Advanced Algebra
Graph and Characteristics of Polynomials
Graph Scales GIVEN

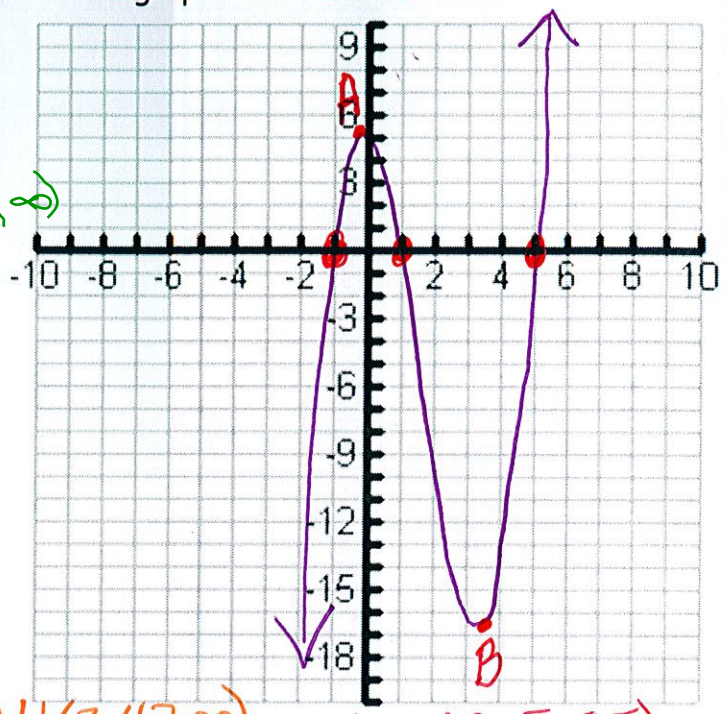
Name: Key
Worksheet A

Factor & solve the polynomials on a separate piece of paper. Describe all the characteristics of each polynomial. Sketch each of the graphs and label vertices.

$f(x) = (x-5)(x+1)(x-1)$

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

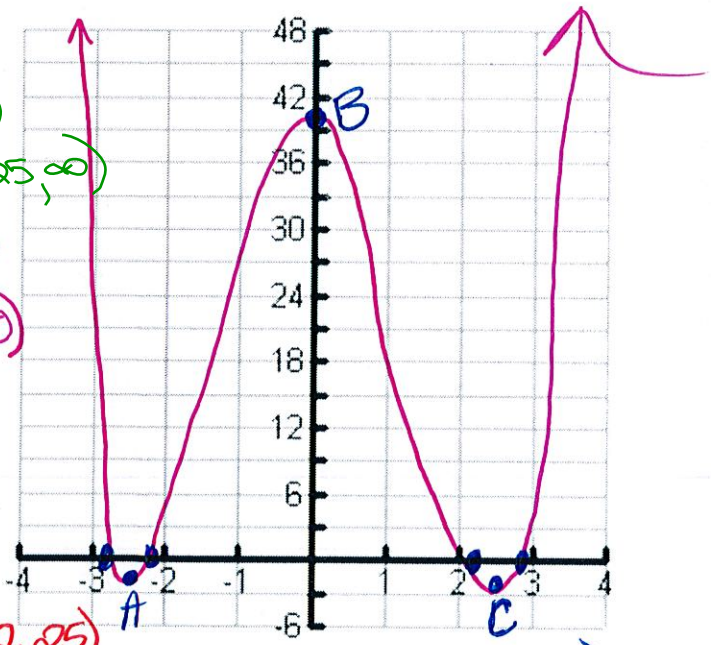
Domain: $-\infty < x < \infty$; $(-\infty, \infty)$
Range: $-\infty < f(x) < \infty$; $(-\infty, \infty)$
Zeros: $x = -1, 1, 5$
x-int: $(-1,0), (1,0), (5,0)$
y-int: $(0,5)$
end behavior: $x \to -\infty, y \to -\infty$
$x \to \infty, y \to \infty$
Maximums: global: None
Local: $(-0.10, 5.05)$
Minimums: global: None
Local: $(3.43, -16.90)$
Intervals: increasing: $(-\infty, -0.10) \cup (3.43, \infty)$
decreasing: $(-0.10, 3.43)$



A(-0.10, 5.05)
B(3.43, -16.90)

2. $f(x) = x^4 - 13x^2 + 40$

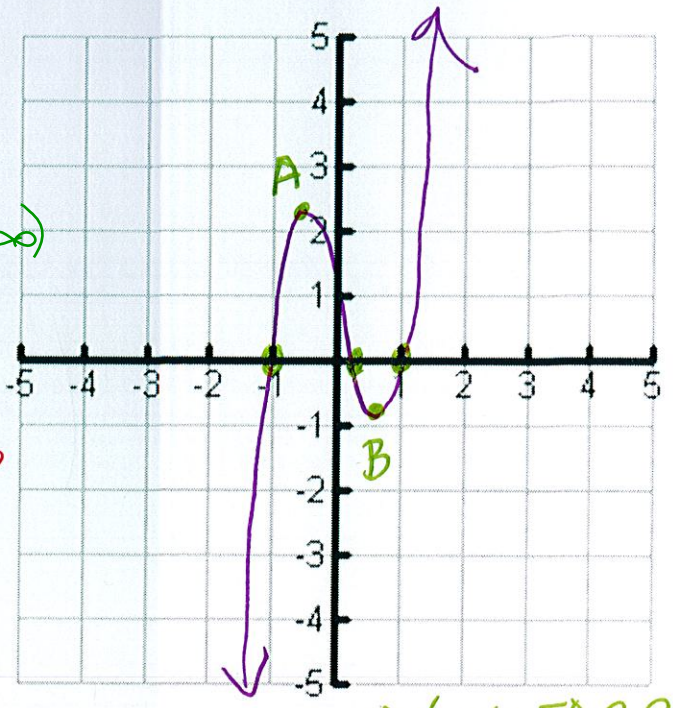
Domain: $-\infty < x < \infty$; $(-\infty, \infty)$
Range: $-2.25 \leq f(x) < \infty$ $[-2.25, \infty)$
Zeros: $x = \sqrt{5}, -\sqrt{5}, 2\sqrt{2}, -2\sqrt{2}$
x-int: $(\sqrt{5}, 0), (-\sqrt{5}, 0), (2\sqrt{2}, 0)$ $(-2\sqrt{2}, 0)$
y-int: $(0, 40)$
end behavior: $x \to -\infty, y \to \infty$
$x \to \infty, y \to \infty$
Maximums: global: None
Local: $(0, 40)$
Minimums: global: $y = -2.25$
Local: $(-2.55, -2.25)$ + $(2.55, -2.25)$
Intervals: increasing: $(-2.55, 0) \cup (2.55, \infty)$
decreasing: $(-\infty, -2.55) \cup (0, 2.55)$



A(-2.55, -2.25)
B(0, 40)
C(2.55, -2.25)

$f(x) = (4x-1)(x+1)(x-1)$

3. $f(x) = 4x^3 - x^2 - 4x + 1$



Domain: $-\infty < x < \infty$; $(-\infty, \infty)$

Range: $-\infty < f(x) < \infty$; $(-\infty, \infty)$

Zeros: $x = 1/4, -1, 1$

x-int: $(1/4, 0), (-1, 0), (1, 0)$

y-int: $(0, 1)$

end behavior: $x \to -\infty, y \to -\infty$
$x \to \infty, y \to \infty$

Maximums: global: None

Local: $(-0.50, 2.25)$

Minimums: global: None

Local: $(0.67, -0.93)$

Intervals: increasing: $(-\infty, -0.50) \cup (0.67, \infty)$

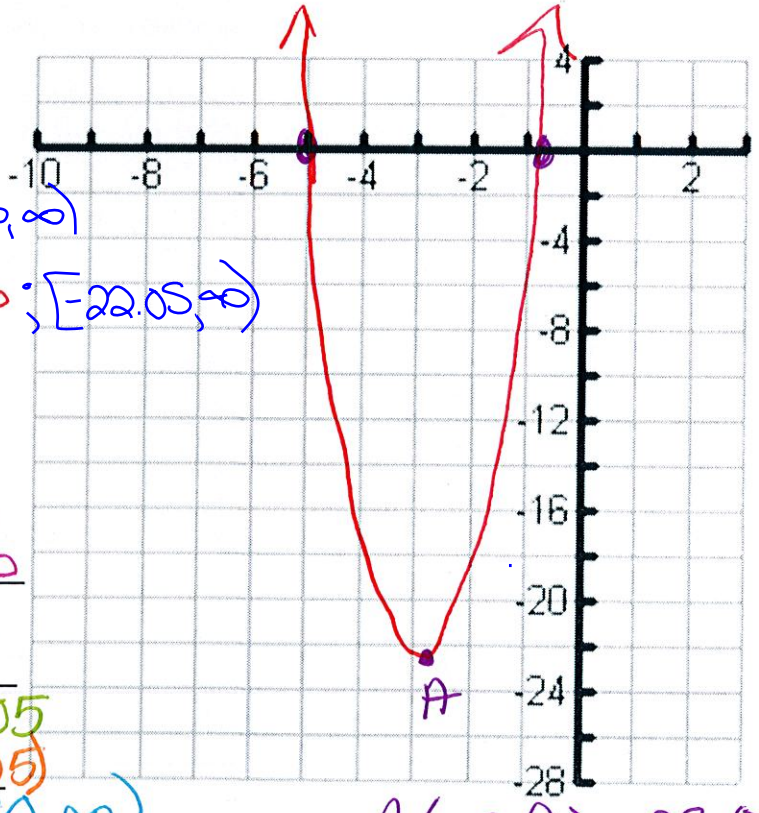
decreasing: $(-0.50, 0.67)$

$A(-0.50, 2.25)$

$B(0.67, -0.93)$

$f(x) = (x+5)(5x+4)$

4. $f(x) = 5x^2 + 29x + 20$



Domain: $-\infty < x < \infty$; $(-\infty, \infty)$

Range: $-22.05 \leq f(x) < \infty$; $[-22.05, \infty)$

Zeros: $x = -5, -4/5$

x-int: $(-5, 0), (-4/5, 0)$

y-int: $(0, 20)$

end behavior: $x \to -\infty, y \to \infty$
$x \to \infty, y \to \infty$

Maximums: global: None

Local: None

Minimums: global: $y = -22.05$

Local: $(-2.90, -22.05)$

Intervals: increasing: $(-2.90, \infty)$

decreasing: $(-\infty, -2.90)$

$A(-2.90, -22.05)$