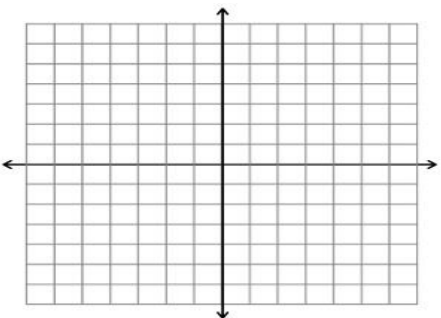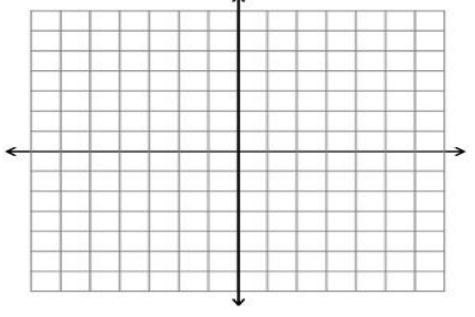| A3.2A Graphing Polynomials	Name

1. Use end-behavior, zeros, and y-intercept to make a sketch of the polynomial.   ***zeros: 1, 4, -2***
Write an equation of the above graph with a scale factor of 1, in x-intercept (factored) form.
y = 1(x_____)(x _____)(x_____)

End behavior:
As x → -∞, y→ ____   as x → ∞, y→ ____

2. Use end-behavior, zeros, and y-intercept to make a sketch of the polynomial.   ***zeros: 0, -1, 1, -4***
Write an equation of the above graph with a scale factor of 1, in x-intercept (factored) form.
y = 1(x_____)(x _____)(x_____)(x_____)

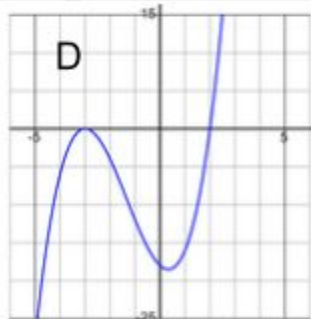End behavior: As x → -∞, y→ ____ as x → ∞, y→ ____
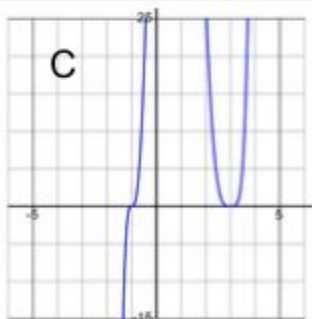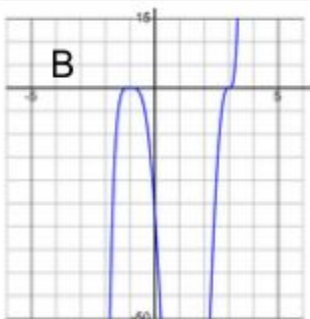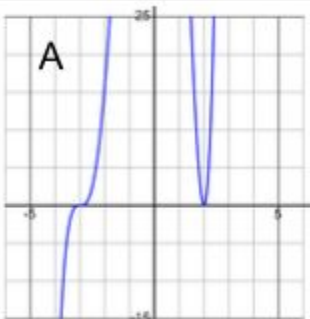
Problems 3-6: Match the polynomial function graphs to the given zeros and multiplicities.

3.   -3 (mult=2), 2 (mult=1)   4.   -3 (mult=3), 2 (mult=2)

5.   -1 (mult=4), 3 (mult=3)   6.   -1 (mult=3), 3 (mult=4)
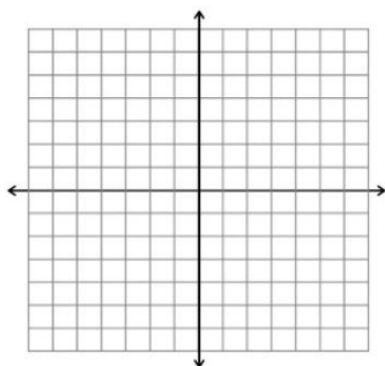
Problems 7-8: Use end-behavior, zeros and multiplicity to make a rough sketch of the graph of the given polynomial.

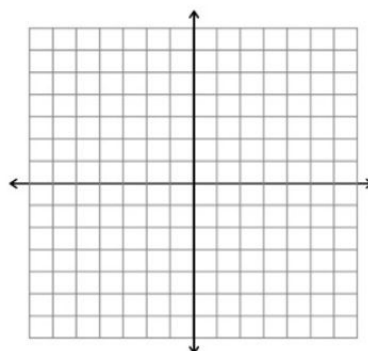7. $y = -(x+2)^2(x-3)(x-1)$ 8. $y = x(x-3)^2$

Zeros *(and mult)*:   Zeros *(and mult)*:
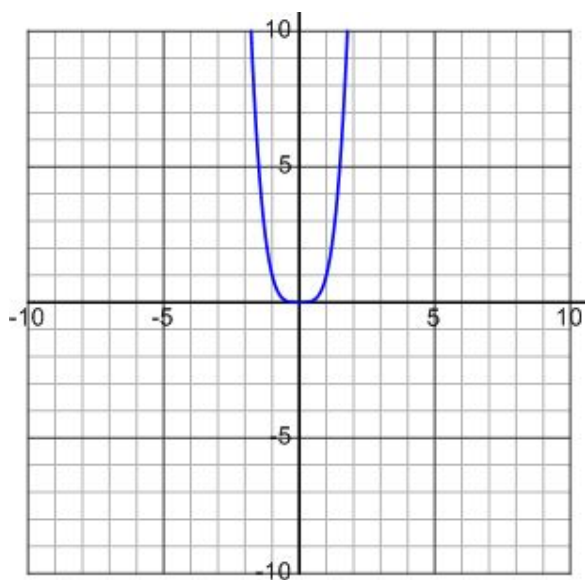
Y-intercept?   Y-intercept?

9. The graph of $f(x) = x^4$ is graphed below. Graph and label the following.	10. The graph of $f(x) = x^3$ is graphed below. Graph and label the following.
A. $f(x) = -(x+3)^4$	A. $f(x) = (x-4)^3$
B. $g(x) = (x-1)^4 + 3$	B. $g(x) = -(x+5)^3 - 2$
C. $k(x) = -x^4 + 10$	C. $k(x) = x^3 + 4$
D. $m(x) = (x+4)^4 - 5$	D. $m(x) = (x-1)^3 + 6$
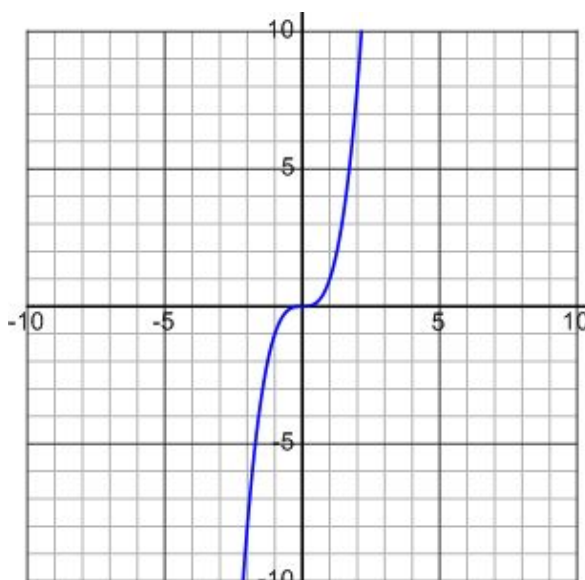
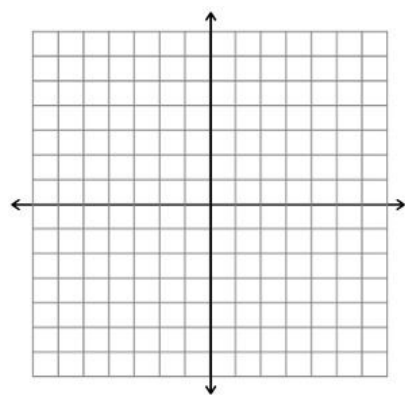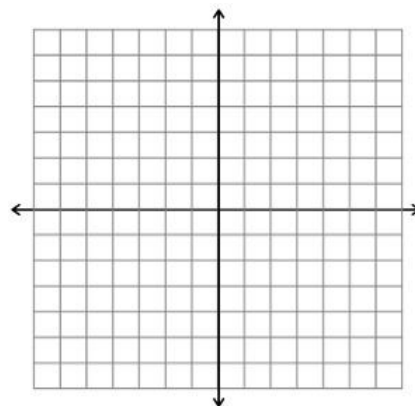| 11. Describe the end behaviors of the function: $$f(x) = -2x^3 + x - 1$$ As $x \to \infty$, $y \to$ _____ As $x \to -\infty$, $y \to$ _____	12. Describe the end behaviors of the function: $$f(x) = x^4 + x^3 - 2x$$ As $x \to \infty$, $y \to$ _____ As $x \to -\infty$, $y \to$ _____
13. Describe the end behaviors of the function: $$f(x) = -.05x^6 + 8$$ As $x \to \infty$, $y \to$ _____ As $x \to -\infty$, $y \to$ _____	14. Describe the end behaviors of the function: $$f(x) = \tfrac{1}{2}x^7 + 4x^4 - 8$$ As $x \to \infty$, $y \to$ _____ As $x \to -\infty$, $y \to$ _____
15. State the degree and the maximum number of turns in the function: $f(x) = x^4 + 2x^2 + 4$	16. State the degree and the maximum number of turns in the function: $f(x) = -3x^3 + x^2 - x + 5$

17. Use end-behavior, x and y-Intercepts, and multiplicity to sketch the polynomial. Label the scale on your x and y axis.

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

18. Use end-behavior, x and y-Intercepts, and multiplicity to sketch the polynomial. Label the scale on your x and y axis.

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

In 1–3, state the maximum number of turns in the graph of the function.

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

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

In 4–6, describe how the graph of g can be obtained from the graph of f.

4. $g(x) = (x-1)^4$
   $f(x) = x^4$

5. $g(x) = -x^5$
   $f(x) = x^5$

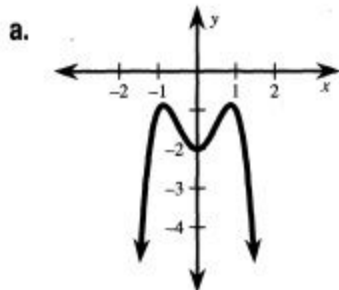In 7–12, describe the left and right behaviors of the graph.

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

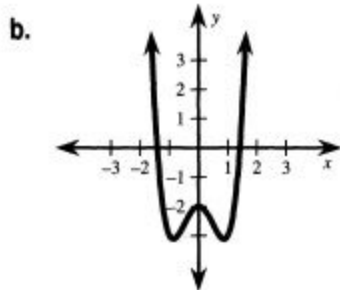8. $f(x) = x^4 + x^3 - 2x$

10. $f(x) = 0.5x^6 + 8$

11. $f(x) = -4x^8 + x^5 - 2x + 7$

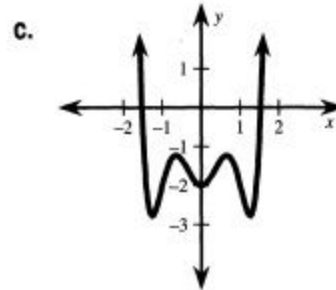In 13–15, match the function with its graph.

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

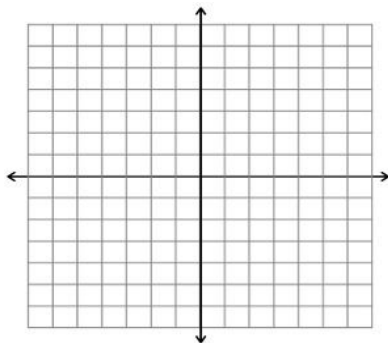**14.** $f(x) = 2x^6 - 6x^4 + 4x^2 - 2$
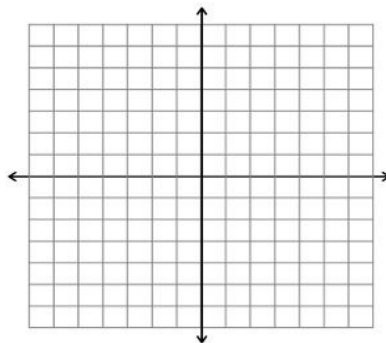
15. $f(x) = -2x^4 + 3x^2 - 2$

a.

b.

c.

In 16–21, sketch the graph of the polynomial function.
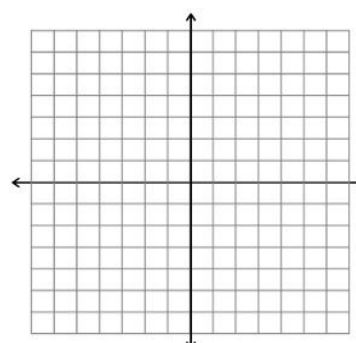
16. $f(x) = x^5 - 2$

17. $f(x) = (x + 3)^4$
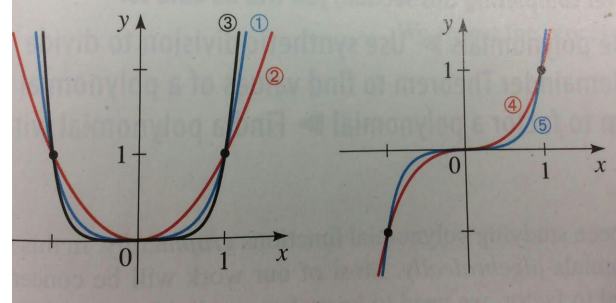
18. $f(x) = -x^3 + 5$

33. Domain: $f(x) = \dfrac{\sqrt{9-5x}}{25x + 10x^2}$	34 Portions of the graphs of $y = x^2$, $y = x^3$, $y = x^4$, $y = x^5$, and $y = x^6$ are plotted in the figures. Determine which function belongs to each graph.
35. Find the vertex, vertex form(standard form), x-intercepts and y-Intercepts of the following, then graph. $f(x) = -3x^2 - 12x + 36$	