	January Prelim Revision 1 – Non Calculator	25
1	Multiply out the brackets and collect like terms $(x+5)(3x^2+x-2)$	**3**
2	The percentage marks of a group of Nat 5 students in their November A/B test is listed below $\quad$ 43$\quad$48$\quad$54$\quad$56$\quad$58$\quad$59$\quad$59$\quad$62$\quad$63$\quad$69$\quad$72$\quad$73 $\quad$(a)$\quad$Calculate:$\quad$(i) the median; $\qquad\qquad\qquad\quad$(ii) the semi-interquartile range. After this test the teacher decides to run some extra study support classes to prepare for the next assessment in January. In the January prelim the median result is 65% and the semi-interquartile range is 9. $\quad$(b) Make **two** appropriate comment comparing the marks in the November and January tests.	**1** **3** **2**
3	For triangle PQR If $\sin P = \frac{1}{4}$, calculate the area of triangle PQR	**2**
4	Change the subject of the formula $A = \frac{7}{2}h(a-b)$ to a	**3**
5	Write the following in order of size, **starting with the smallest.** $\quad$ sin 0°,$\qquad$ sin 30°,$\qquad$ sin 200°	**2**
6	(a) Express $\frac{12}{\sqrt{3}}$ with a rational denominator. $\quad$ Give your answer in the simplest form (b) Evaluate $9^{\frac{3}{2}}$	**2** **2**

7 The diagram shows part of a parabola with an equation in the form
$y = (x + a)^2 + b$

(-2, 1)
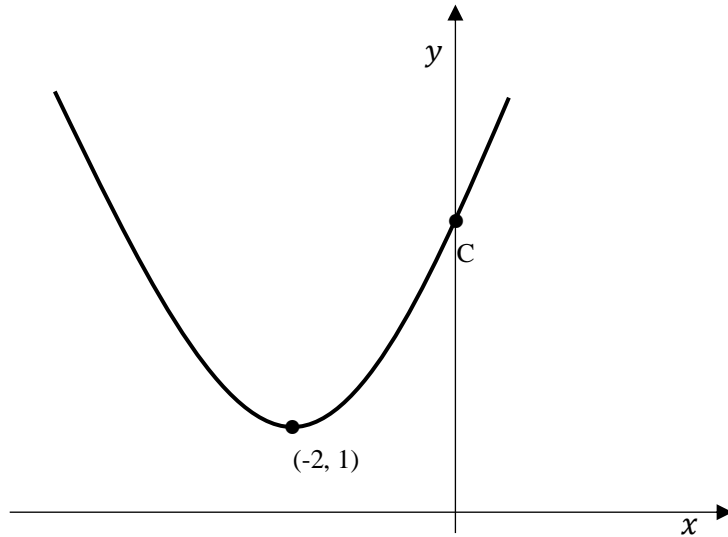
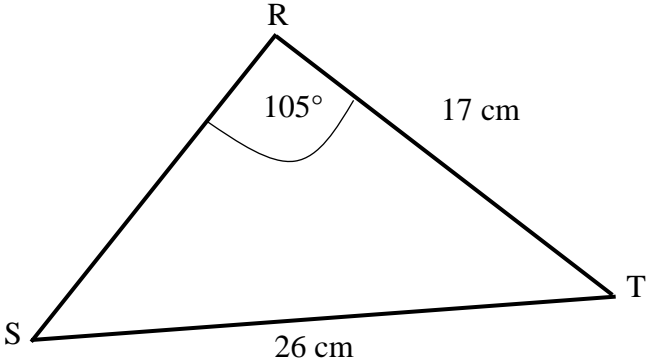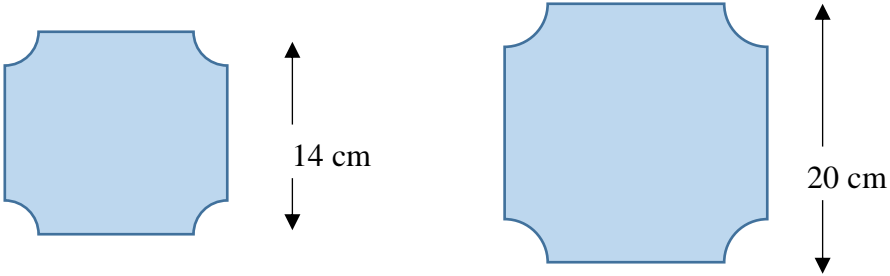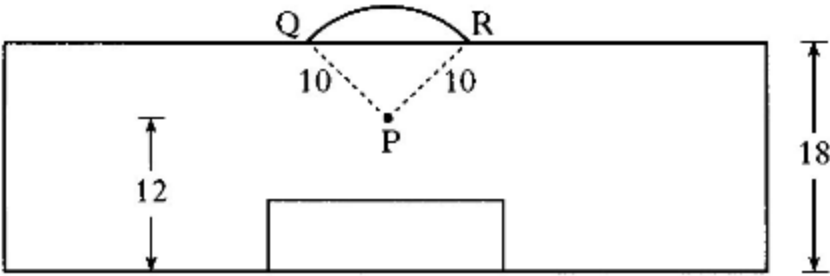(a) Write down the equation of the axis of symmetry for this graph **1**
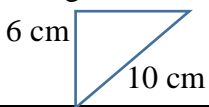
(b) Write down the equation of the parabola **2**

(c) Find the coordinates of point C **2**

	January Prelim Revision 1 – Calculator	**35**
1	The value of a house increased from £130 000 to £137800 in one year.	
	(a) What is the percentage increase?	**1**
	(b) If the house continues to rise at this rate, what is the value of the house after a **further** 2 years. Give your answer rounded to the nearest hundred pounds.	**3**
2	For the triangle shown below. Calculate the size of angle S	**3**

3	The height in centimetres of 6 sunflowers is given below 149 155 165 159 160 172 For this sample, calculate the mean and the standard deviation	**4**
4	These two shapes are mathematically similar.	

The height of the smaller shape is $14\ cm$ and the area is $26\ cm^2$
The height of the larger shaper is $20\ cm$.
Calculate the area of the larger shape.

3

5	The diagram shows the penalty area in a football pitch.	

	The penalty spot is marked at point P QR is an arc of a circle with centre P with a radius of 10 yards The width of the penalty area is 18 yards. The distance of the penalty spot from the goal line is 12 yards	
	(a) Calculate the size of angle QPR	**3**
	(b) Calculate the length of arc QR	**3**
6	Whilst on holiday in the US Ella paid \$450.87 for a laptop. This price included 13% sales tax. What was the price of the laptop before sales tax was added?	**3**
7	Algebraically solve the system of equations $\qquad 5x + 2y = 6$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad 3x + 8y = 7$	**3**
8	Express $\quad \dfrac{a}{b} \div \dfrac{a^2}{b}\quad$ as a fraction in its simplest form	**2**
9	Solve the equation $\qquad 5\sin x° + 1 = -3, \quad 0 \le x \le 360°$	**3**
10	The weight, W kilograms, of a giraffe is related to its age, m months, by the formula. $$W = \frac{1}{4}\left(m^2 - 4m + 272\right)$$ At what age will a giraffe weigh 83 kilograms?	**4**

	Revision 1 Non Calculator Answers
1	$3x^3 + x^2 - 2x + 15x^2 + 5x - 10 = 3x^3 + \mathbf{16x^2 + 3x - 10}$
2	Median is 59% SIQR is 5.5
	On average the marks were better in the January as the median mark is higher.
	However, the marks are less consistent in January as the SIQR is larger
3	Area $= \frac{1}{2} \times q \times r \times \sin P = \frac{1}{2} \times 16 \times 20 \times \frac{1}{4} = 8 \times 5 = \mathbf{40\ cm^2}$
4	$A = \frac{7}{2}h(a-b),\qquad \frac{2A}{7} = h(a-b),\qquad \frac{2A}{7h} = a - b\ \rightarrow\ \boldsymbol{a = \frac{2A}{7h} + b}$
5	$\sin 0° = 0,\ \sin 30° > 0,\ \sin 200° < 0$ so in order $\mathbf{\sin 200°,\ \sin 0°,\ \sin 30°}$
6	(a) $\frac{12}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = \mathbf{4\sqrt{3}}$ \qquad (b) $9^{\frac{3}{2}} = \left(\sqrt{9}\right)^3 = 3^3 = \mathbf{27}$
7	(a) $\boldsymbol{x = -2}$ (b) $\boldsymbol{y = (x+2)^2 + 1}$ (c) $x = 0,\ y = 5$ **C** $\mathbf{(0,5)}$

	Revision 1 Calculator Answers
1	(a) Percentage change $\frac{137800}{130000} = 1.06$ So the percentage increase is 6%
	(b) $137800 \times 1.06^2 = \mathbf{£154832.08}$
2	Using the Sine Rule $\frac{\sin S}{17} = \frac{\sin 105}{26}$ $\sin s = \frac{17 \times \sin 105}{16} = 0.63156688,\ \boldsymbol{S = 39°}$
3	Mean is 160 \qquad St Dev $= \sqrt{\frac{316}{5}} = 7.94984\ ...$
4	LSF $= \frac{20}{14}$, Area of larger shape is $26 \times \left(\frac{20}{16}\right)^2 = \mathbf{53\ cm^2}$
5	(a) Using SohCahToa \qquad\qquad (b) Arc $= \frac{106}{360} \times \pi \times 20 = \mathbf{18.5\ cm}$
	6 cm
	10 cm \qquad angle QPR is $2 \times \cos^{-1}\left(\frac{6}{10}\right) = 2 \times 53 = \mathbf{106°}$
6	$113\% = \$450.87,\ 100\% = \mathbf{\$399}$
7	Simultaneous equations
	$5x + 2y = 6$ \qquad\qquad Scale \qquad $20x + 8y = 24$
	$3x + 8y = 7$ \qquad\qquad\qquad\qquad $\underline{3x + 8y = 7}$
	\qquad\qquad\qquad\qquad\qquad\qquad $17x = 17,\ \boldsymbol{x = 1,\ y = \frac{1}{2}}$
8	$\frac{a}{b} \div \frac{a^2}{b} = \frac{a}{b} \times \frac{b}{a^2} = \frac{1}{a}$
9	$\sin x = -\frac{4}{5},\ \ x = \mathbf{233°}$ **and** $\mathbf{307°}$
10	$83 = \frac{1}{4}(m^2 - 4m + 272),\ \ 332 = m^2 - 4m + 272,\ \ 0 = m^2 - 4m - 60$
	$0 = (x - 10)(x + 6)$ $x = 10$ or $x = -6,\ \boldsymbol{x = }$ **10 months**

SI \qquad\qquad\qquad\qquad\qquad National 5 \qquad\qquad\qquad\qquad\qquad 2018