

MHF4U: Grade 12 Advanced Functions (Catholic)
Unit 1: Introduction to Polynomial Functions
Activity 3: Graphing Polynomial Functions in Factored Form

Formative Worksheet
Graph Sketching of Polynomial Functions in Factored Form

You may do this on paper, as you are going to check your own work, and do not need to submit this assignment to your instructor.

Show your work clearly, so you can check to see where you might have gone wrong, or your instructor can, should you need some assistance.

For each of the following functions:

- i) State the value and the degree of each of the x-intercepts.
- ii) State the value of the y-intercept.
- iii) State the degree of the function and the end behaviour it will exhibit.
- iv) Sketch the function, showing all intercepts.

1. $f(x) = -x(x-4)(x+3)^2$

2. $f(x) = -1(x-5)^3$

3. $f(x) = 0.5(x+2)(x-5)^3(x+4)$

4. $f(x) = -(x+3)^2(x-2)^2(x-5)^2$

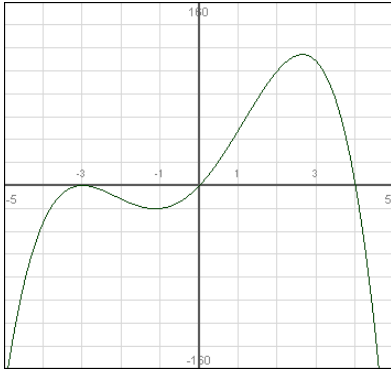
5. $f(x) = 0.3(x-1)^3(x+3)^6$

Formative Worksheet - SOLUTIONS

Graph Sketching of Polynomial Functions in Factored Form

1. $f(x) = -x(x-4)(x+3)^2$

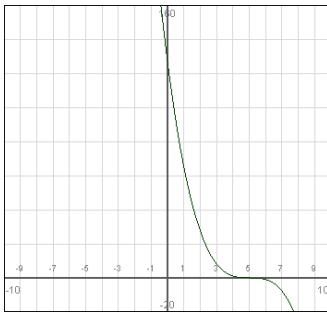
- i) x-intercepts: $x=0$ (cut), $x=4$ (cut), and $x=-3$ (bounce).
- ii) y-intercept: $y=0$.
- iii) This is a negative 4th degree function so the end behaviour is as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$, and as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$.



iv)

2. $f(x) = -1(x-5)^3$

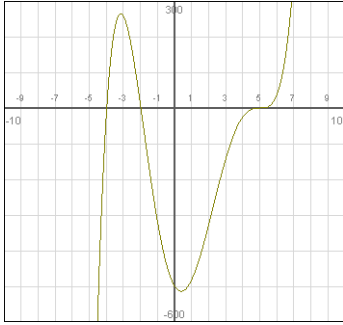
- i) x-intercepts: $x=5$ (saddle).
- ii) y-intercept: $y=125$.
- iii) This is a negative 3rd degree function so as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$ and as $x \rightarrow -\infty$, $f(x) \rightarrow \infty$.



iv)

3. $f(x) = 0.5(x+2)(x-5)^3(x+4)$

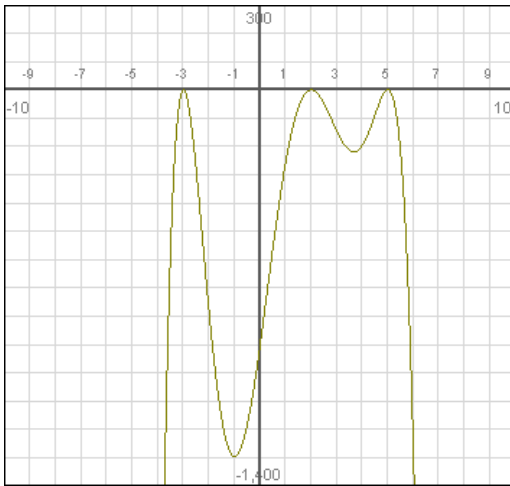
- i) The x-intercepts are $x=-2$ (cut), $x=5$ (saddle) and $x=-4$ (cut).
- ii) The y-intercept is $y=-500$.
- iii) This is a positive 5th degree polynomial function so as $x \rightarrow \infty$, $f(x) \rightarrow \infty$ and as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$.



iv)

4. $f(x) = -(x+3)^2(x-2)^2(x-5)^2$

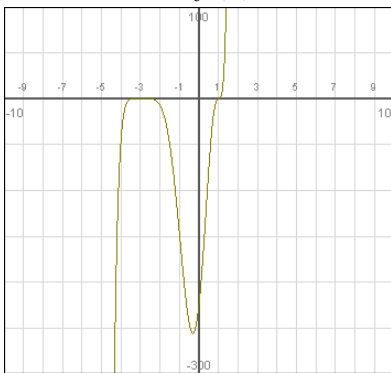
- i) The x-intercepts are $x=-3$ (bounce), $x=2$ (bounce) and $x=5$ (bounce).
- ii) The y-intercept is at $y=-900$.
- iii) This is a negative 6th degree polynomial function so, as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$ and as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$.



iv)

5. $f(x) = 0.3(x-1)^3(x+3)^6$

- i) The x-intercepts are at $x=1$ (saddle), and $x=-3$ (bounce – acting like a 6th degree function).
- ii) The y-intercept is $y=-218.7$.
- iii) This is a positive 9th degree polynomial function so as $x \rightarrow \infty$, $f(x) \rightarrow \infty$ and as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$.



iv)