75$ and $x^2+x-90=0$	A1	with full working seen
	Alternative method 2 – vertical split		
	$(x-5)(x+1)$ and $5(x-2)$	M1	oe may be seen as two areas
	$x^2-5x+x-5+5x-10$ (= 75) or $x^2-4x-5+5x-10$ (= 75)	M1dep	oe expression with all brackets expanded
	$x^2-5x+x-5+5x-10=75$ and $x^2+x-90=0$ or $x^2-4x-5+5x-10=75$ and $x^2+x-90=0$	A1	with full working seen
	Alternative method 3 – large rectangle subtract 3 × 5		
	$x(x+1)$ and 3×5	M1	oe may be seen as two areas
	x^2+x-15 (= 75)	M1dep	oe expression with brackets expanded and 3×5 evaluated
	$x^2+x-15=75$ and $x^2+x-90=0$	A1	with full working seen

Q	Answer	Mark	Comments
3(a) cont	**Alternative method 4 – split into three areas**		
	$3(x-5)$ and $(x-2)(x-5)$ and $5(x-2)$	M1	oe may be seen as three areas
	$3x-15+x^2-2x-5x+10+5x-10$ $(=75)$ or $3x-15+x^2-7x+10+5x-10$ $(=75)$	M1dep	oe expression with all brackets expanded
	$3x-15+x^2-2x-5x+10+5x-10=75$ and $x^2+x-90=0$ or $3x-15+x^2-7x+10+5x-10=75$ and $x^2+x-90=0$	A1	with full working seen
	Additional Guidance		
	Ignore attempts to solve the equation or substituting values for x		
	Condone missing end bracket for M1		
	Condone missing pairs of brackets if recovered eg $3\times x-5$ recovered to $3x-15$		

Q	Answer	Mark	Comments
3(b)	$(x-9)(x+10)$ $(=0)$ and answer 9	B2	B1 $(x-9)(x+10)$ $(=0)$ and answer 9 and –10 SC1 $(x+9)(x-10)$ $(=0)$ and answer 10
	Additional Guidance		
	If no response is seen, check part (a) for any creditworthy work		
	Answer 9 with no working can be awarded up to B2 from correct factorising seen in part (a)		
	Answer 9 from quadratic formula or completing the square		B1
	Answer 9 and –10 from quadratic formula or completing the square		B0
	Answer from trial and improvement only		B0

Q	Answer	Mark	Comments
4(a)	11 5 4 or 10 7 3 or 10 6 4 or 9 8 3 or 9 7 4 or 9 6 5 or 8 7 5	B2	any order B1 answer of three positive numbers in any order with sum 20 eg 17 2 1 or $9\frac{1}{2}$ $8\frac{1}{2}$ 2 or 10 5 5 or $6\frac{2}{3}$ $6\frac{2}{3}$ $6\frac{2}{3}$ or correct equation in w, x and y eg $4w + 4x + 4y = 80$ or $w + x + y = 20$

Additional Guidance	
Ignore attempts to work out the volume or surface area eg 10 5 5 volume calculated as 500	B1
Negative numbers and/or zero used	B0
$wxy > 200$ or $wxy = 200$	B0
Allow $6.\dot{6}$ for $6\frac{2}{3}$	

Q	Answer	Mark	Comments
5(a)	The number of blueberries in the tub	B1	