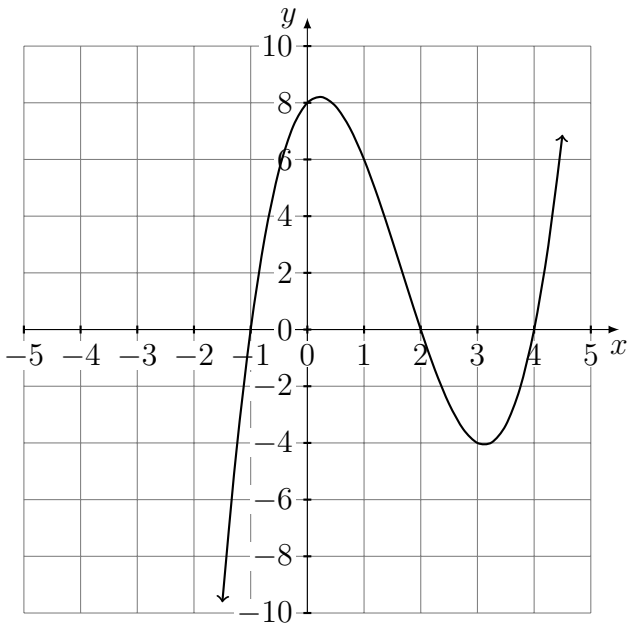
Classwork: Polynomial function features & graphing

Use pencil for graphs. Label points as ordered pairs.

1. Part of the function $f(x) = x^3 - 5x^2 + 2x + 8$ is shown on the graph.



   (a) Write down the y-intercept.

   (b) Show that $f(0)$ is the y-intercept by substituting $x = 0$ into the function $f(x)$.

   (c) Write down the x-intercepts.

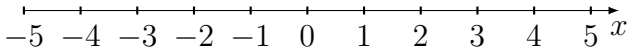
   (d) Show that 2 is an x-intercept because $x = 2$ is a solution to $f(x) = 0$.

   (e) What is the end behavior?
      i. As $x \to +\infty$ does $y \to +\infty$ or $-\infty$?
      ii. As $x \to -\infty$ does $y \to +\infty$ or $-\infty$?

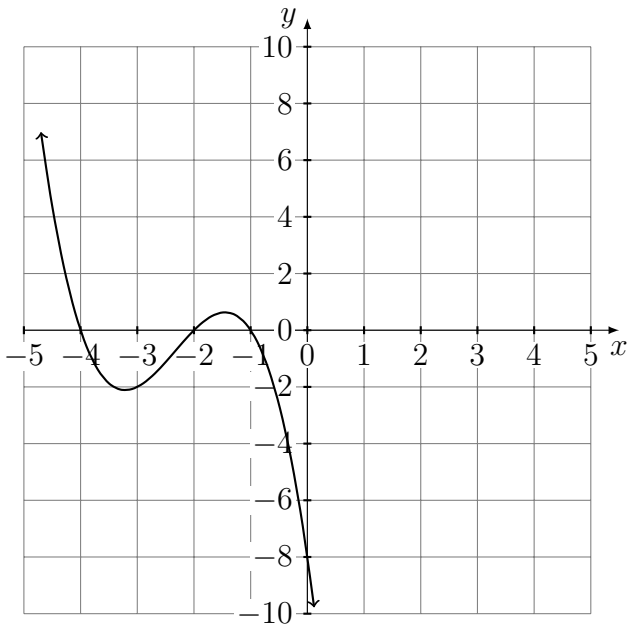
   (f) Label the local maximum and local minimum as ordered pairs (approximate the values).

   (g) Slope: on the x-axis below, label the portion of the domain where f is increasing with pluses ("+") and decreasing with negative signs ("-"). Mark the extema (maximum and minimum) with zeros since $f(x)$ is horizontal at those points.

   (h) Write down the intervals the function is increasing and decreasing.



2. The function $g(x) = -x^3 - 7x^2 - 14x - 8$ is shown on the graph.



(a) Write down the y-intercept.

(b) Show that $f(0)$ is the y-intercept by substituting $x = 0$ into the function $f(x)$.

(c) Write down the x-intercepts.

(d) Show that -1 is an x-intercept because $x = -1$ is a solution to $f(x) = 0$.

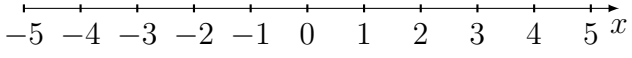
(e) What is the sign of the leading coefficient?
What is the end behavior?

i. As $x \to +\infty$ does $y \to +\infty$ or $-\infty$?

ii. As $x \to -\infty$ does $y \to +\infty$ or $-\infty$?

(f) Label the local maximum and local minimum as ordered pairs (approximate the values).

(g) Slope: on the x-axis below, label the domain as increasing, decreasing, or horizontal (with "+", "-", & "0"), and state the respective intervals.

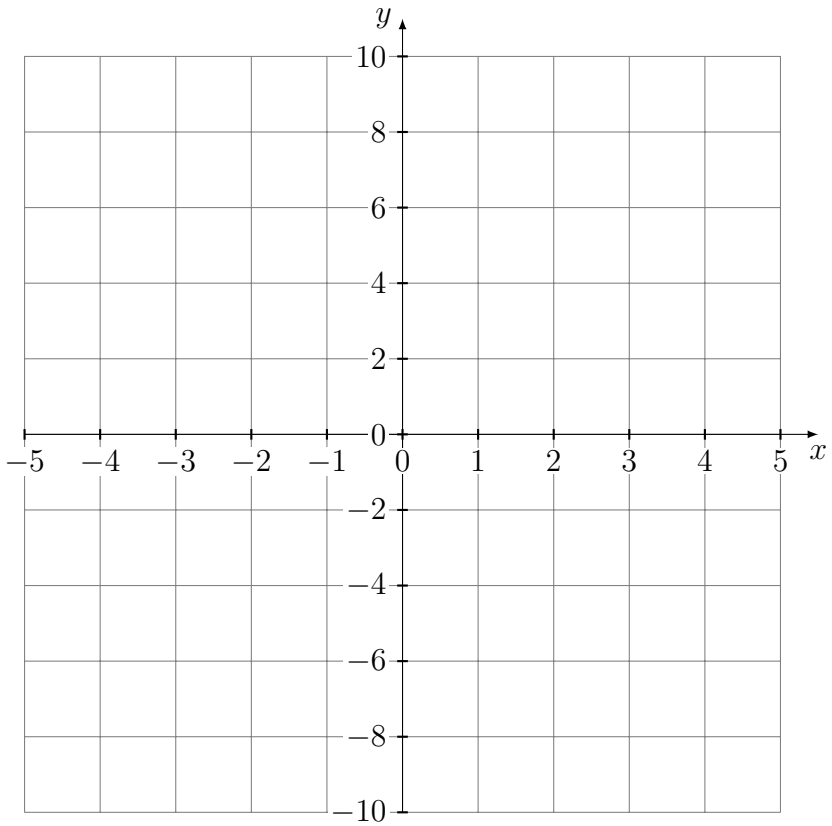


3. Given the function $h(x) = x^3 + 2x^2 - 5x - 6$.

   (a) Write down the y-intercept. Mark it on the plot.

   (b) Show that -1 is an x-intercept because $x = -1$ is a solution to $f(x) = 0$. Mark $(-1, 0)$ on the graph as an x-intercept.

   (c) The other x-intercepts are -3 and $+2$. Mark them on the plot.



   (d) What is the sign of the leading coefficient, positive or negative? Hence, what is the function's end behavior?

      i. As $x \to +\infty$ does $y \to +\infty$ or $-\infty$?

      ii. As $x \to -\infty$ does $y \to \infty$ or $-\infty$?

   (e) Using the intercepts and end behavior, sketch the curve.

   (f) Graph the function on a calculator. Is the shape of your sketch approximately correct?

Simplify

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

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

6. $x^2 \times x^{-2}y^3$

7. $x^5 \div x^2y^3$

8. $\sqrt{x^4y^2z^6}$

The formula for simple interest is $P(t) = P_0(1+rt)$.

9. What is the value of \$100 in principal at a rate of 4% per annum after one-half year?

10. What is the value of \$250 in principal at a rate of 5.25% per annum after nine months?