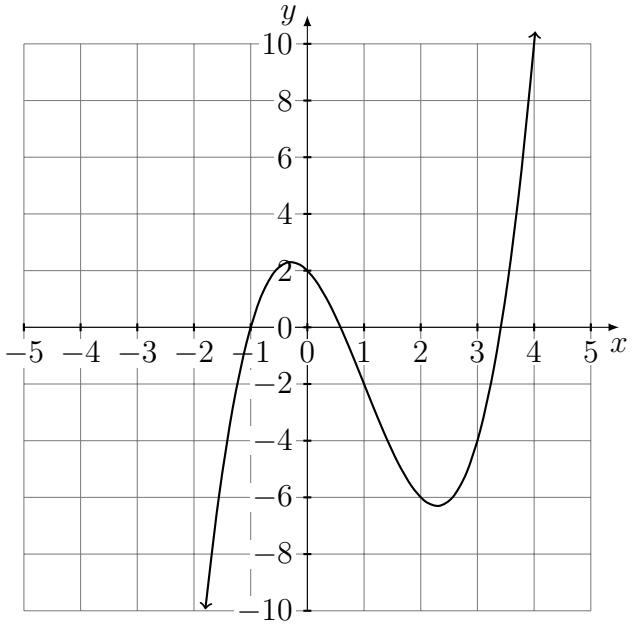
BECA / Dr. Huson / Algebra 2
30 May 2019
Homework: Polynomial function features & graphing Name:

Use pencil for graphs. Label points as ordered pairs.

1. The function $f(x) = x^3 - 3x^2 - 2x + 2$ 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 end behavior?

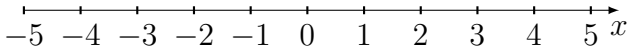
i. As $x \to +\infty$ does $y \to +\infty$ or $-\infty$?

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.



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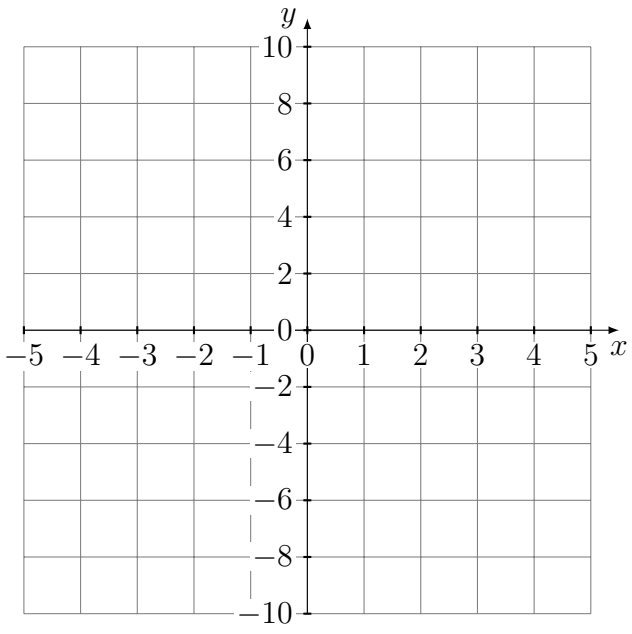
2. Plot the function $g(x) = -x^3 - 5x^2 - 3x + 4$ on the graph.



(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 -4 is an x-intercept because $x = -4$ is a solution to $f(x) = 0$.

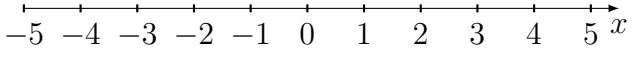
(e) What is the sign of the leading coefficient?
What is the end behavior?

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.



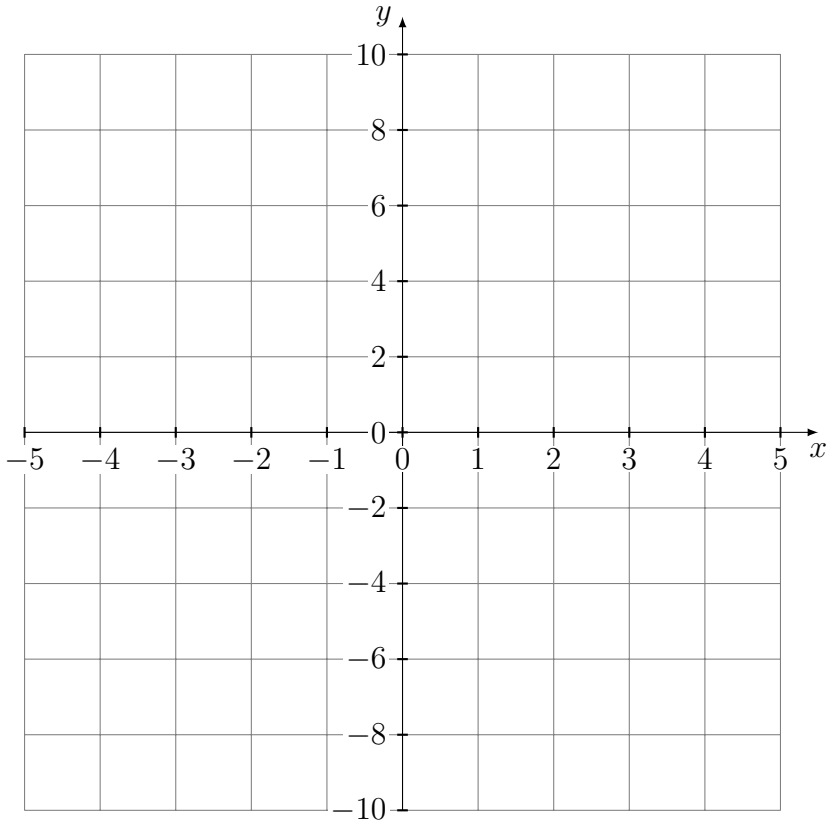
BECA / Dr. Huson / Algebra 2
30 May 2019
Homework: Polynomial function features & graphing Name:

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?

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Simplify

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

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

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

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

8. $\sqrt[3]{x^6 y^3 z^6}$

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

9. What is the value of \$200 in principal at a rate of 5% per annum after one-half year?

10. What is the value of \$220 in principal at a rate of 5.5% per annum after nine months?