



a) Use a graphing calculator to sketch the graph of the polynomial function $P(x) = -x^3 + 4x^2 + 7x - 10$.

b) Use the graph to state the x -intercepts.

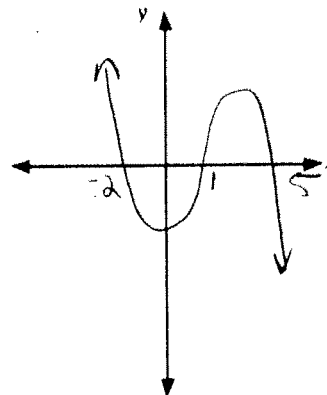
$-2, 1, 5$

c) Write the polynomial in factored form.

$$P(x) = -(x+2)(x-1)(x-5)$$

d) Circle the correct alternative:

- The left arm of the graph is (rising / falling).
- The right arm of the graph is (rising / falling).
- The degree of the polynomial is (even / odd).
- The leading coefficient of the polynomial is (positive / negative).



The investigative assignment in this lesson will develop the relationships between the directions of the arms of the graph of a polynomial, the degree of the polynomial, and the sign of the leading coefficient of the polynomial.

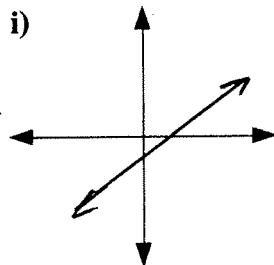
Complete Assignment Questions #1 - #3

Assignment

1. In each question use a graphing calculator to:

- i) sketch the graph of the polynomial function
- ii) state the zeros of the polynomial function
- iii) write the polynomial function in factored form.

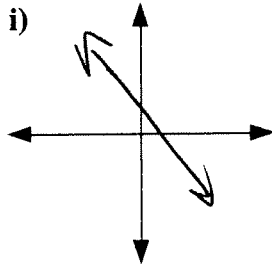
a) $P(x) = x - 2$



ii) 2

iii) $P(x) = (x - 2)$

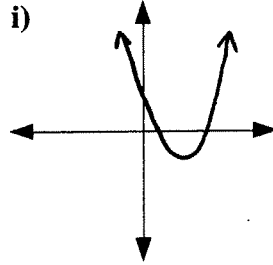
b) $P(x) = -x + 2$



ii) 2

iii) $P(x) = -(x - 2)$

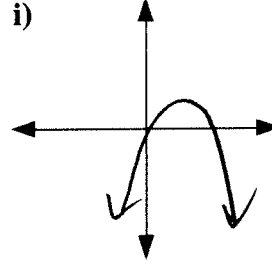
c) $P(x) = x^2 - 6x + 8$



ii) $2, 4$

iii) $P(x) = (x-2)(x-4)$

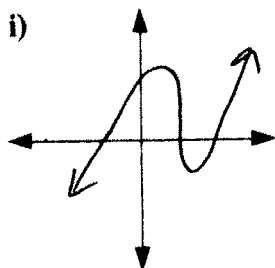
d) $P(x) = -x^2 + 6x - 8$



ii) $2, 4$

iii) $P(x) = -(x-2)(x-4)$

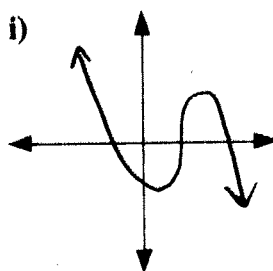
e) $P(x) = x^3 - 7x^2 + 7x + 15$



ii) $-1, 3, 5$

iii) $P(x) = (x+1)(x-3)(x-5)$

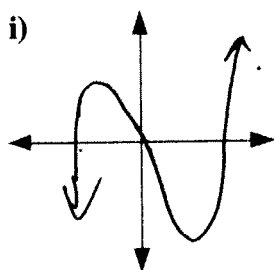
f) $P(x) = -x^3 + 7x^2 - 7x - 15$



ii) $-1, 3, 5$

iii) $P(x) = -(x+1)(x-3)(x-5)$

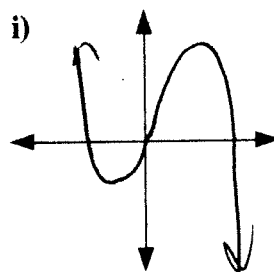
g) $P(x) = x^3 - x^2 - 12x$



ii) $-3, 0, 4$

iii) $P(x) = x(x+3)(x-4)$

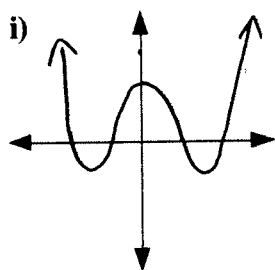
h) $P(x) = -x^3 + x^2 + 12x$



ii) $-3, 0, 4$

iii) $P(x) = -x(x+3)(x-4)$

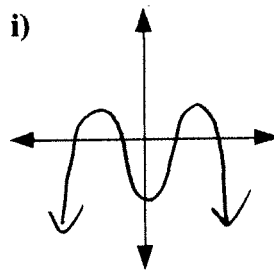
i) $P(x) = x^4 - 5x^2 + 4$



ii) $-2, -1, 1, 2$

iii) $P(x) = (x+2)(x+1)(x-1)(x-2)$

j) $P(x) = -x^4 + 5x^2 - 4$



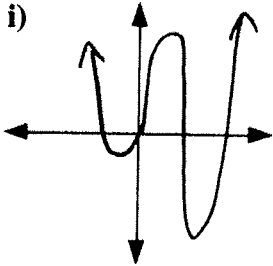
ii) $-2, -1, 1, 2$

iii) $P(x) = -(x+2)(x+1)(x-1)(x-2)$

2. In each question use a graphing calculator to

- i) sketch the graph of the polynomial function
- ii) state the zeros of the polynomial function
- iii) write the polynomial function in factored form

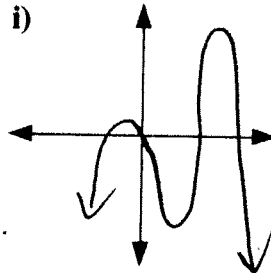
a) $P(x) = x^4 - 7x^3 + 7x^2 + 15x$



ii) $-1, 0, 3, 5$

iii) $P(x) = x(x+1)(x-3)(x-5)$

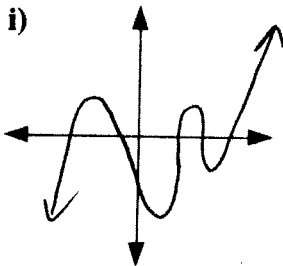
b) $P(x) = -x^4 + 7x^3 - 7x^2 - 15x$



ii) $-1, 0, 3, 5$

iii) $P(x) = -x(x+1)(x-3)(x-5)$

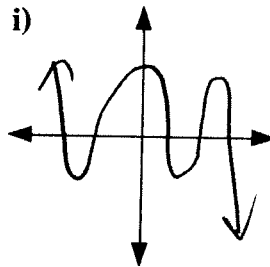
c) $P(x) = x^5 - 3x^4 - 5x^3 + 15x^2 + 4x - 12$



ii) $-2, -1, 1, 2, 3$

iii) $P(x) = (x+2)(x+1)(x-1)(x-2)(x-3)$

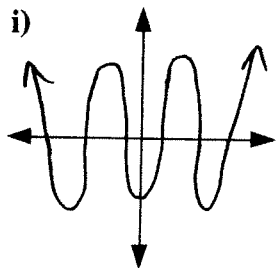
d) $P(x) = -x^5 + 3x^4 + 5x^3 - 15x^2 - 4x + 12$



ii) $-2, -1, 1, 2, 3$

iii) $P(x) = -(x+2)(x+1)(x-1)(x-2)(x-3)$

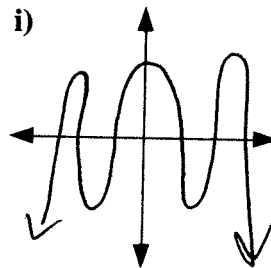
e) $P(x) = x^6 - 14x^4 + 49x^2 - 36$



ii) $-3, -2, -1, 1, 2, 3$

iii) $P(x) = (x+3)(x+2)(x+1)(x-1)(x-2)(x-3)$

f) $P(x) = -x^6 + 14x^4 - 49x^2 + 36$

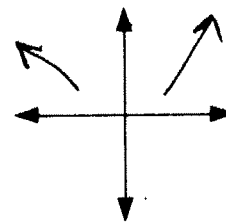


ii) $-3, -2, -1, 1, 2, 3$

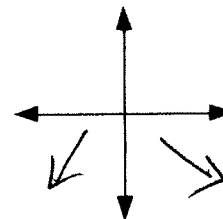
iii) $P(x) = -(x+3)(x+2)(x+1)(x-1)(x-2)(x-3)$

3. Based on your observations from questions #1 and #2, circle the correct choice in each of the following statements.

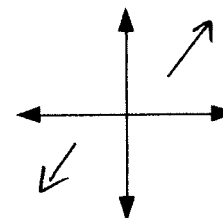
a) If the graph of a polynomial has *two rising arms*, then the degree of the polynomial is (even, odd) and the leading coefficient is (positive, negative).



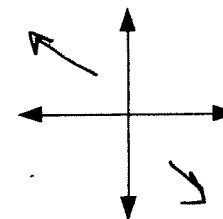
b) If the graph of a polynomial has *two falling arms*, then the degree of the polynomial is (even, odd) and the leading coefficient is (positive, negative).



c) If the graph of a polynomial has a *right arm rising and the left arm falling*, then the degree of the polynomial is (even, odd) and the leading coefficient is (positive, negative).



d) If the graph of a polynomial has a *right arm falling and the left arm rising*, then the degree of the polynomial is (even, odd) and the leading coefficient is (positive, negative).



e) The leading coefficient is positive if the (left, right) arm is (rising, falling).

f) The leading coefficient is negative if the (left, right) arm is (rising, falling).