College Algebra
Section 3.2

Name: KEY

Describe the transformations of $y = x^n$.

1. $y = x^3$

a. $f(x) = (x-4)^3$

→ 4

b. $f(x) = -x^3 - 4$

Reflected

↓ 4

c. $f(x) = -\frac{1}{4}x^3$

Reflected

Compress × 1/4

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

← 2

↓ 4

2. $y = x^6$

a. $f(x) = -(x-5)^6$

Reflected

→ 5

b. $f(x) = \frac{1}{8}x^6$

Compress × 1/8

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

← 3

↓ 4

d. $f(x) = -\frac{1}{4}x^6 + 1$

Reflected ↑ 1

Compress × 1/4

Describe the left and right-hand behavior of the graph of the polynomial function. Make sure the polynomial is written in standard form.

3. $f(x) = 12x^3 + 4x$

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

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

4. $f(x) = 6x - 9x^3 + x^2$

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

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

5. $f(x) = \frac{1}{4}x^5 - x^4 + 8$

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

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

How many local maxima and minima does the polynomial have?

6. $y = -9x^2 + 7x + 6$

1

7. $y = x^4 - 3x^2 + 9$

3

8. $y = -2x^2 + 7x + 6$

1

9. $y = x^4 - 9x^2 + 7$

3

Find all real zeros of the polynomial function, determine the multiplicity of each zero, end behavior, x and y-intercepts, number of maximum turning points, graph the function. Check your answer using a graphing calculator.

10. $f(x) = x^2 - 9$

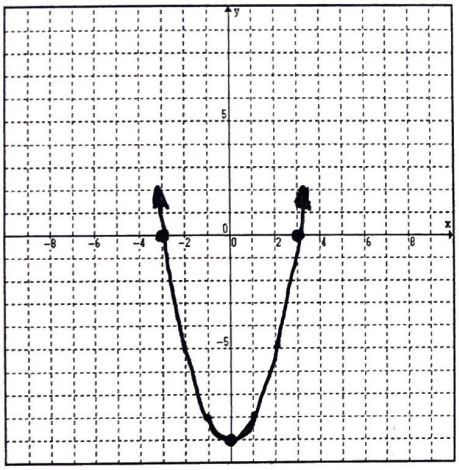
Zeros: ± 3

End Behavior: ↑ ↑

x-intercepts: $(\pm 3, 0)$

y-intercept: $(0, -9)$

Max Turns: 1



11. $P(x) = (x - 1)(x + 1)(x - 2)$

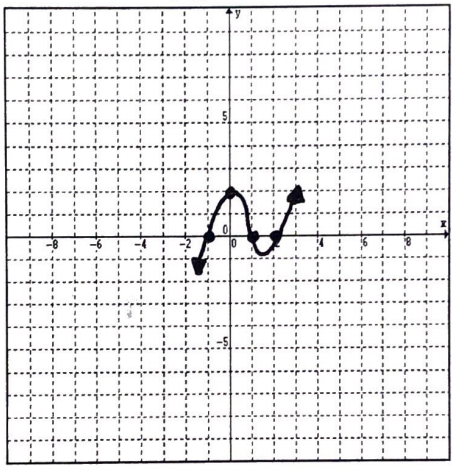
Zeros: $1, -1, 2$

End Behavior: ↓ ↑

x-intercepts: $(1,0)$ $(-1,0)$ $(2,0)$

y-intercept: $(0, 2)$

Max Turns: 2



12. $P(x) = x^3(x + 2)(x - 2)^2$

Zeros: $0, -2, 2$

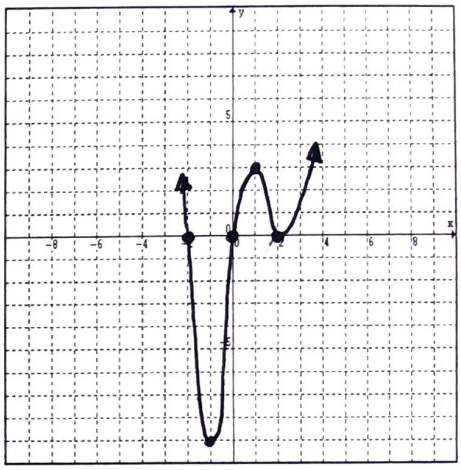
End Behavior: ↑ ↑

x-intercepts: $(0,0)$ $(\pm 2, 0)$

y-intercept: $(0,0)$

X	1	-1
Y	3	-9

Max Turns: 5



13. $P(x) = x^3 + 2x^2 - 3x$

$x(x+3)(x-1)$

Zeros: $0, -3, 1$

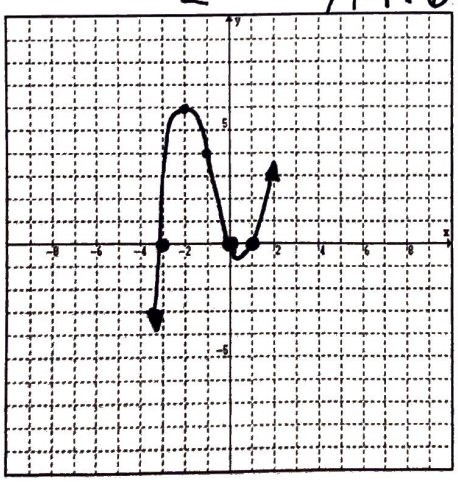
End Behavior: ↓ ↑

x-intercepts: $(0,0)(-3,0)(1,0)$

y-intercept: $(0,0)$

X	-1	-2
Y	4	6

Max Turns: 2



14. $P(x) = x^4 - 4x^2 - 12$

$(x^2-6)(x^2+2)$

Zeros: $\pm\sqrt{6}, \pm i\sqrt{2}$

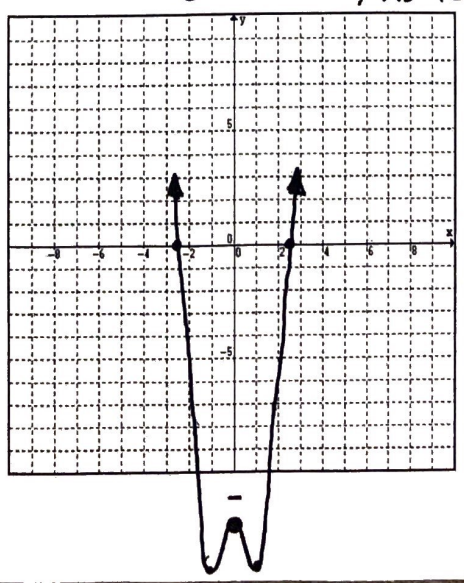
End Behavior: ↑ ↑

x-intercepts: $(\pm\sqrt{6}, 0)$

y-intercept: $(0, -12)$

X	1	-1
Y	-15	-15

Max Turns: 3



15. $P(x) = x^3 + 2x^2 - 9x - 18$

Zeros: $\pm 3, -2$

End Behavior: ↓ ↑

x-intercepts: $(\pm 3, 0)(-2, 0)$

y-intercept: $(0, -18)$

X	1	2
Y	-24	-20

Max Turns: 2