

POLYNOMIAL FUNCTIONS REVIEW

Directions: Divide each polynomial.

1.) $(5x^3 - 6x^2 + 8) \div (x - 4)$

2.) $(x^4 + 5x^3 + 6x^2 - x - 2) \div (x^2 - 3x + 2)$

Directions: State the end behavior of each function.

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

4.) $f(x) = 2x^5 - 5x + 7$

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

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

Directions: Determine whether the function is even, odd, or neither. Then describe the symmetry.

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

7.) $f(x) = x^3 - x - 2$

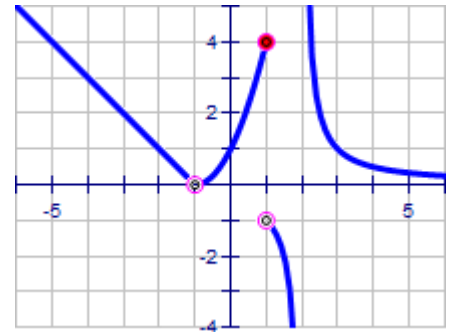
8.) $f(x) = x^3 - x$

Directions: State the increasing, decreasing and constant intervals in interval notation.

9.) INCREASING:

10.) DECREASING:

11.) CONSTANT:



Directions: Use the Remainder Theorem to determine whether $(x + 4)$ is a factor of the function below.

12.) $f(x) = x^3 - x^2 - 24x - 56$

Directions: Use synthetic division to find the remainder. Is the divisor a factor of the polynomial?

13.) $(2x^4 + 14x^3 - 2x^2 - 14x) \div (x + 7)$

14.) $(3x^3 - 17x^2 + 15x - 25) \div (x + 5)$

Directions: Write a polynomial function with the given zeros that has the least degree and all real coefficients.

15.) $x = -3, x = 2, x = \frac{1}{2}$

16.) $x = 2, x = 4i$

17.) $x = -5$ (multiplicity of 2)

Directions: Given the description of each polynomial function, answer the questions.

18.) The graph of a polynomial function $f(x)$ has a root of $x = -2$ (multiplicity of 3)

- Does the graph cross or touch the x -axis at $x = -2$?
- What is the least degree of $f(x)$?
- Write $f(x)$ with real coefficients and with the least degree.

19.) The graph of a polynomial function $f(x)$ has a root at $x = -4$ (multiplicity of 2) and a root at $x = -3i$.

- Does the graph cross or touch the x -axis at $x = -4$?
- Does the graph cross or touch the x -axis at $x = -3i$?
- What is the least degree of $f(x)$?
- Write $f(x)$ with real coefficients and with the least degree.

Directions: Use Descartes' Rule of Signs to determine the possible amount of positive and negative real zeros.

20.) $f(x) = 4x^2 - 8x + 3$

21.) $g(x) = -5x^3 + x^2 - x + 5$

22.) $j(x) = 3x^4 + 2x^2 + x + 3$

Directions: Use Synthetic Division to determine whether each value is an upper bound, lower bound, a zero or neither.

23.) $f(x) = x^4 - 4x^3 + 16x - 16$

- $x = -4$
- $x = 4$
- $x = 2$
- $x = -1$

Directions: Determine all properties of each polynomial function and sketch a graph WITHOUT a graphing calculator.

24.) $f(x) = x^3 + 3x^2 - 4x - 12$

a.) Determine the possible number of rational roots.

Possible Roots: _____

b.) Determine the possible number of positive and negative real zeros.

of possible positive zeros: _____

of possible negative zeros: _____

c.) Determine the linear factorization and zeros. Be sure to state if any zeros have multiplicity.

FACTORS: _____

ZEROS: _____

d.) Determine the end behavior.

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

e.) Determine the possible number of turning points.

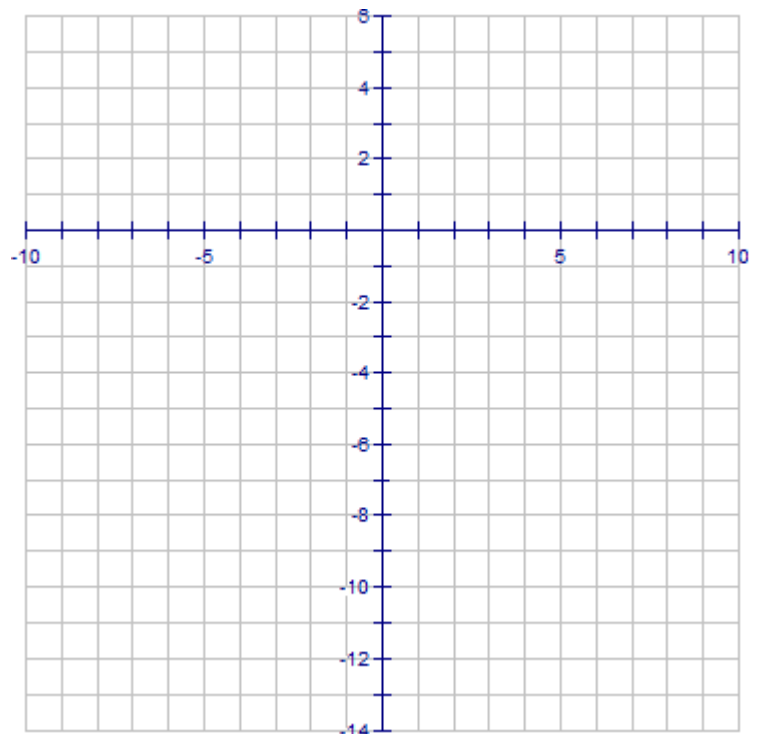
Max # of turning points: _____

f.) Determine the x -intercept(s).

g.) Determine the y -intercept. _____

GIVEN: Maximum: $(-2.53, 1.13)$

GIVEN: Minimum: $(0.53, -13.13)$



25.) $f(x) = 2x^3 - 7x^2 - 5x + 4$

a.) Determine the possible number of rational roots.

Possible Roots: _____

b.) Determine the possible number of positive and negative real zeros.

of possible positive zeros: _____

of possible negative zeros: _____

c.) Determine the linear factorization and zeros. Be sure to state if any zeros have multiplicity.

FACTORS: _____

ZEROS: _____

d.) Determine the end behavior.

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

e.) Determine the possible number of turning points.

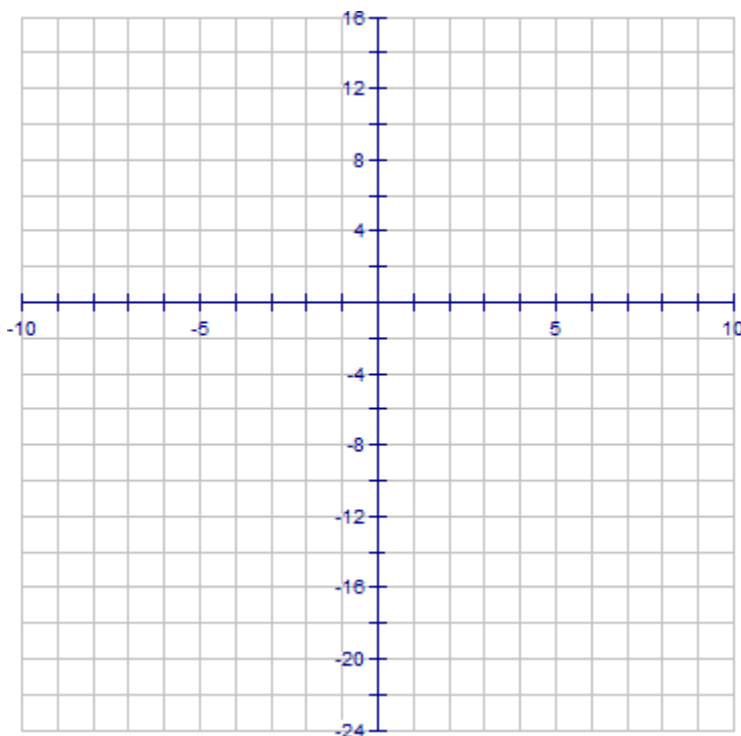
Max # of turning points: _____

f.) Determine the x -intercept(s).

g.) Determine the y -intercept. _____

GIVEN: Maximum: $(-0.32, 4.82)$

GIVEN: Minimum: $(2.65, -21.19)$



26.) $f(x) = -x^4 + 4x^3 + x^2 - 16x + 12$

a.) Determine the possible number of rational roots.

Possible Roots: _____

b.) Determine the possible number of positive and negative real zeros.

of possible positive zeros: _____

of possible negative zeros: _____

c.) Determine the linear factorization and zeros. Be sure to state if any zeros have multiplicity.

FACTORS: _____

ZEROS: _____

d.) Determine the end behavior.

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

e.) Determine the possible number of turning points.

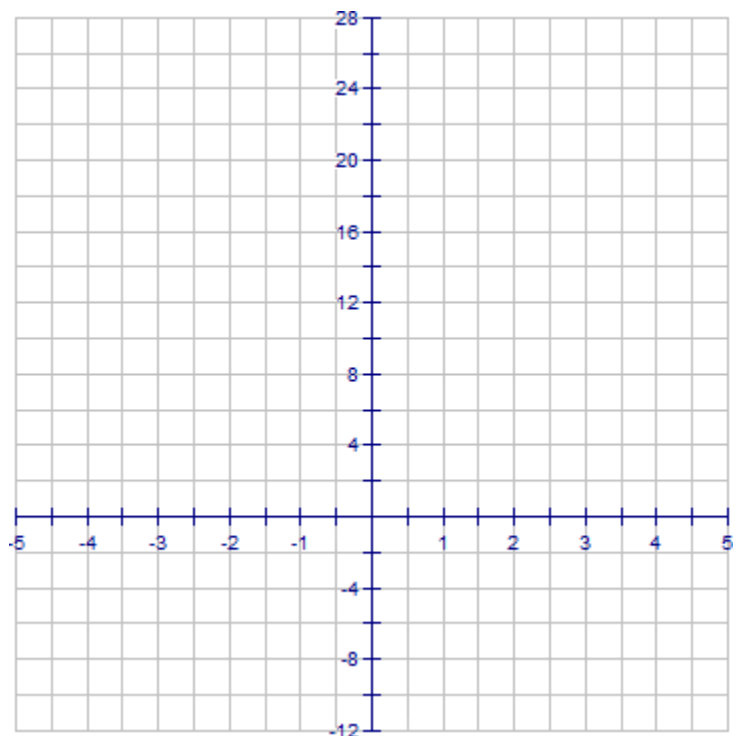
Max # of turning points: _____

f.) Determine the x -intercept(s).

g.) Determine the y -intercept. _____

GIVEN: Maximum: $(-1.06, 24.06)$ & $(2.60, 1.77)$

GIVEN: Minimum: $(1.46, -1.32)$



27.) $f(x) = x^3 + 8x^2 + 20x + 16$

a.) Determine the possible number of rational roots.

Possible Roots: _____

b.) Determine the possible number of positive and negative real zeros.

of possible positive zeros: _____

of possible negative zeros: _____

c.) Determine the linear factorization and zeros. Be sure to state if any zeros have multiplicity.

FACTORS: _____

ZEROS: _____

d.) Determine the end behavior.

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

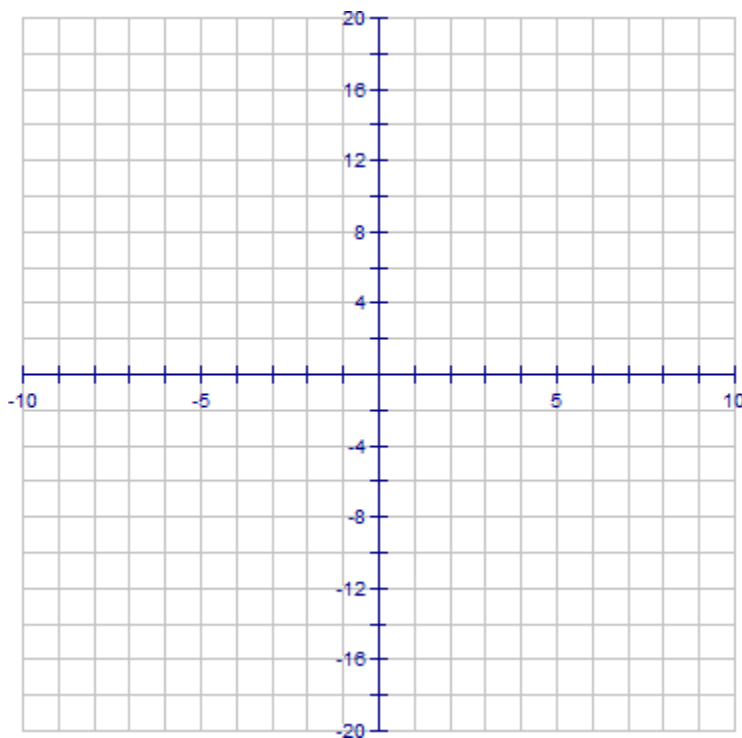
e.) Determine the possible number of turning points.

Max # of turning points: _____

f.) Determine the x -intercept(s).

g.) Determine the y -intercept. _____

GIVEN: Maximum: $(-3.33, 1.19)$



28.) $f(x) = -3x^3 + 20x^2 - 36x + 16$

a.) Determine the possible number of rational roots.

Possible Roots: _____

b.) Determine the possible number of positive and negative real zeros.

of possible positive zeros: _____

of possible negative zeros: _____

c.) Determine the linear factorization and zeros. Be sure to state if any zeros have multiplicity.

FACTORS: _____

ZEROS: _____

d.) Determine the end behavior.

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

e.) Determine the possible number of turning points.

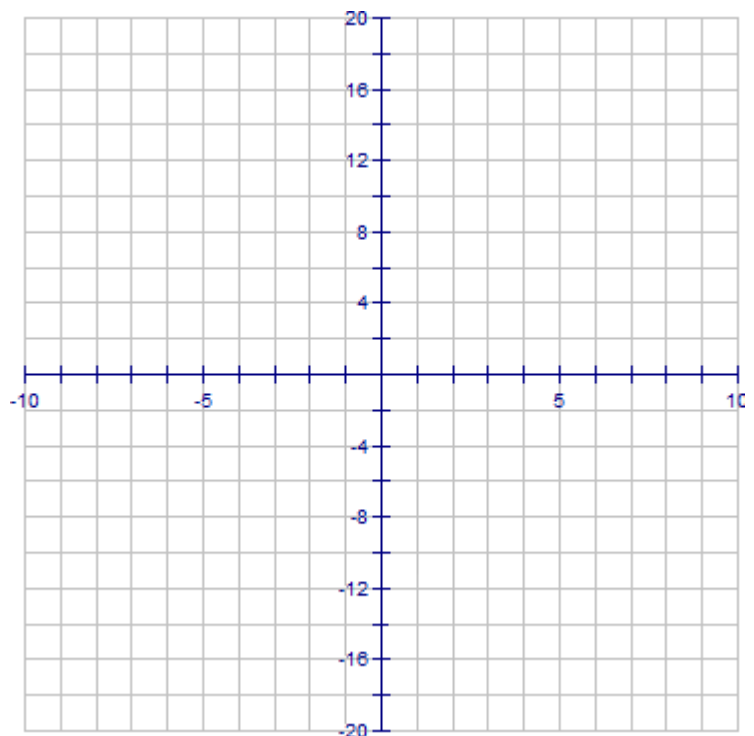
Max # of turning points: _____

f.) Determine the x -intercept(s).

g.) Determine the y -intercept. _____

GIVEN: Maximum: (3.19, 7.30)

GIVEN: Minimum: (1.25, -3.61)



29.) $f(x) = x^4 - 5x^2 - 36$

a.) Determine the possible number of rational roots.

Possible Roots: _____

b.) Determine the possible number of positive and negative real zeros.

of possible positive zeros: _____

of possible negative zeros: _____

c.) Determine the linear factorization and zeros. Be sure to state if any zeros have multiplicity.

FACTORS: _____

ZEROS: _____

d.) Determine the end behavior.

$x \rightarrow -\infty$ $f(x) \rightarrow$ _____

$x \rightarrow \infty$ $f(x) \rightarrow$ _____

e.) Determine the possible number of turning points.

Max # of turning points: _____

f.) Determine the x -intercept(s).

g.) Determine the y -intercept. _____

GIVEN: Maximum: $(0, -36)$

GIVEN: Minimum: $(-1.58, -42.25)$ & $(1.58, -42.25)$

