Algebra 2
Chapter 5 – Polynomials
5.2 – Worksheet – Graphing Polynomials

Poly - KEY

Date: ____________ **Period:** ________

Part One – Identifying End Behavior

For each of the following identify the Lead Degree, the Lead Coefficient, and the End Behavior.

1.) $t(x) = 2x - 5$

Name: LINEAR BINOMIAL

Leading Degree: Even or Odd

Leading Coefficient: Positive or Negative

End Behavior:

$as\ x \to \infty, t(x) \to$ ∞

$as\ x \to -\infty, t(x) \to$ $-\infty$

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

Name: QUADRATIC BINOMIAL

Leading Degree: Even or Odd

Leading Coefficient: Positive or Negative

End Behavior:

$as\ x \to \infty, a(x) \to$ $-\infty$

$as\ x \to -\infty, a(x) \to$ $-\infty$

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

Name: QUARTIC TRINOMIAL

Leading Degree: Even or Odd

Leading Coefficient: Positive or Negative

End Behavior:

$as\ x \to \infty, g(x) \to$ $-\infty$

$as\ x \to -\infty, g(x) \to$ $-\infty$

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

Name: QUINTIC TRINOMIAL

Leading Degree: Even or Odd

Leading Coefficient: Positive or Negative

End Behavior:

$as\ x \to \infty, m(x) \to$ $-\infty$

$as\ x \to -\infty, m(x) \to$ ∞

5.) $n(x) = \frac{1}{2}x^6 + 2x^2 - 3x + 4$

Name: 6TH DEGREE POLYNOMIAL

Leading Degree: Even or Odd

Leading Coefficient: Positive or Negative

End Behavior:

$as\ x \to \infty, n(x) \to$ ∞

$as\ x \to -\infty, n(x) \to$ ∞

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

Name: CUBIC POLYNOMIAL

Leading Degree: Even or Odd

Leading Coefficient: Positive or Negative

End Behavior:

$as\ x \to \infty, f(x) \to$ ∞

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

Part Two – Sketching Polynomials

7.) $j(x) = 2x^3 - 9x^2 + 7x$

# of Solution(s): 3

$0 = 2x^3 - 9x^2 + 7x$

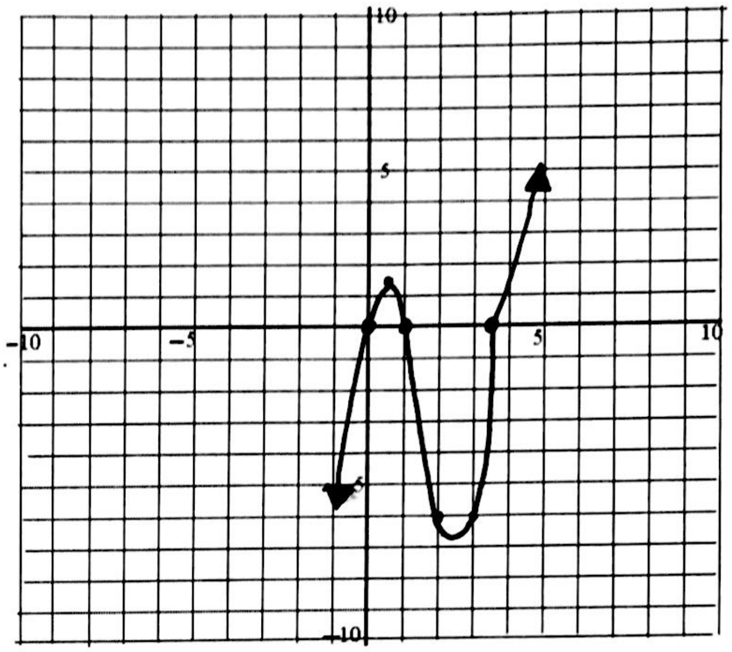
$0 = x(2x^2 - 9x + 7)$

$0 = x[2x^2 - 7x - 2x + 7]$

$0 = x[(2x^2 - 7x) + (-2x + 7)]$

$0 = x[x(2x - 7) - 1(2x - 7)]$

$0 = x(2x - 7)(x - 1)$



Zero(s): $x = 0$ $x = 1$ $x = 7/2$

End Behavior:

0 1 3.5

x	.5	2	3	
$j(x)$	1.5	-6	-6	

as $x \to \infty, j(x) \to$ ∞

as $x \to -\infty, j(x) \to$ $-\infty$

8.) $h(x) = 3x^4 - 27x^2$

# of Solution(s): 4

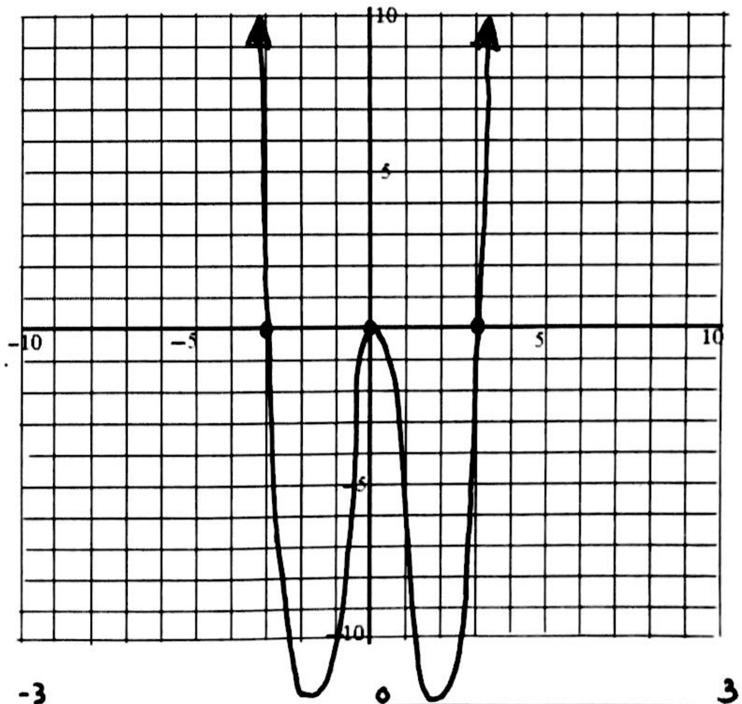
$0 = 3x^4 - 27x^2$

$0 = 3x^2(x^2 - 9)$

$3x^2 = 0$ $x^2 - 9 = 0$

$x^2 = 0$ $x^2 = 9$

$x = 0$ $x = \pm 3$



Zero(s): $x = 0$ $x = 0$ $x = 3$ $x = -3$

End Behavior:

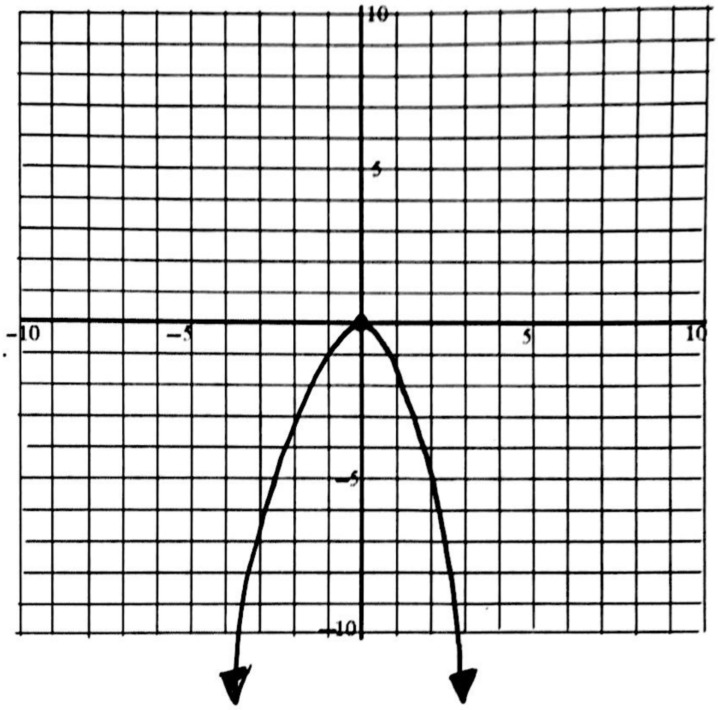
-3 0 3

x	-2	-1	1	2
$h(x)$	-60	-24	-24	-60

as $x \to \infty, h(x) \to$ ∞

as $x \to -\infty, h(x) \to$ ∞

9.) $b(x) = -x^4 - 16x^2$



# of Solution(s): 4

$0 = -x^4 - 16x^2$

$0 = -x^2(x^2 + 16)$

$0 = -x^2 \qquad x^2 + 16 = 0$

$0 = x^2 \qquad x^2 = -16$

$\pm 0 = x \qquad x = \pm 4i$

Zero(s): $x = 0$, $x = 0$, $x = 4i$, $x = -4i$

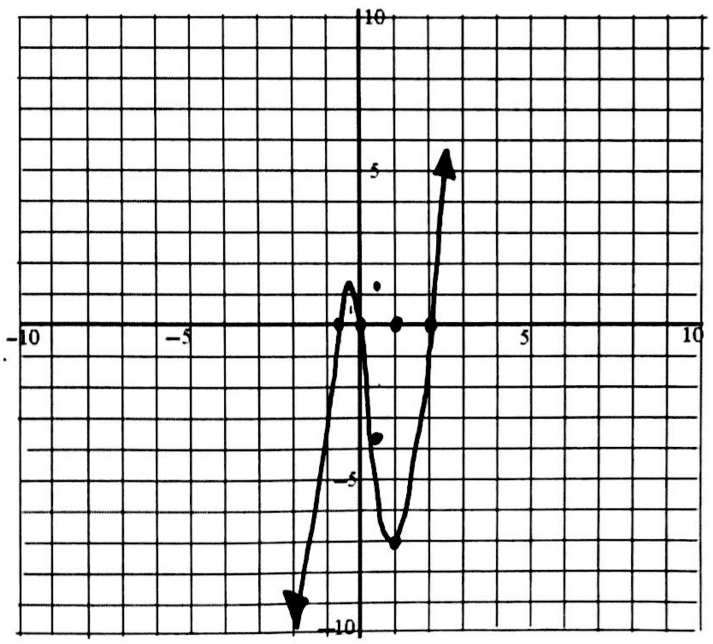
End Behavior:

as $x \to \infty, b(x) \to$ $-\infty$

as $x \to -\infty, b(x) \to$ $-\infty$

x	-2	-1	1	2
$b(x)$	-80	-17	-17	-80

10.) $f(t) = 4t^3 - 5t^2 - 6t$



# of Solution(s): 3

$0 = 4t^3 - 5t^2 - 6t$

$0 = t(4t^2 - 5t - 6)$

$0 = t[4t^2 - 8t + 3t - 6]$

$0 = t[(4t^2 - 8t) + (3t - 6)]$

$0 = t[4t(t-2) + 3(t-2)]$

$0 = t(t-2)(4t+3)$

$t = 0 \qquad t - 2 = 0 \qquad 4t + 3 = 0$

Zero(s): $t = 0$ $t = 2$ $t = -3/4$

End Behavior:

as $x \to \infty, f(t) \to$ ∞

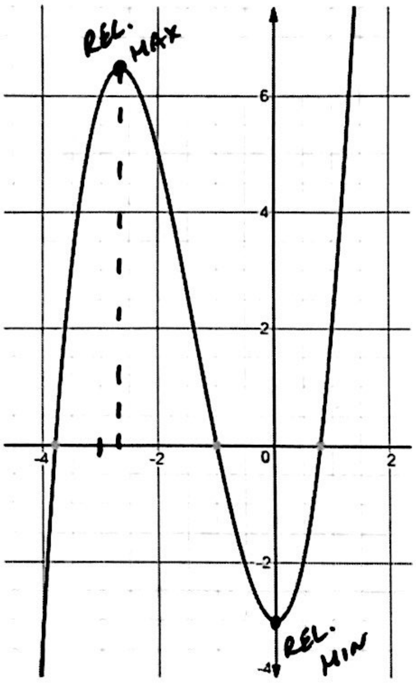
as $x \to -\infty, f(t) \to$ $-\infty$

t		-.5	.5	1
$f(t)$		1.25	-3.75	

Part Three – Identifying Relative Maximums and Minimums

Given each of the polynomial graphs below, identify the key information.

11.)



Lead Coefficient: Positive or Negative (circle one)

Degree: Even or Odd (Circle One)

Relative Maximum(s): (-2.5, 6.5)

Relative Minimum(s): (0, -3)

Zero(s): x = .75, x = -1, x = -3.75

Y-intercept: (0, -3)

Interval Increasing: $(-\infty, -2.5) \cup (0, \infty)$

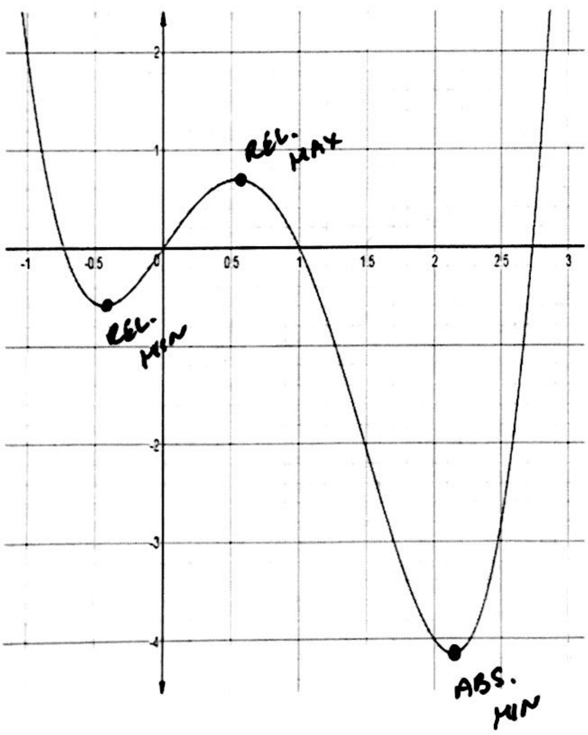
Interval Decreasing: (-2.5, 0)

End Behavior:

as $x \to \infty, f(x) \to$ ∞

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

12.)



Lead Coefficient: Positive or Negative (circle one)

Degree: Even or Odd (Circle One)

Relative Maximum(s): (.6, .7)

Relative Minimum(s): (-.4, -.6)

Zero(s): x = 1, x = 2.7, x = 0, x = -.7

Y-intercept: (0,0)

Interval Increasing: $(-.4, .6) \cup (2.2, \infty)$

Interval Decreasing: $(-\infty, -.4) \cup (.6, 2.2)$

End Behavior:

as $x \to \infty, f(x) \to$ ∞

as $x \to -\infty, f(x) \to$ ∞

Evaluate each of the polynomials.

13.) If $f(x) = 2x^2 - 3x + 2$ find $f(-3)$.

$f(-3) = 2(-3)^2 - 3(-3) + 2$

$f(-3) = 2(9) - 3(-3) + 2$

$f(-3) = 18 + 9 + 2$

$f(-3) = 29$

14.) If $f(x) = 2x^2 - 3x + 2$ find $f(m+2)$.

$f(m+2) = 2(m+2)^2 - 3(m+2) + 2$

$= 2(m+2)(m+2) - 3(m+2) + 2$

$= 2(m^2 + 2m + 2m + 4) - 3(m+2) + 2$

$= 2(m^2 + 4m + 4) - 3(m+2) + 2$

$= 2m^2 + 8m + 8 - 3m - 6 + 2$

$f(m+2) = 2m^2 + 5m + 4$

15.) If $h(x) = -4x^{-3} + 4x^{-2}$ find $h(-2)$.

$h(-2) = -4(-2)^{-3} + 4(-2)^{-2}$

$= \frac{-4}{(-2)^3} + \frac{4}{(-2)^2}$

$= \frac{-4}{-8} + \frac{4}{4}$

$= \frac{4}{8} + \frac{8}{8}$

$= \frac{12}{8}$

$h(-2) = \frac{3}{2} = 1.5$

16.) If $h(x) = -4x^{-3} + 4x^{-2}$ find $h(2t^3)$.

$h(2t^3) = -4(2t^3)^{-3} + 4(2t^3)^{-2}$

$= \frac{-4}{(2t^3)^3} + \frac{4}{(2t^3)^2}$

$= \frac{-4}{8t^9} + \frac{4}{4t^6}$

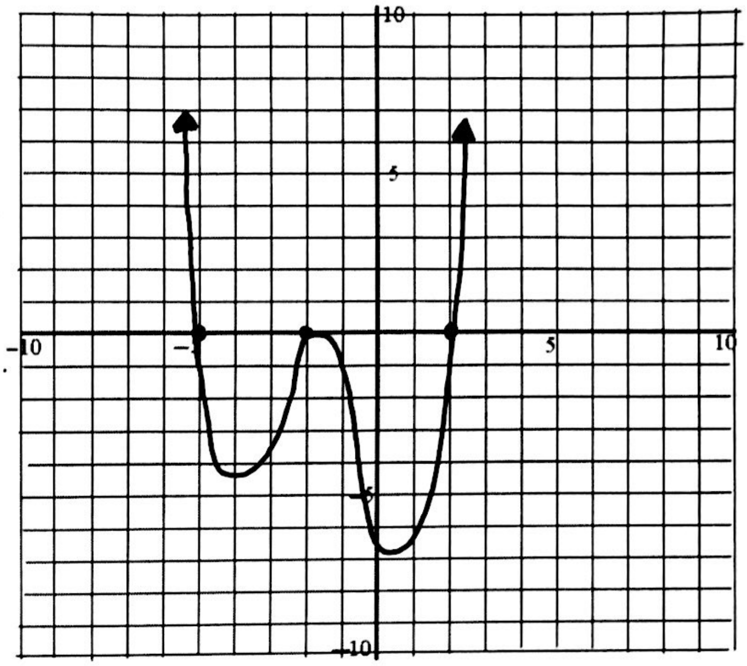
$= \frac{-1}{2t^9} + \frac{1}{t^6}$

$= \frac{-1}{2t^9} + \frac{2t^3}{2t^9}$

$= \frac{-1 + 2t^3}{2t^9}$

Part Four – Sketching Polynomials

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



\# of Solution(s): 4

$x-2=0$ $x+2=0$ $x+2=0$ $x+5=0$

$x=2$ $x=-2$ $x=-2$ $x=-5$

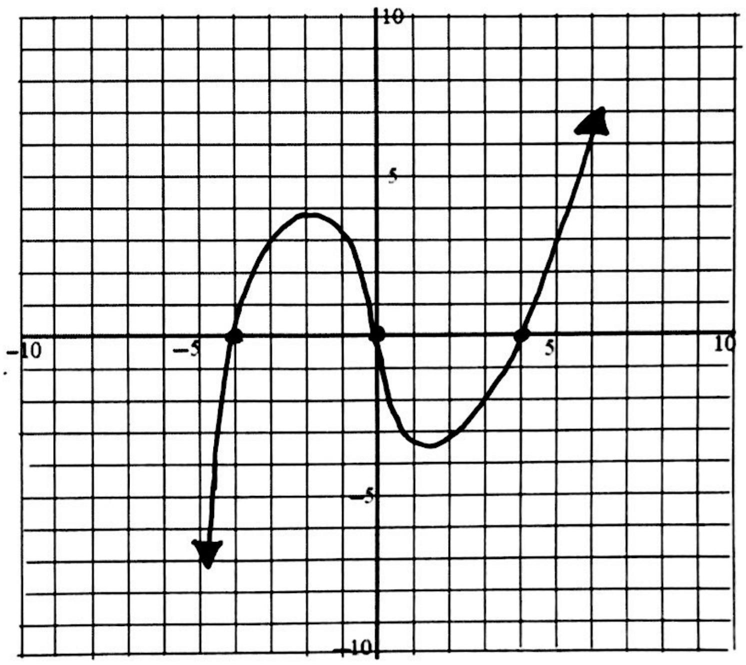
Zero(s): -5, -2 Bounce, 2

End Behavior:

$as\ x \to \infty, f(x) \to$ ∞

$as\ x \to -\infty, f(x) \to$ ∞

18.) $f(x) = 2x^3 - 32x$



\# of Solution(s): 3

$0 = 2x^3 - 32x$

$0 = 2x(x^2 - 16)$

$2x = 0$ $x^2 - 16 = 0$

$x = 0$ $x^2 = 16$

$x = \pm 4$

Zero(s): -4, 0, 4

End Behavior:

$as\ x \to \infty, f(x) \to$ ∞

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