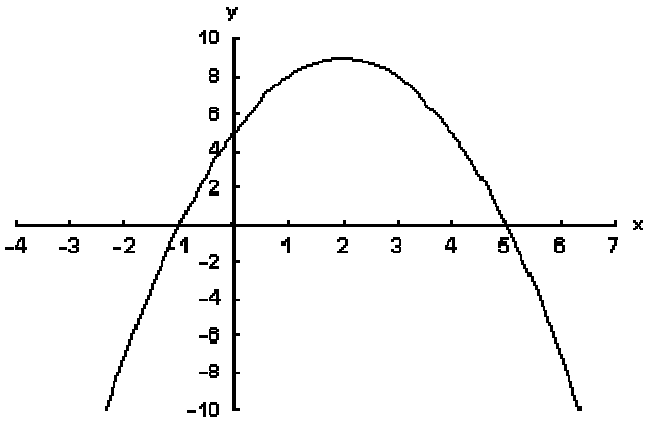
Name: _____ **Period:** _____

Math Studies **Quadratic Functions IB Questions**

1. Factorise:
   a. $x^2 - 13x + 40$
   b. $6 - x - x^2$
   c. $3x^2 + 10x - 8$
   d. Find the equation, in the form $y = ax^2 + bx + c$, of the curve drawn below.



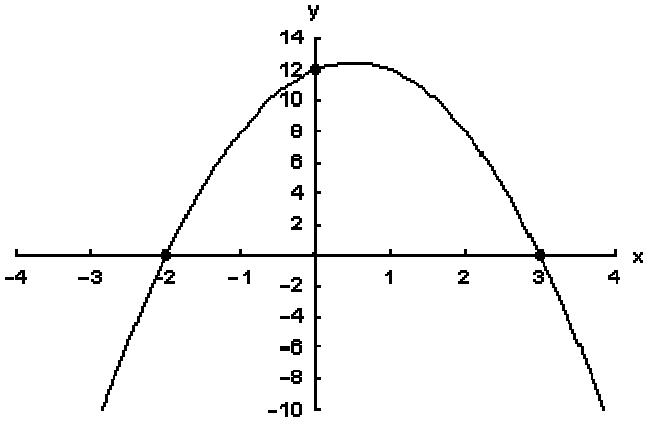
2. A right triangle has 3 sides known to be (x – 5), (2x + 1), and 2x.
   a. Draw a diagram of the right triangle and clearly label the appropriate sides.
   b. By use of Pythagoras' theorem, show how the sides of the triangle can yield the equation $x^2 - 14x + 24 = 0$.
   c. A graph of $y = x^2 - 14x + 24$ is to be drawn to help determine the sides of the triangle. Some of the values have been calculated below to help plot the figure.

x	0	2	4	6	8	10	12	14
y	24	0	A	-24	B	-16	0	C

   Find the missing letters A, B, and C.
   d. Using a scale of 1 cm = 2 units on the x-axis and 1 cm = 5 units on the y-axis, draw the graph of $y = x^2 - 14x + 24$.
   e. Using your graph, or otherwise, solve the equation $x^2 - 14x + 24 = 0$.
   f. Use your answer to find the lengths of the 3 sides of the triangle.

3. a. Factorise the expression $3x^2 + 13x - 10$.
   b. Use your answer to part a. to solve the equation $3x^2 + 13x = 10$.

4. The diagram below shows a quadratic equation in the form $y = ax^2 + bx + c$.

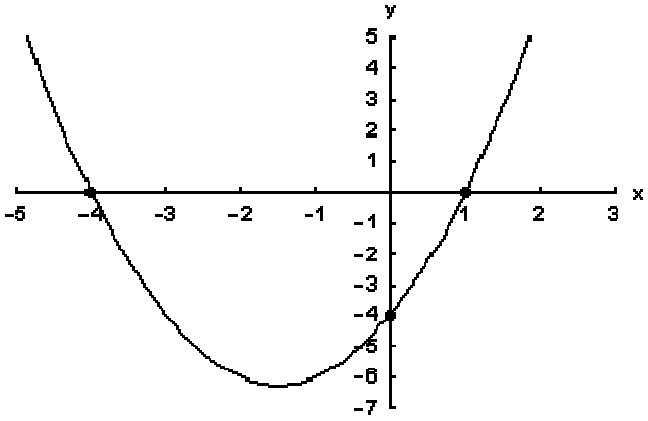


   a. Find the value of c.
   b. Find the values of a and b.

5. a. Factorise $3x^2 - 10x + 3$

   b. Solve the equation $3x^2 - 10x + 6 = 3$ using your answer to part a.

6. The graph below shows the quadratic function $f(x) = x^2 + bx + c$.

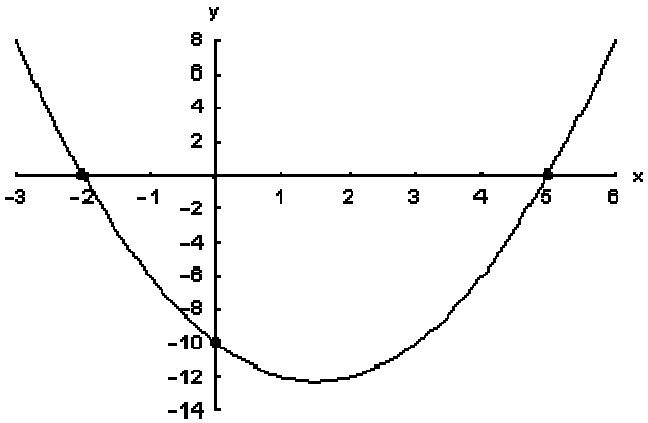


   a. Find the value of c.

   b. Factorise the equation.

   c. Find the value of b.

7. The graph of $y = x^2 - 3x - 10$ is drawn below. The points A and B are where the curve intercepts the x-axis. The point C is the minimum of the graph.



   a. Factorise $x^2 - 3x - 10$.

   b. Write down the coordinates of A.

   c. Write down the coordinates of B.

   d. Write down the coordinates of C.

8. Consider the following equations:

   i. $y = 3x^2 - 2x$ ii. $y = 4 - 2x - x^2$

   iii. $y = (x - 2)(x + 3)$ iv. $y = 2x^2 - 3x + 7$

   Which of these graphs

   a. has a y-intercept below the x-axis.

   b. does not cross the x-axis.

   c. passes through the origin.

   d. has a vertex at the coordinate (-1, 5).