26 Graphs of Polynomials

Due:
12/14/2015 at 06:00am EST.

Students will be able to:

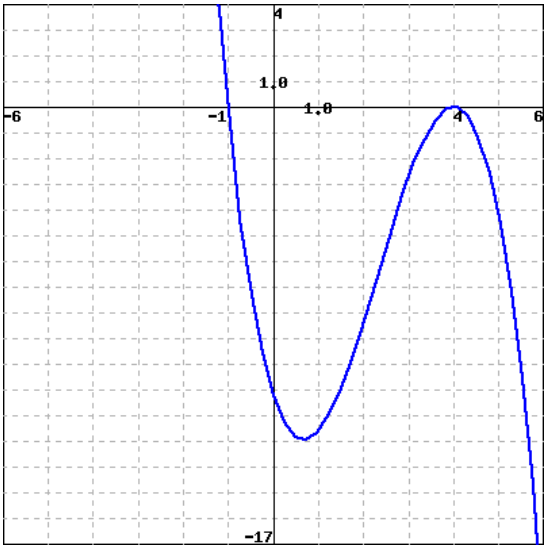
- Find real zeros of polynomials and identify their multiplicities
- Determine end behavior of the graph of polynomial
- Determine if the graph of polynomial is above or below the x-axis to either side of the real zero
- Produce a possible formula for the polynomial based on the graph

Functions and symbols that WeBWorK understands.

Links to some useful WeBWorK pages for students

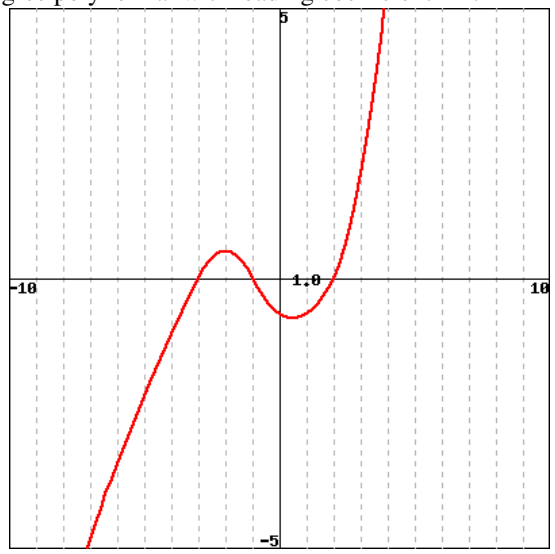
1. (1 pt) Given $f(x) = -7(x+5)^2(x+4)^3(x-5)^6$, find the roots in increasing order.
The roots are ___, ___, and ___.
To the left of the first root, is the graph of $f(x)$ above or below the x-axis? Answer above or below: ___.
Between the first two roots, is the graph of $f(x)$ above or below the x-axis? Answer above or below: ___.
Between the last two roots, is the graph of $f(x)$ above or below the x-axis? Answer above or below: ___.
After the last root, is the graph of $f(x)$ above or below the x-axis? Answer above or below: ___

2. (1 pt)



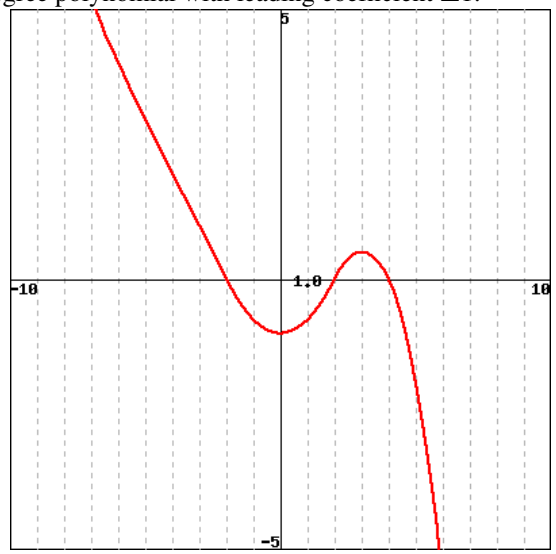
To get a better look at the graph, you can click on it.
The curve above is the graph of a degree 3 polynomial. It goes through the point $(5,-4.2)$. Find the polynomial.
$f(x) =$ _____

3. (1 pt) The following is an approximate graph of a 3rd degree polynomial with leading coefficient ± 1:



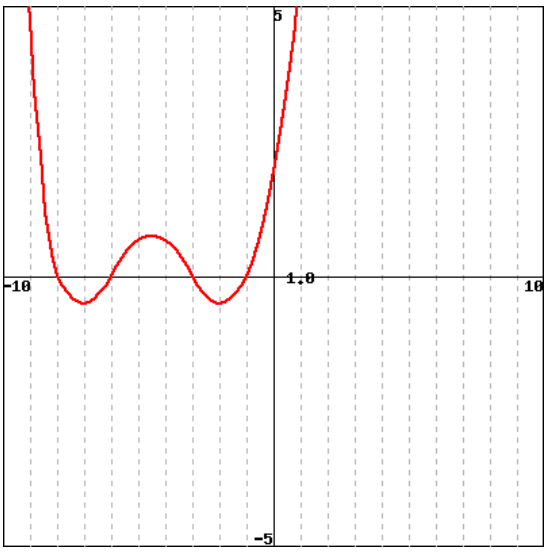
Use the information about the $x-$ intercepts and end behavior to come up with a formula for the polynomial.
$p(x) =$ _____

4. (1 pt) The following is an approximate graph of a 3rd degree polynomial with leading coefficient ± 1:



Use the information about the $x-$ intercepts and end behavior to come up with a formula for the polynomial.
$p(x) =$ _____

5. (1 pt) The following is an approximate graph of a 4th degree polynomial with leading coefficient ± 1:



Use the information about the $x-$ intercepts and end behavior to come up with a formula for the polynomial.

$p(x) =$ _____

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6. (1 pt) The following is an approximate graph of a 4th degree polynomial with leading coefficient ± 1:

Use the information about the $x-$ intercepts and end behavior to come up with a formula for the polynomial.

$p(x) =$ _____

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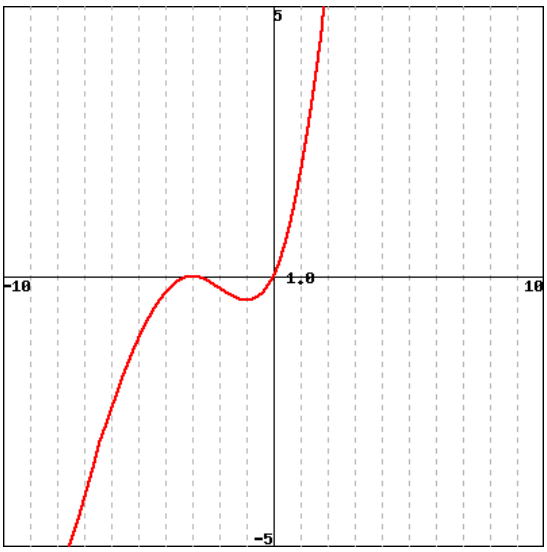
7. (1 pt) The following is an approximate graph of a 3rd degree polynomial with leading coefficient ± 1:



Use the information about the $x-$ intercepts and end behavior to come up with a formula for the polynomial.

$p(x) =$ _____

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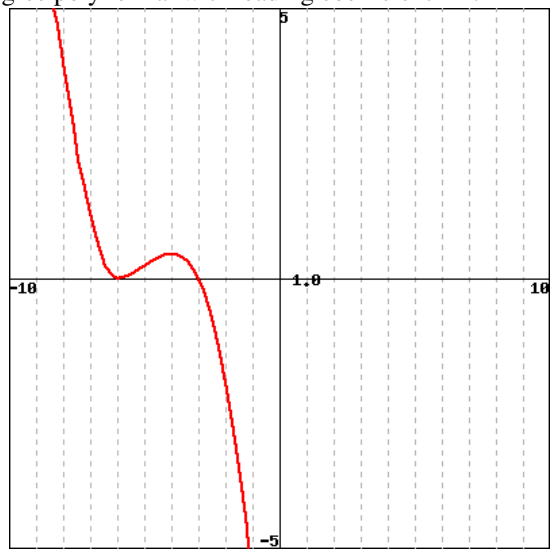
8. (1 pt) The following is an approximate graph of a 3rd degree polynomial with leading coefficient ± 1:



Use the information about the $x-$ intercepts and end behavior to come up with a formula for the polynomial.

$p(x) =$ _____

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9. (1 pt) In this problem we consider the following polynomial

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

Find the y-intercept of the graph of $y = f(x)$

$y =$ _____

Find the x-intercepts of the graph of $y = f(x)$

$x =$ _____

Determine the zeros of polynomial $f(x)$

Zeros are $x =$ _____

Determine the multiplicities of the zeros you entered above

Multiplicities are _____

Find the degree of the polynomial $f(x)$

Degree is _____

Find the leading term of the polynomial $f(x)$

Leading term is _____

Determine the intervals where the graph of $f(x)$ is above x-axis.

The graph is above x-axis on open intervals _____

Note: if the answer is an empty set, enter it as

Determine the intervals where the graph of $f(x)$ is below x-axis.

The graph is below x-axis on open intervals _____

Note: if the answer is an empty set, enter it as

Left end behavior: as $x \to -\infty$, $f(x) \to$ _____

Right end behavior: as $x \to +\infty$, $f(x) \to$ _____

Find the solution set of

$-2(x+4)(x+2)(x-6) > 0$

Solution set is _____

Note: if the answer is an empty set, enter it as

Find the solution set of

$-2(x+4)(x+2)(x-6) < 0$

Solution set is _____

Note: if the answer is an empty set, enter it as

Find the solution set of

$-2(x+4)(x+2)(x-6) \geq 0$

Solution set is _____

Note: if the answer is an empty set, enter it as

Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3

Find the solution set of

$-2(x+4)(x+2)(x-6) \leq 0$

Solution set is _____

Note: if the answer is an empty set, enter it as

Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3

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10. (1 pt) In this problem we consider the following polynomial

$f(x) = 2(x+1)(x+3)^2(x-8)^3$

Find the y-intercept of the graph of $y = f(x)$

$y =$ _____

Find the x-intercepts of the graph of $y = f(x)$

$x =$ _____

Determine the zeros of polynomial $f(x)$

Zeros are $x =$ _____

Determine the multiplicities of the zeros you entered above

Multiplicities are _____

Find the degree of the polynomial $f(x)$

Degree is _____

Find the leading term of the polynomial $f(x)$

Leading term is _____

Determine the intervals where the graph of $f(x)$ is above x-axis.

The graph is above x-axis on open intervals _____

Note: if the answer is an empty set, enter it as

Determine the intervals where the graph of $f(x)$ is below x-axis.

The graph is below x-axis on open intervals _____

Note: if the answer is an empty set, enter it as

Left end behavior: as $x \to -\infty$, $f(x) \to$ _____

Right end behavior: as $x \to +\infty$, $f(x) \to$ _____

Find the solution set of

$2(x+1)(x+3)^2(x-8)^3 > 0$

Solution set is _____

Note: if the answer is an empty set, enter it as

Find the solution set of

$2(x+1)(x+3)^2(x-8)^3 < 0$

Solution set is _____

Note: if the answer is an empty set, enter it as

Find the solution set of

$2(x+1)(x+3)^2(x-8)^3 \geq 0$

Solution set is _____

Note: if the answer is an empty set, enter it as

Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3

Find the solution set of

$2(x+1)(x+3)^2(x-8)^3 \leq 0$

Solution set is _____

Note: if the answer is an empty set, enter it as

Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3

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11. (1 pt) In this problem we consider the following polynomial

$f(x) = -4(x-7)^2(x-8)^2(x+8)^2$

Find the y-intercept of the graph of $y = f(x)$

$y =$ _____

Find the x-intercepts of the graph of $y = f(x)$

$x =$ _____

Determine the zeros of polynomial $f(x)$

Zeros are $x =$ _____

Determine the multiplicities of the zeros you entered above

Multiplicities are _____

Find the degree of the polynomial $f(x)$

Degree is _____

Find the leading term of the polynomial $f(x)$

Leading term is _____

Determine the intervals where the graph of $f(x)$ is above x-axis.

The graph is above x-axis on open intervals _____

Note: if the answer is an empty set, enter it as

Determine the intervals where the graph of $f(x)$ is below x-axis.

The graph is below x-axis on open intervals _____

Note: if the answer is an empty set, enter it as

Left end behavior: as $x \to -\infty$, $f(x) \to$ _____

Right end behavior: as $x \to +\infty$, $f(x) \to$ _____

Find the solution set of
$-4(x-7)^2(x-8)^2(x+8)^2 > 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Find the solution set of
$-4(x-7)^2(x-8)^2(x+8)^2 < 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Find the solution set of
$-4(x-7)^2(x-8)^2(x+8)^2 \geq 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3
Find the solution set of
$-4(x-7)^2(x-8)^2(x+8)^2 \leq 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3

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12. (1 pt) In this problem we consider the following polynomial
$f(x) = 8x(x-4)(x+3)(x-5)$
Find the y-intercept of the graph of $y = f(x)$
$y =$ _____
Find the x-intercepts of the graph of $y = f(x)$
$x =$ _____
Determine the zeros of polynomial $f(x)$
Zeros are $x =$ _____
Determine the multiplicities of the zeros you entered above
Multiplicities are _____
Find the degree of the polynomial $f(x)$
Degree is _____
Find the leading term of the polynomial $f(x)$
Leading term is _____
Determine the intervals where the graph of $f(x)$ is above x-axis.
The graph is above x-axis on open intervals _____
Note: if the answer is an empty set, enter it as
Determine the intervals where the graph of $f(x)$ is below x-axis.
The graph is below x-axis on open intervals _____
Note: if the answer is an empty set, enter it as
Left end behavior: as $x \to -\infty$, $f(x) \to$ _____
Right end behavior: as $x \to +\infty$, $f(x) \to$ _____
Find the solution set of
$8x(x-4)(x+3)(x-5) > 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Find the solution set of
$8x(x-4)(x+3)(x-5) < 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Find the solution set of
$8x(x-4)(x+3)(x-5) \geq 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3
Find the solution set of
$8x(x-4)(x+3)(x-5) \leq 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3

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13. (1 pt) In this problem we consider the following polynomial
$f(x) = -8x^2(x+3)^3(x-5)(x-8)^2$
Find the y-intercept of the graph of $y = f(x)$
$y =$ _____
Find the x-intercepts of the graph of $y = f(x)$
$x =$ _____
Determine the zeros of polynomial $f(x)$
Zeros are $x =$ _____
Determine the multiplicities of the zeros you entered above
Multiplicities are _____
Find the degree of the polynomial $f(x)$
Degree is _____
Find the leading term of the polynomial $f(x)$
Leading term is _____
Determine the intervals where the graph of $f(x)$ is above x-axis.
The graph is above x-axis on open intervals _____
Note: if the answer is an empty set, enter it as
Determine the intervals where the graph of $f(x)$ is below x-axis.
The graph is below x-axis on open intervals _____
Note: if the answer is an empty set, enter it as
Left end behavior: as $x \to -\infty$, $f(x) \to$ _____
Right end behavior: as $x \to +\infty$, $f(x) \to$ _____
Find the solution set of
$-8x^2(x+3)^3(x-5)(x-8)^2 > 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Find the solution set of
$-8x^2(x+3)^3(x-5)(x-8)^2 < 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Find the solution set of
$-8x^2(x+3)^3(x-5)(x-8)^2 \geq 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3
Find the solution set of
$-8x^2(x+3)^3(x-5)(x-8)^2 \leq 0$

Solution set is _____
Note: if the answer is an empty set, enter it as
Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3

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14. (1 pt) In this problem we consider the following polynomial
$f(x) = -4x^2(x+6)^2(x-2)^3(x+5)^2$

Find the y-intercept of the graph of $y = f(x)$
$y =$ _____

Find the x-intercepts of the graph of $y = f(x)$
$x =$ _____

Determine the zeros of polynomial $f(x)$
Zeros are $x =$ _____

Determine the multiplicities of the zeros you entered above
Multiplicities are _____

Find the degree of the polynomial $f(x)$
Degree is _____

Find the leading term of the polynomial $f(x)$
Leading term is _____

Determine the intervals where the graph of $f(x)$ is above x-axis.
The graph is above x-axis on open intervals _____
Note: if the answer is an empty set, enter it as

Determine the intervals where the graph of $f(x)$ is below x-axis.
The graph is below x-axis on open intervals _____
Note: if the answer is an empty set, enter it as

Left end behavior: as $x \to -\infty$, $f(x) \to$ _____
Right end behavior: as $x \to +\infty$, $f(x) \to$ _____

Find the solution set of
$-4x^2(x+6)^2(x-2)^3(x+5)^2 > 0$
Solution set is _____
Note: if the answer is an empty set, enter it as

Find the solution set of
$-4x^2(x+6)^2(x-2)^3(x+5)^2 < 0$
Solution set is _____
Note: if the answer is an empty set, enter it as

Find the solution set of
$-4x^2(x+6)^2(x-2)^3(x+5)^2 \geq 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3

Find the solution set of
$-4x^2(x+6)^2(x-2)^3(x+5)^2 \leq 0$
Solution set is _____
Note: if the answer is an empty set, enter it as
Note: if the solution set contains intervals and several points, enter it similar to (-inf, -1] U [0,1] U 2, 3