Essential skills A* record sheet

Name:

Question	Topic	Worksheet 1	Worksheet 2	Worksheet 3	Worksheet 4	Worksheet 5
1	Completing the square					
2	Sine/cosine rule (lengths)					
3	Surds - Rationalising the denominator					
4	Circle theorems					
5	Forming and solving quadratic equations					
6	Simultaneous equations with quadratic					
7	Rearranging difficult formulae					
8	Algebraic proof					
9	Sine/cosine rule (angles)					
10	Vector geometry					
11	Probability					
12	Simplifying algebraic fractions					
13	Equations involving indices					
14	Transformations of functions					
15	Solving algebraic fraction equations					
	Total					

Keep a record of how well you do in this table.
You should always try to **improve** on the previous sheet. Make sure you look at your corrections and targets so you know what you have to do to achieve better.

After each sheet, set yourself a target as to what you want to improve for next time..

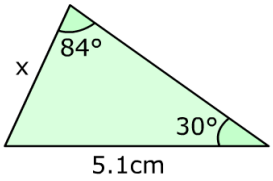
Date Set	Target	Date Achieved

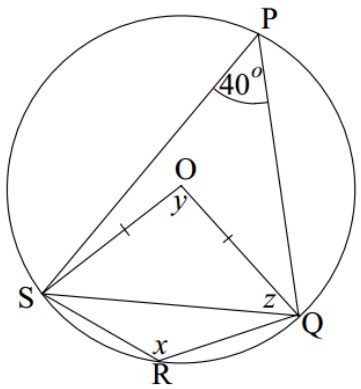
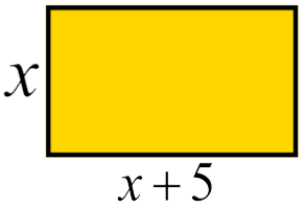
Name:

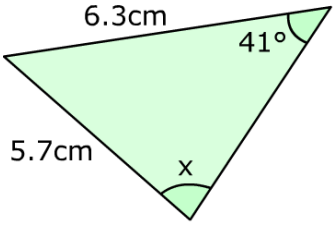
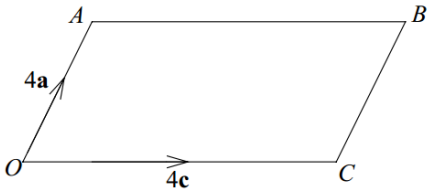
Mark:

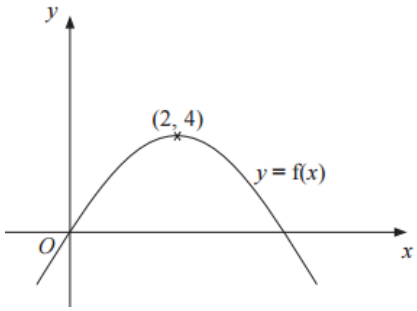
A* GCSE – Essential Skills 1

Show all of your working out (use a separate sheet if required)

1	Write the following in the form $(x + p)^2 + q$ $x^2 + 10x - 20$ Hence find the minimum point of $y = x^2 + 10x - 20$	
2* (104)	Work out the missing length to 3sf  	
3 (95)	Rationalise the denominator: $\frac{15}{\sqrt{3}}$	

4 (90)	Calculate the angles x,y and z  	
5 (98)	The area of the rectangle is 14cm^2. Form a quadratic equation and use it to find the value of x.  	
6* (101)	Solve simultaneous equation (linear/quadratic) $y = 2x + 3$ $y = x^2 + 9x + 15$	
7 (100)	Make m the subject of the formula $3(4p + m) = 5 - 4m$	

8 (111)	Prove that half the sum of four consecutive numbers is odd.	
9* (104)	Work out the missing angle to the nearest degree  	
10 (108)	Find in terms of **a** and **c** $\overrightarrow{AP}$ where P is the midpoint of AC  	
11 (92)	A bag contains 3 black discs and 7 white discs. A disc is taken at random from the bag and **not replaced**. Another disc is then taken. Find the probability that both discs were black. (Draw tree diagram on separate sheet if required)	

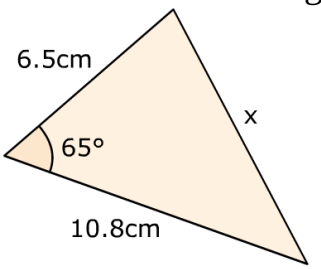
12 (99)	Simplify fully $\frac{x^2+4x}{4x+16}$	
13 (94)	Find the value of $64^{-\frac{2}{3}}$	
14 (102)	 Write down the maximum point of $y = f(x-5)+2$	
15* (99)	Solve the following equation: $x+\frac{2}{x}=3$	

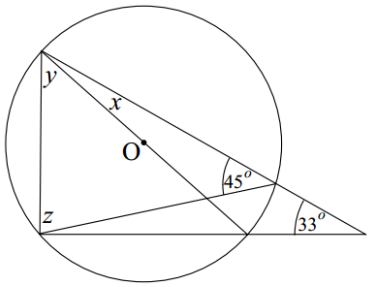
Name:

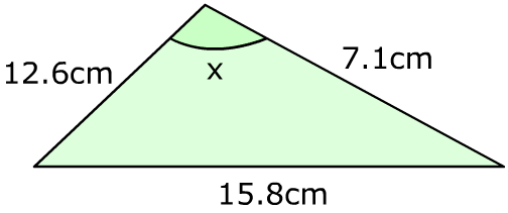
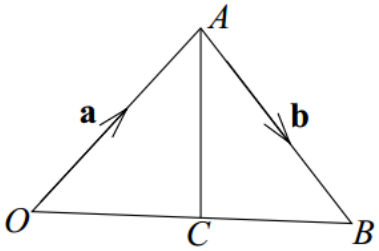
Mark:

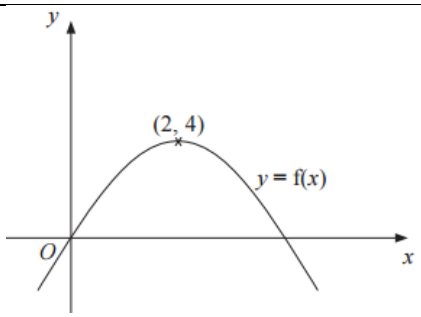
A* GCSE – Essential Skills 2

Show all of your working out (use a separate sheet if required)

1	Write the following in the form $(x + p)^2 + q$ $x^2 + 6x + 12$ Hence find the minimum point of $y = x^2 + 6x + 12$	
2* (104)	Work out the missing length to 3sf  	
3 (95)	Rationalise the denominator: $\frac{16}{3+\sqrt{5}}$	

4 (90)	Calculate the angles x,y and z  	
5 (98)	The area of the rectangle is 63cm^2. Form a quadratic equation and use it to find the value of x. $(x+4)cm$ $(2x-7)cm$	
6* (101)	Solve simultaneous equation (linear/quadratic) $x^2 + y^2 = 20$ $y = 3x - 10$	
7 (100)	Make x the subject of the formula $3(x-4) = y(5-2x)$	

8 (111)	Prove that: $(n+4)^2-(3n+4)\equiv(n+1)(n+4)+8$	
9* (104)	Work out the missing angle to the nearest degree  	
10 (108)	C is the midpoint of OB. Find $\overrightarrow{AC}$ in terms of **a** and **b**.  	
11 (92)	A bag contains 2 red balls and 7 blue balls. A ball is taken at random from the bag and **not replaced**. Another ball is then taken. Find the probability that both balls were the same colour. (Draw tree diagram on separate sheet if required)	

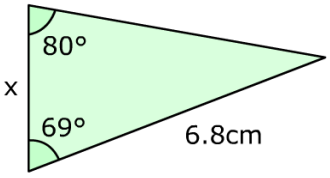
12 (99)	Simplify fully $\frac{3x-21}{x^2+x-56}$	
13 (94)	Find the value of x $\left(\frac{1}{2}\right)^x = 32$	
14 (102)	 Write down the maximum point of $y = f(2x) - 3$	
15* (99)	Solve the following equation: $\frac{x-3}{2} = \frac{5}{x}$	

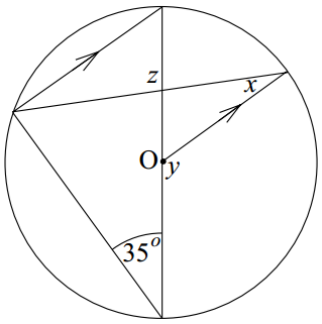
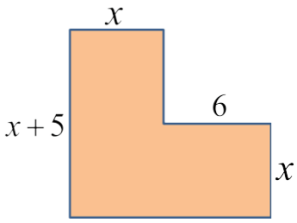
Name:

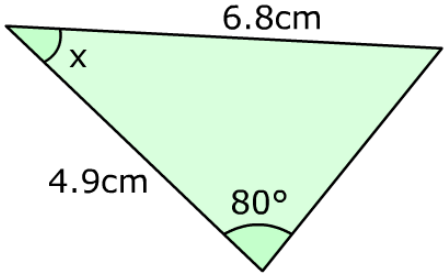
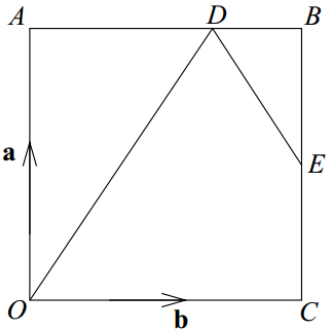
A* GCSE – Essential Skills 3

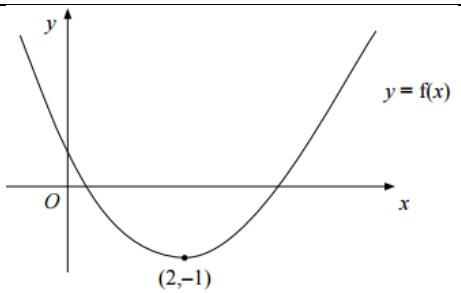
Mark:

Show all of your working out (use a separate sheet if required)

1	Write the following in the form $(x + p)^2 + q$ $x^2 + 16x + 64$ Hence find the minimum point of $y = x^2 + 16x + 64$	
2* (104)	Work out the missing length to 3sf  	
3 (95)	Rationalise the denominator: $\frac{20}{5-\sqrt{5}}$	

4 (90)	Calculate the angles x,y and z  	
5 (98)	The area of the shape is 60cm^2. Form a quadratic equation and use it to find the value of x.  	
6* (101)	Solve simultaneous equation (linear/quadratic) $y = x^2 + 8x - 6$ $y = 3x + 8$	
7 (100)	Make c the subject of the formula $a = \frac{3bc}{b - c}$	

8 (111)	Prove that, if the difference of two numbers is 4, then the difference of their squares is a multiple of 8.	
9* (104)	Work out the missing angle to the nearest degree  	
10 (108)	 OABC is a square. Point D cuts the line AB in the ratio 2:1. Point E is the midpoint of BC. By first finding $\overrightarrow{OD}$ and $\overrightarrow{OE}$, find the vector $\overrightarrow{DE}$	
11 (92)	There are 3 digestives and 5 custard creams in a biscuit tin. Oakley takes two at random. Work out the probability that she gets one of each. (Draw tree diagram on separate sheet if required)	

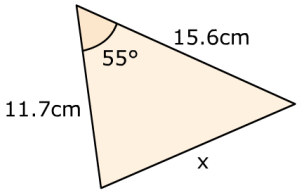
12 (99)	Simplify fully $\frac{x^2-2x-24}{x^2+8x+16}$	
13 (94)	Find the value of x $2^x = \frac{1}{16}$	
14 (102)	 Write down the minimum point of $y = f(x-4)+3$	
15* (99)	Solve the following equation: $\frac{5x+4}{x+2} - \frac{3}{x} = 2$	

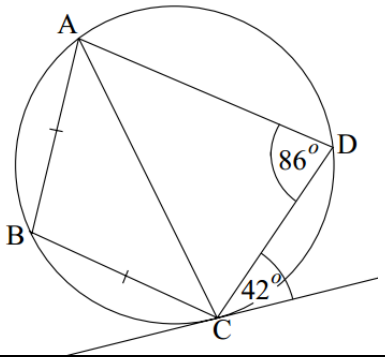
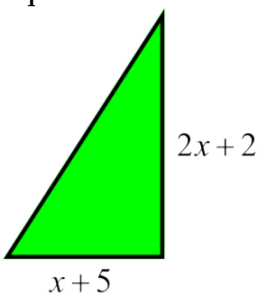
Name:

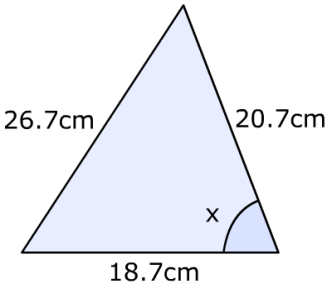
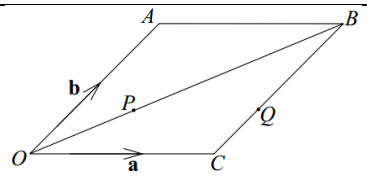
Mark:

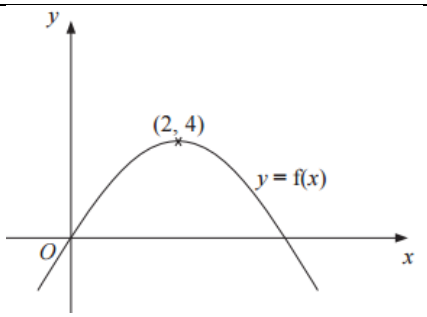
A* GCSE – Essential Skills 4

Show all of your working out (use a separate sheet if required)

1	Write the following in the form $(x + p)^2 + q$ $x^2 + 5x - 6$ Hence find the minimum point of $y = x^2 + 5x - 6$	
2* (104)	Work out the missing length to 3sf  	
3 (95)	Rationalise the denominator: $\frac{9}{2+\sqrt{3}}$	

4 (90)	Calculate the angles ABC,ACB, ACD and DAC  	
5 (98)	The area of the triangle is $21cm^2$. Form a quadratic equation and use it to find the value of x.  	
6* (101)	Solve simultaneous equation (linear/quadratic) $y = x^2 + 6x + 11$ $y = 10x + 8$	
7 (100)	Make n the subject of the formula $m = \frac{5-3n}{2n-4}$	

8 (111)	Prove that: $(n+3)^2-(3n+5)\equiv(n+1)(n+2)+2$	
9* (104)	Work out the missing angle to the nearest degree  	
10 (108)	 OABC is a rhombus. Point P cuts the line OB in the ratio 1:2. Point Q cuts the line CB in the ratio 1:2. Find the vector $\overrightarrow{PQ}$ and explain why it is parallel to $\overrightarrow{AB}$.	
11 (92)	In a class of 20 pupils there are 6 boys and 14 girls. Two names are chosen at random. Find the probability that they are both girls. (Draw tree diagram on separate sheet if required)	

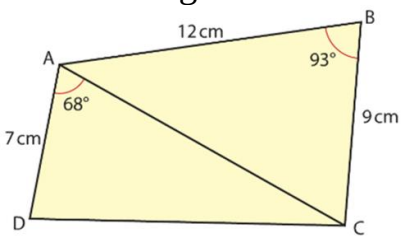
12 (99)	Simplify fully $\frac{x^2+x-6}{x^2-7x+10}$	
13 (94)	Find the value of x $25^x = \frac{1}{5}$	
14 (102)	 Write down the maximum point of $y = f(-2x)$	
15* (99)	Solve the following equation: $\frac{3}{x-2} + \frac{8}{x+3} = 2$	

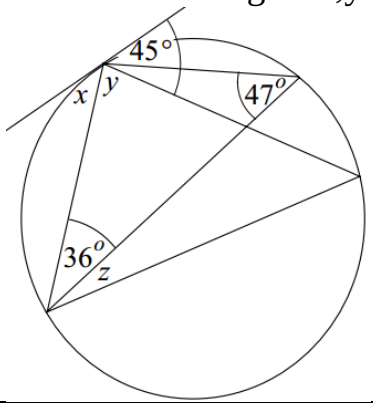
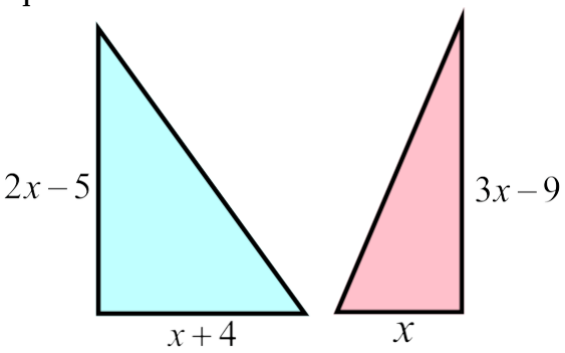
Name:

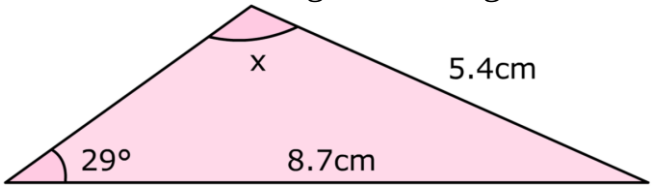
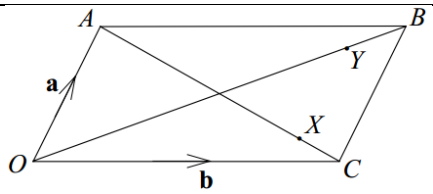
Mark:

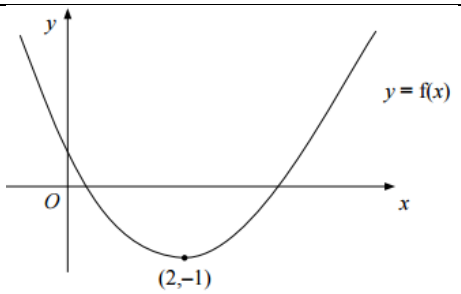
A* GCSE – Essential Skills 5

Show all of your working out (use a separate sheet if required)

1	Write the following in the form $(x + p)^2 + q$ $x^2 + \frac{1}{2}x + 2$ Hence find the minimum point of $y = x^2 + \frac{1}{2}x + 2$	
2* (104)	Find the length DC to 3sf  	
3 (95)	Rationalise the denominator: $\frac{21}{3-\sqrt{7}}$	

4 (90)	Calculate the angles x,y and z  	
5 (98)	The areas of both rectangles are equal. Form a quadratic equation and solve it to work out the area of each triangle.  	
6* (101)	Solve simultaneous equation (linear/quadratic) $x^2 + y^2 = 52$ $y = x - 2$	
7 (100)	Make x the subject of the formula $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$	

8 (111)	Prove that $(3n+1)^2-(3n-1)^2$ is a multiple of 6 for all values of n.	
9* (104)	Work out the missing **obtuse** angle to the nearest degree  	
10 (108)	 OABC is a parallelogram. Point Y and point X cut the lines OB and OC in the ratio 5:1. Find the vectors $\overrightarrow{OB}$, $\overrightarrow{YB}$, $\overrightarrow{AC}$, $\overrightarrow{XC}$ and $\overrightarrow{XY}$. How are XY and CB related?	
11 (92)	There are 3 red sweets, 2 green sweets and 5 blue sweets in a bag. Shona eats 2 random sweets. What is the probability that both sweets were the same colour? (Draw tree diagram on separate sheet if required)	

12 (99)	Simplify fully $\frac{x^2+4x-32}{x^2-8x+16}$	
13 (94)	Find the value of x $81^x = \frac{1}{3}$	
14 (102)	 Write down the minimum point of $y = 3f(x-2)$	
15* (99)	Solve the following equation: $\frac{5}{x+2} + \frac{2}{x-1} = 1$	