Year 12 Intro 3

Question 1

Express $x^2 + 10x - 15$ in the form $(x + p)^2 + q$.

..... **(2 marks)**

Question 2

Express $x^2 - 6x - 81$ in the form $(x - p)^2 + q$.

..... **(2 marks)**

Question 3

Express $7 - 4x - x^2$ in the form $p - (x + q)^2$ where p and q are constants.

..... **(2 marks)**

Question 4

Write $2x^2 - 8x + 9$ in the form $a(x + b)^2 + c$

..... **(3 marks)**

Question 5

Write $3x^2 - 12x + 7$ in the form $a(x + b)^2 + c$

..... **(3 marks)**

Question 6 Solve by factorisation $2x^2 + 5x - 12 = 0$

..... **(3 marks)**

Question 7 Solve by factorisation $3x^2 + 11x - 20 = 0$

..... **(3 marks)**

Question 8

Solve the equation $3x^2 + 9x - 2 = 0$ correct to 1 decimal place.

..... **(3 marks)**

Question 9

Solve the equation $10x^2 + 3x - 11 = 0$ correct to 1 dp.

..... **(3 marks)**

Question 10

Solve $\frac{3}{x-2} + \frac{2}{x-1} = 5$ Do **not** use trial and improvement.

Write your solutions to 3 significant figures.

..... **(6 marks)**

Question 11

Solve $x^2 + 8x + 6 = 0$ by completing the square.

Give your answer in the form $a \pm \sqrt{b}$, where a and b are integers.

..... **(4 marks)**

Question 12

Solve $x^2 + 6x + 2 = 0$ Give your answer in the form $a \pm \sqrt{b}$ where a and b are integers.

..... **(4 marks)**

Question 13

Use the discriminant to determine the nature of the roots of the function $f(x) = 7x^2 + 5x - 1$

..... **(2 marks)**

Question 14

Determine the nature of the roots of the equation

$3x^2 - 2x + 7 = 0$

[ ] "two real and distinct roots"

[ ] "one real repeated root" / "equal roots"

[ ] "no real roots"

Question 15

Find the value of q for which the equation
$qx^2 - 6x + 18 = 0$ has one repeated real root.

$q =$ **.....**

Question 16

A curve has the equation $y = 2x^2 - 8x - 5$.

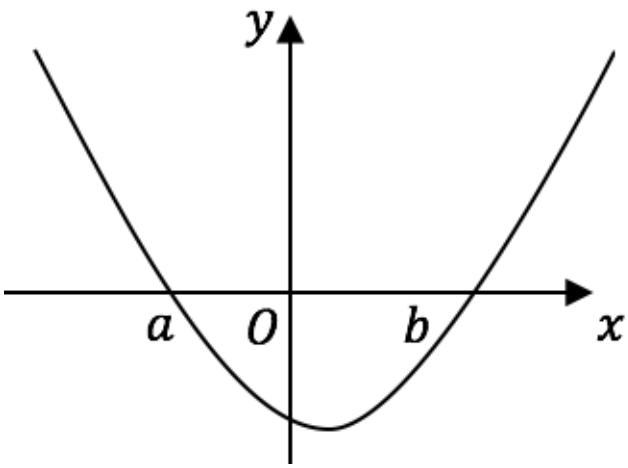
Find the coordinates of the point where the curve intercepts the y -axis.

..... **(1 mark)**

Question 17

Below is a sketch of the graph with equation $y = x^2 - 3x - 18$.

Work out the values of a and b .



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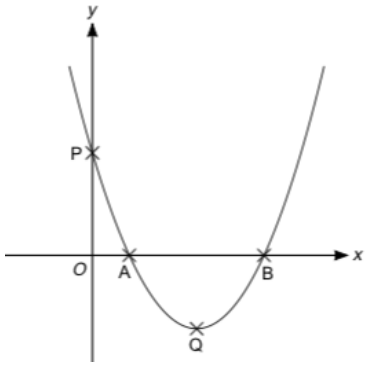
Question 18

Sketch the graph of $y = (x - 6)(x + 4)$.
On your sketch, show clearly the points of intersection with the x -axis and the y -axis, and the coordinates of the turning point.

(2 marks)

Question 19 This is a sketch of the graph of $y = (x - 1)(x - 3)$.



Work out the coordinates of the turning point Q.

..... **(3 marks)**

Question 20

You are given that $x^2 + 6x + 2 \equiv (x + 3)^2 - 7$

Write the coordinates of the minimum point on the curve $y = x^2 + 6x + 2$

..... **(1 mark)**

Question 21

The curve C has equation $y = 3 - 5(x + 1)^2$

The point A is the maximum point on C. Write down the coordinates of A .

..... **(1 mark)**

Question 22

By completing the square, find the coordinates of the turning point of the curve with equation $y = x^2 + 10x + 18$ You must show all your working.

..... **(3 marks)**