

Algebra 2

Unit 3A: Graphing Polynomials

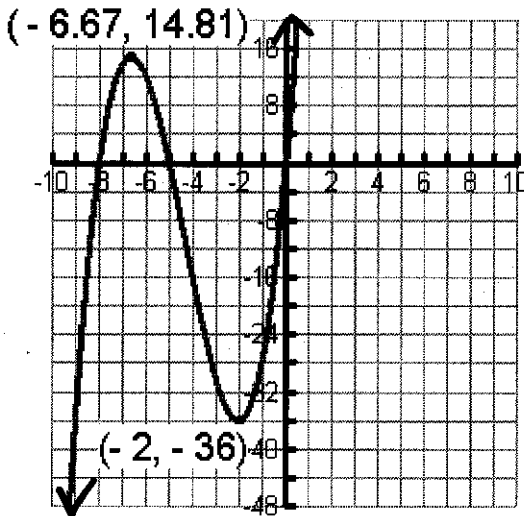
Characteristics of Polynomial Graphs WS

Name Key

Given the functions and their graphs, describe all the characteristics for each of the following. For domain and range, give both the inequality statement and interval notation format. Leave zeros in radical form and x-intercepts put in decimal form where applicable. Round to 3 decimal places.

1.  $f(x) = x(x+5)(x+8)$

Work:  $x=0$        $x+8=0$   
 $x+5=0$



Domain:  $-\infty < x < \infty$       Range:  $-\infty < y < \infty$   
 $(-\infty, \infty)$        $(-\infty, \infty)$

x-intercepts:  $(0,0)$   $(-5,0)$       y-intercepts:  $(0,0)$   
 $(-8,0)$

zeros:  $x = 0, -5, -8$

end behaviors:  $x \rightarrow -\infty$        $y \rightarrow -\infty$   
 $x \rightarrow +\infty$        $y \rightarrow +\infty$

intervals of increasing:  $(-\infty, -6.67) \cup (-2, \infty)$

intervals of decreasing:  $(-6.67, -2)$

maximums

minimums

extrema: none

extrema: none

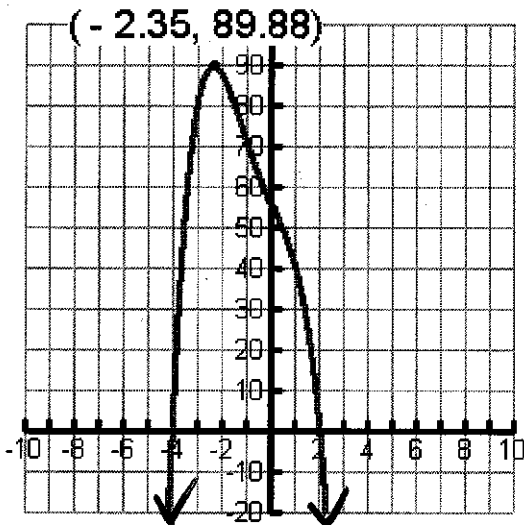
relative:

relative:

$(-6.67, 14.81)$        $(-2, -36)$

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

Work:



Domain:  $-\infty < x < \infty$       Range:  $-\infty < y \leq 89.88$   
 $(-\infty, \infty)$        $(-\infty, 89.88]$

x-intercepts:  $(2,0)$   $(-4,0)$       y-intercepts:  $(0,56)$

zeros:  $x = 2, -4, \pm i\sqrt{7}$

end behaviors:  $x \rightarrow -\infty$        $y \rightarrow -\infty$   
 $x \rightarrow +\infty$        $y \rightarrow -\infty$

intervals of increasing:  $(-\infty, -2.35)$

intervals of decreasing:  $(-2.35, \infty)$

maximums

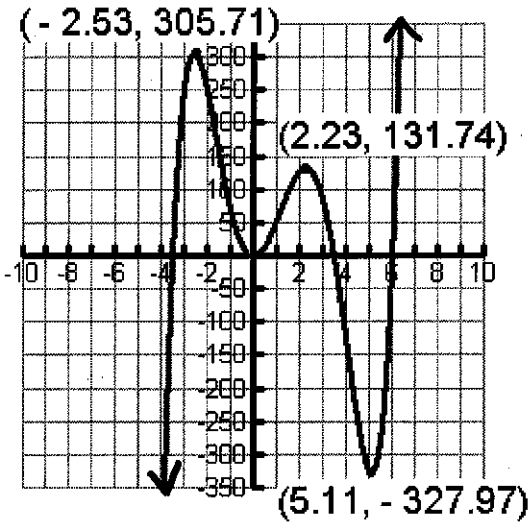
minimum

extrema:  $y = 89.88$       extrema: none

relative: none      relative: none

3.  $f(x) = x^2(x-6)(x^2-12)$

Work:



Domain:  $-\infty < x < \infty$   
 $(-\infty, \infty)$       Range:  $-\infty < y < \infty$   
 $(-\infty, \infty)$

x-intercepts:  $(0,0)$   $(6,0)$  y-intercepts:  $(0,0)$   
 mult. 2  $(\pm 2\sqrt{3}, 0)$

zeros:  $x = 0, 6, \pm 2\sqrt{3}$

end behaviors:  
 $x \rightarrow -\infty \quad y \rightarrow -\infty$   
 $x \rightarrow +\infty \quad y \rightarrow +\infty$

intervals of increasing:  
 $(-\infty, -2.53) \cup (0, 2.23) \cup (5.11, \infty)$

intervals of decreasing:  
 $(-2.53, 0) \cup (2.23, 5.11)$

maximums

extrema: none

relative:

$(-2.53, 305.71)$

$(2.23, 131.74)$

minimum

extrema: none

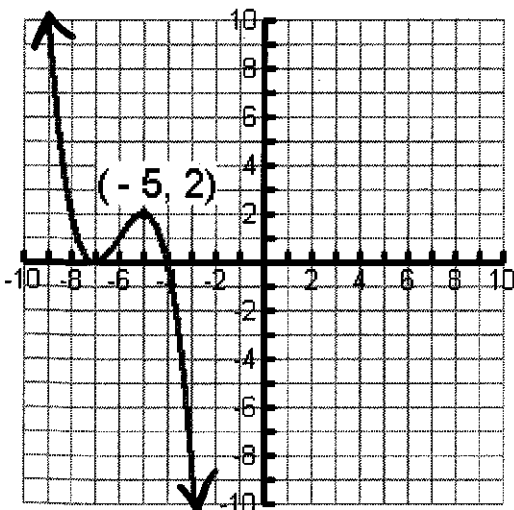
relative:

$(0,0)$

$(5.11, -327.97)$

4.  $f(x) = -\frac{1}{2}(x+7)^2(x+4)$

Work:



Domain:  $-\infty < x < \infty$       Range:  $-\infty < y < \infty$   
 $(-\infty, \infty)$        $(-\infty, \infty)$

x-intercepts:  $(-4,0)$   $(-7,0)$  y-intercepts:  $(0,-98)$

zeros:  $x = -4, -7$  w/ mult. of 2

end behaviors:  
 $x \rightarrow -\infty \quad y \rightarrow +\infty$   
 $x \rightarrow +\infty \quad y \rightarrow -\infty$

intervals of increasing:  
 $(-7, -5)$

intervals of decreasing:  
 $(-\infty, -7) \cup (-5, \infty)$

maximums

extrema: none

relative:

$(-5, 2)$

minimum

extrema: none

relative:

$(-7, 0)$