# Homework 3.2 – Polynomial Functions

**1.** (1 pt) alfredLibrary/AUCl/chapter3/lesson2/quiz/question22pet.pg

Choose T for true or F for false. Notice that your attempts are limited.

$\boxed{?}$ Extrema of a polynomial can be found by setting the first derivative equal to zero.

$\boxed{?}$ Inflection points of a polynomial can be found by setting the second derivative equal to zero.

$\boxed{?}$ A polynomial will always have an extremum.

$\boxed{?}$ End behavior of a polynomial is determined by the leading coefficient

$\boxed{?}$ End behavior of a polynomial is determined by the term with highest power.

**2.** (1 pt) alfredLibrary/AUCl/chapter3/lesson2/quiz/question11pet.pg

Compute each of the following for the polynomial

$$f(x) = -4x^8 + 7x^5 + 5x^3 - 4x.$$

(a) $f'(x) = $ _____

(b) $f''(x) = $ _____

(c) $f'(5) = $ _____

**3.** (1 pt) alfredLibrary/AUCl/chapter3/lesson2/cp1pet.pg

Let $f(x) = 2x^3 + 3x^2 - 120x$. Enter multiple answers as a comma-separated list.

(a) The critical numbers of $f$ are $x = $ _____.

(b) The values of $x$ for which $f$ has a horizontal tangent line are $x = $ _____.

(c) $f$ has a relative maximum at $x = $ _____.

(d) $f$ has a relative minimum at $x = $ _____.

(e) $f$ has an inflection point at $x = $ _____.

**4.** (1 pt) alfredLibrary/AUCl/chapter3/lesson2/prob6pet.pg

The equation of motion of a particle is $s(t) = t^3 - 3t$, where $s$ is in meters and $t$ is in seconds. Assume that $t \geq 0$.

(a) Find the velocity $v$ as a function of $t$.

$v(t) = $ _____ $m/s$

(b) Find the acceleration $a$ as a function of $t$.

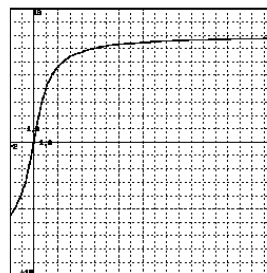$a(t) = $ _____ $m/s^2$

(c) Find the acceleration after 2 seconds.

$a(2) = $ _____ $m/s^2$

(d) Find the acceleration when the velocity is 0.

$a = $ _____ $m/s^2$

**5.** (1 pt) alfredLibrary/AUCl/chapter3/lesson2/horizontalasymptote1pet

Try to determine the end behavior of the function $f(x)$ in the positive direction by looking at its graph shown below.



$$\lim_{x \to \infty} f(x) = \underline{\quad}$$

**6.** (1 pt) alfredLibrary/AUCl/chapter3/lesson2/endbehavior1pet.pg

Determine the end behavior of the indicated functions by evaluating the limits at infinity and negative infinity. Enter INF for $\infty$ and -INF for -$\infty$. (HINT: The end behavior of a polynomial is determined by the term with the highest power.)

(a) $\lim\limits_{x \to \infty} \left( 36x^2 - 36x^6 \right) = $ _____

(b) $\lim\limits_{x \to -\infty} \left( 36x^2 - 36x^6 \right) = $ _____

(c) $\lim\limits_{x \to \infty} \left( 20x^2 - 17x^3 \right) = $ _____

(d) $\lim\limits_{x \to -\infty} \left( 20x^2 - 17x^3 \right) = $ _____