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.

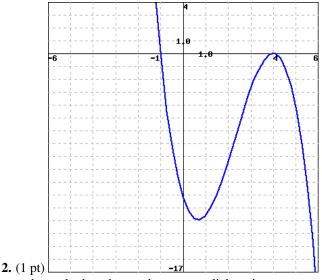
The roots are ____, ____, and

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: ____.

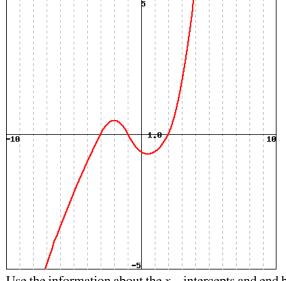
Between the last two roots, is the graph of f(x) above or below the x-axis? Answer above or below: ____.

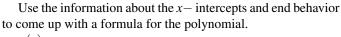
After the last root, is the graph of f(x) above or below the x-axis? Answer above or below: _____



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 :

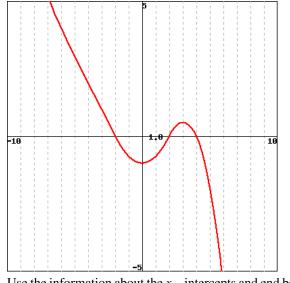


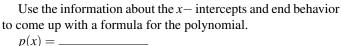




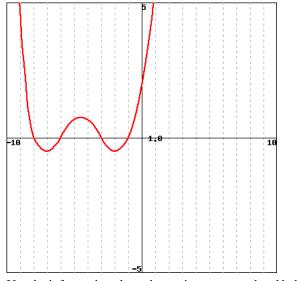
1

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

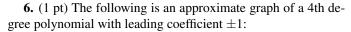


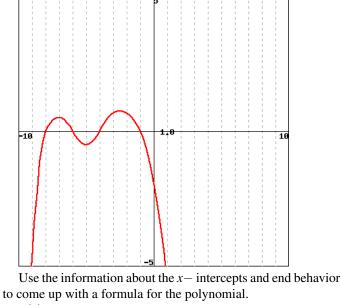


5. (1 pt) The following is an approximate graph of a 4th degree polynomial with leading coefficient ± 1 :



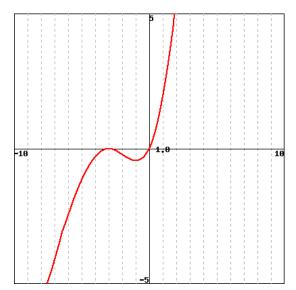
Use the information about the *x*- intercepts and end behavior to come up with a formula for the polynomial. p(x) =_____





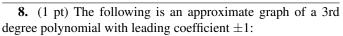
p(x) =_____

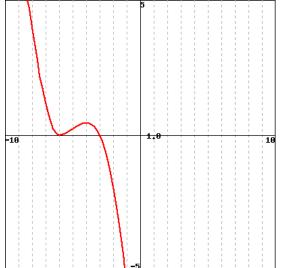
7. (1 pt) The following is an approximate graph of a 3rd degree polynomial with leading coefficient ± 1 :



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







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

$$p(x) = _$$

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

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 $f(x)$	Determine
Degree is	<i>x</i> -axis.
Find the leading term of the polynomial $f(x)$	The graph
Leading term is	
Determine the intervals where the graph of $f(x)$ is above	Note: if the
<i>x</i> -axis.	Left end b
The graph is above <i>x</i> -axis on open intervals	Right end bel
Note: if the answer is an empty set, enter it as	Find the so
Determine the intervals where the graph of $f(x)$ is below	2(x+1)(x+3)
<i>x</i> -axis.	Solution set i
The graph is below x-axis on open intervals	Note: if the
	Find the so
Note: if the answer is an empty set, enter it as	2(x+1)(x+3)
Left end behavior: as $x \to -\infty$, $f(x) \to ___$	Solution set i
Right end behavior: as $x \to +\infty$, $f(x) \to ___$	Note: if the
Find the solution set of	Find the se
-2(x+4)(x+2)(x-6) > 0	2(x+1)(x+3)
Solution set is	Solution set i
Note: if the answer is an empty set, enter it as	Note: if the
Find the solution set of	Note: if the
-2(x+4)(x+2)(x-6) < 0	enter it simila
Solution set is	Find the se
Note: if the answer is an empty set, enter it as	2(x+1)(x+3)
Find the solution set of	Solution set i
$-2(x+4)(x+2)(x-6) \ge 0$	Note: if the
Solution set is	Note: if the
Note: if the answer is an empty set, enter it as	enter it simila
Note: if the solution set contains intervals and several points,	
enter it similar to (-inf, -1] U [0,1] U 2, 3	11. (1 pt)
Find the solution set of	mial
$-2(x+4)(x+2)(x-6) \le 0$	f(x) = -4(x)
Solution set is	Find the y
Note: if the answer is an empty set, enter it as	y = '
Note: if the solution set contains intervals and several points,	Find the x
enter it similar to (-inf, -1] U [0,1] U 2, 3	x =
10. (1 pt) In this problem we consider the following polyno-	Determine
mial	Zeros are $x =$
$f(x) = 2(x+1)(x+3)^{2}(x-8)^{3}$	Determine
Find the <i>y</i> -intercept of the graph of $y = f(x)$	Multiplicities
y =	Find the d
Find the <i>x</i> -intercepts of the graph of $y = f(x)$	Degree is
<i>x</i> =	Find the le
Determine the zeros of polynomial $f(x)$	Leading term
Zeros are $x =$	Determine
Determine the multiplicities of the zeros you entered above	x-axis.
Multiplicities are	The graph is a
Find the degree of the polynomial $f(x)$	Note: if the
Degree is	Determine
Find the leading term of the polynomial $f(x)$	<i>x</i> -axis.
Leading term is	The graph
Determine the intervals where the graph of $f(x)$ is above	
<i>x</i> -axis.	Note: if the
The graph is above x-axis on open intervals	Left end b
Note: if the answer is an empty set, enter it as	Right end bel
	3

he the intervals where the graph of f(x) is below is below x-axis on open intervals h answer is an empty set, enter it as behavior: as $x \to -\infty$, $f(x) \to _$ ehavior: as $x \to +\infty$, $f(x) \to ___$ solution set of $(3)^2(x-8)^3 > 0$ is ___ answer is an empty set, enter it as solution set of $(3)^2(x-8)^3 < 0$ is ____ answer is an empty set, enter it as solution set of $(3)^2(x-8)^3 \ge 0$ is ___ answer is an empty set, enter it as e solution set contains intervals and several points, lar to (-inf, -1] U [0,1] U 2, 3 solution set of $(-3)^2(x-8)^3 \le 0$ is_ answer is an empty set, enter it as e solution set contains intervals and several points, lar to (-inf, -1] U [0,1] U 2, 3 In this problem we consider the following polyno- $(x-7)^2(x-8)^2(x+8)^2$ y-intercept of the graph of y = f(x)*x*-intercepts of the graph of y = f(x)the zeros of polynomial f(x)e the multiplicities of the zeros you entered above es are . degree of the polynomial f(x)leading term of the polynomial f(x)n is _ he the intervals where the graph of f(x) is above

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 $x \to +\infty$, $f(x) \to \infty$	
--	--

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 $-4(x-7)^2(x-8)^2(x+8)^2 \ge 0$ 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 $-4(x-7)^2(x-8)^2(x+8)^2 \le 0$ 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 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) > 0Solution 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) < 0Solution set is _ Note: if the answer is an empty set, enter it as

Find the solution set of $8x(x-4)(x+3)(x-5) \ge 0$ 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 $8x(x-4)(x+3)(x-5) \le 0$ 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 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 below x-axis open intervals is on 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 $-8x^2(x+3)^3(x-5)(x-8)^2 \ge 0$ 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 $-8x^2(x+3)^3(x-5)(x-8)^2 \le 0$

Solution set is Note: if the answer is an empty set, enter it as	The graph is below x-axis on open intervals
Note: if the solution set contains intervals and several points,	Note: if the answer is an empty set, enter it as
enter it similar to (-inf, -1] U [0,1] U 2, 3	Left end behavior: as $x \to -\infty$, $f(x) \to $
enter it similar to (-inf, -1] U [0,1] U 2, 3 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	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 $-4x^2(x+6)^2(x-2)^3(x+5)^2 \ge 0$ 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 $-4x^2(x+6)^2(x-2)^3(x+5)^2 \le 0$ Solution set is Note: if the answer is an empty set, enter it as Note: if the solution set of $-4x^2(x+6)^2(x-2)^3(x+5)^2 \le 0$ Solution set is Note: if the answer is an empty set, enter it as Note: if the answer is an empty set, enter it as Note: if the answer is an empty set, enter it as Note: if the answer is an empty set, enter it as Note: if the answer is an empty set, enter it as Note: if the answer is an empty set, enter it as Note: if the answer is an empty set, enter it as Note: if the answer is an empty set, enter it as
x-axis.	enter it similar to (-inf, -1] U [0,1] U 2, 3

Generated by ©WeBWorK, http://webwork.maa.org, Mathematical Association of America