POLYNOMIALS – ASSESSMENT TASK

Name: _____

1. (a) Where does the parabola :
$y = x^2 + 4x + 10$ cut the y-axis?

(b) Using the method of completing the squares, find its vertex.

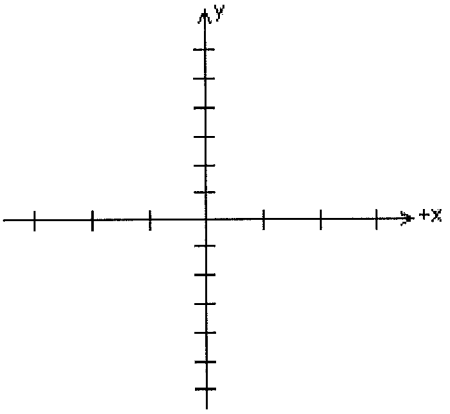
(c) What is the minimum value of this function?

2. (a) Find the co-efficient of x^2 in the expansion of :
$(x^2 - 3x - 1).(3x^2 - x + 2)$

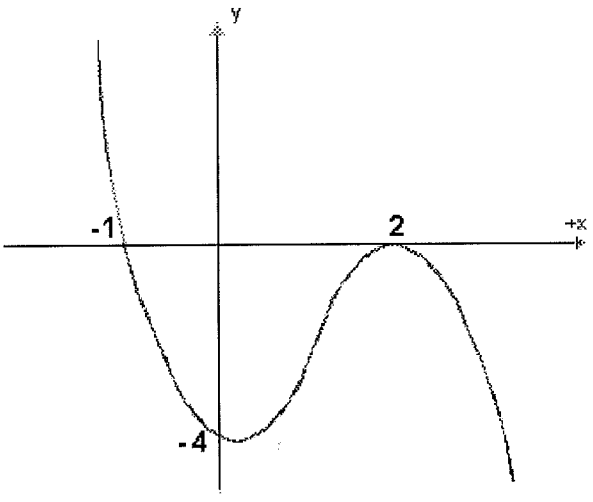
(b) Find **a** , **b** and **c** if :-
$ax(x+1) + b(x+1) + c = 2x^2 + x - 1$

3. (a) Where does the curve :
$y = (x+1)(2-x)(x+3)(2x-1)$
cut the x and y axes?

(b) Sketch the curve:



4. What is the equation of the curve below?



Equation: _____

5. (a) Show that (x+3) is a factor of :

$x^3 + x^2 - 9x - 9$

(b) Find the other factors and fully factorise the above polynomial.

(c) Solve the equation:

$X^3 + x^2 - 9x - 9 = 0$

6. If x-5 and x+2 are both factors of the polynomial :

$X^3 - 5x^2 + ax + b$

Find a and b.

POLYNOMIALS – ASSESSMENT TASK

Name: Stephanie Aoong.

1. (a) Where does the parabola :

$y = x^2 + 4x + 10$ cut the y-axis?

when $x=0$, $y = 0+0+10$

$=10$. ✓

(b) Using the method of completing the squares, find its vertex.

$y = (x^2+4x+(2)^2) + 10 - 4$

$= (x+2)^2 + 6$. ✓

$\therefore x = -2, \ y = 6$

$(-2, 6)$ ✓

(c) What is the minimum value of this function?

6. ✓

2. (a) Find the co-efficient of x^2 in the expansion of :

$(x^2 - 3x - 1).(3x^2 - x + 2)$

$= 3x^4 - x^3 + 2x^2 - 9x^3 + 3x^2 - 6x$
$-3x^2 + x - 1$

$= 3x^4 - 10x^3 + 2x^2 - 5x - 1$ ✓

$\therefore$ the coeff. of x^2 is 2.

(b) Find **a**, **b** and **c** if :-

$ax(x+1) + b(x+1) + c = 2x^2 + x - 1$

$= ax^2 + ax + bx + b + c$

$ax^2 + x(a+b) + b + c$. ✓

$a = 2$. —① ✓

$a+b = 1$ —②

$b+c = -1$ —③

$\therefore a = 2$ ✓
$b = -1$ ✓
$c = 0$ ✓

Sub ① in ②

$2 + b = 1$ ✓

$b = -1$ —④

Sub ④ in ③

$-1 + c = -1$ ✓

$c = 0$

3. (a) Where does the curve :

$y = (x+1)(2-x)(x+3)(2x-1)$

cut the x and y axes?

x-ints : $x = -1, -3, \frac{1}{2}, 2$. ✓

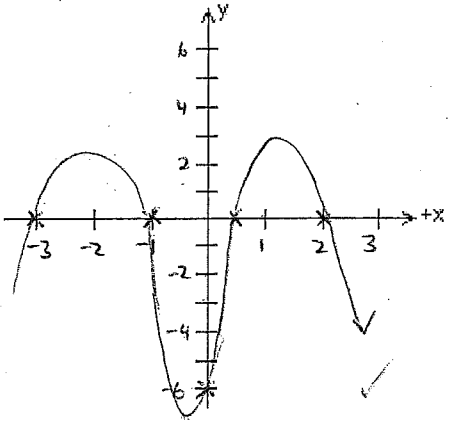
y-int : $x = 0$.

$y = (0+1)(2-0)(0+3)(2(0)-1)$

$= 1 \times 2 \times 3 \times -1$

$= -6$. ✓

(b) Sketch the curve:



4. What is the equation of the curve below?

$y = k(x+1)(x-2)^2$

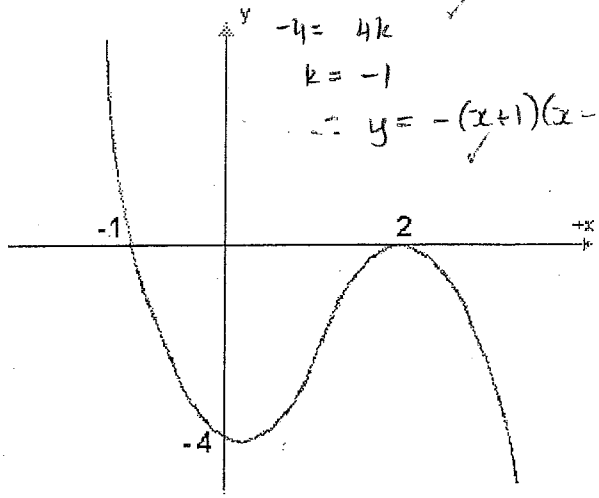
Sub $(0, -4)$

$-4 = k(0+1)(0-2)^2$ ✓

$-4 = 4k$

$k = -1$

$\therefore y = -(x+1)(x-2)^2$ ✓



Equation: $y = -(x+1)(x-2)^2$ ✓.

5. (a) Show that (x+3) is a factor of :

$$x^3 + x^2 - 9x - 9$$

Let $P = x^3 + x^2 - 9x - 9$ ✓

Sub in $x = -3$.

$P(-3) = (-3)^3 + (-3)^2 - 9(-3) - 9$ ✓

$= 0$.

$\therefore (x+3)$ is a factor.

(b) Find the other factors and fully factorise the above polynomial.

$$x+3 \;\overline{)\; x^3 + x^2 - 9x - 9}$$

$x^2 - 2x - 3$ ✓

$x^3 + 3x^2$

$-2x^2 - 9x$

$-2x^2 - 6x$

$-3x - 9$ ✓

$-3x - 9$

0

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

$(x-3)(x+1) = 0$

(c) Solve the equation:

$$X^3 + x^2 - 9x - 9 = 0$$

$(x+3)(x-3)(x+1) = 0$ ✓

$x = -3, -1, 3.$

6. If x-5 and x+2 are both factors of the polynomial :

$$X^3 - 5x^2 + ax + b$$

Find a and b.

Let $P(x) = x^3 - 5x^2 + ax + b$

$P(5) = 5^3 - 5(5)^2 + a(5) + b = 0$

$= 125 - 125 + 5a + b = 0$

$+5a + b = 0$ —— ① ✓

$P(-2) = (-2)^3 - 5(-2)^2 + a(-2) + b = 0$

$-8 - 20 - 2a + b = 0$

$-28 - 2a + b = 0$

$2a - b = -28$ — ② ✓

From ① $b = -5a$ — ③

Sub ③ in ②

$2a - (-5a) = -28$

$2a + 5a = -28$

$7a = -28$

$a = -\frac{28}{7}$

$= -4$ ✓ — ④

Sub ④ in ③

$b = -5(-4)$ ✓

$= 20$

$\therefore a = -4$ *

$b = 20$. ✓ *