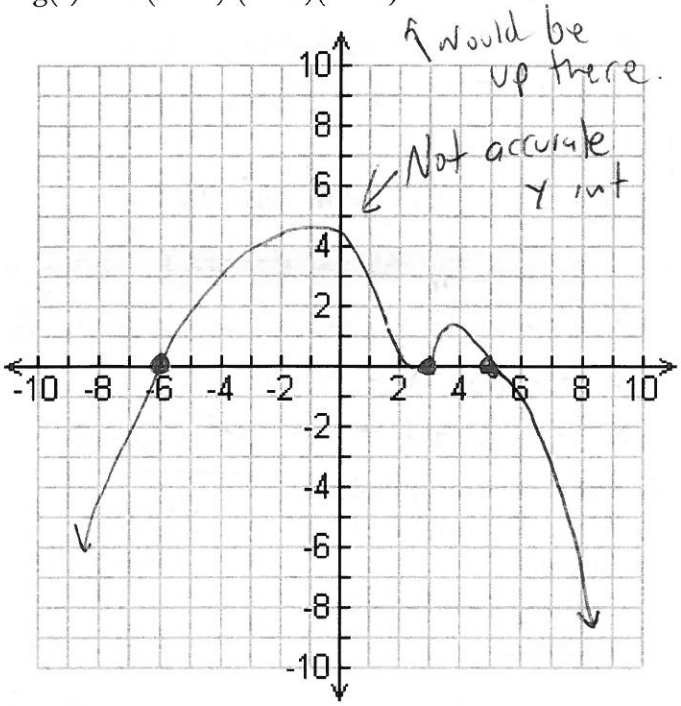
Name:_____Period:_____ Date:_____

3.2 Practice Problems

Without a calculator, sketch a graph given the function. Below each graph, describe the end behavior.

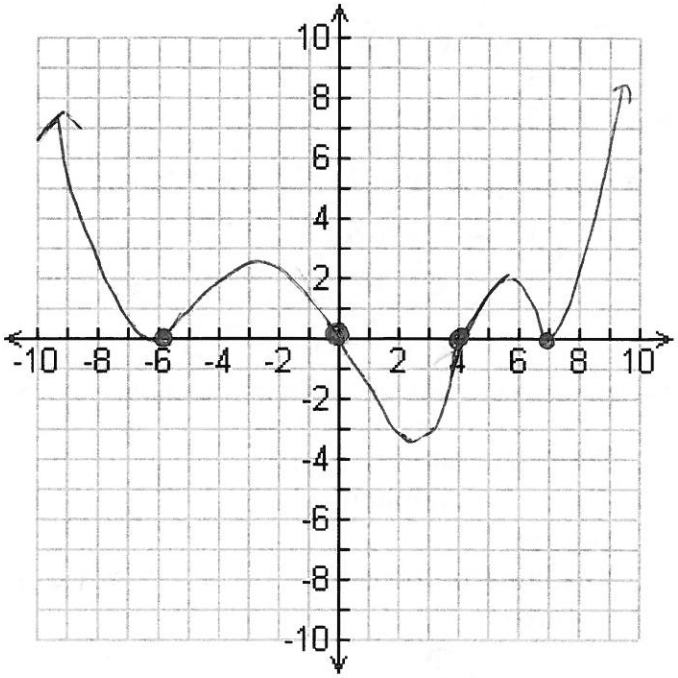
1. $g(x) = -3(x-3)^2(x-5)(x+6)^3$



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

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

2. $f(x) = 5x(x-4)(x+6)^6(x-7)^2$



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

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

Without a calculator, find the solutions of the function. Also, describe the end behavior of each function.

3. $h(x) = 3x^5 - 12x^4 - 75x^3 + 300x^2$

$3x^2(x^3 - 4x^2 - 25x + 100)$

$3x^2(x^2(x-4) - 25(x-4))$

$3x^2(x-5)(x+5)(x-4)$

$x = 0, 0, 5, -5, 4$

4. $n(x) = 5x^4 - 5x$

$5x(x^3 - 1)$

$5x(x-1)(x^2+x+1)$

$x = 0, 1, \frac{-1 \pm i\sqrt{3}}{2}$

$1 - 4(1)(1)$
-3

Not x-ints

5. $p(x) = -10x^2 - 26x + 12$

$-2(5x^2 + 13x - 6)$

$-2(5x^2 + 15x - 2x - 6)$

$-2(5x(x+3) - 2(x+3))$

$-2(5x-2)(x+3)$

$x = 2/5, -3$

6. $a(x) = 8x^5 - 6x^2 + 12x^3 - 9$

$2x^2(4x^3 - 3) + 3(4x^3 - 3)$

$(2x^2+3)(4x^3-3)$

Just know how to get to here

$(\sqrt[3]{4}x - \sqrt[3]{3})(4^{2/3}x^2 + \sqrt[3]{12}x + 3^{2/3})$

$x = \pm\sqrt{\frac{3}{2}}$;

Find a polynomial function of least degree in standard (expanded) form with the given zeros.

7. x = 3, -2/5, 0, 0

$x^2(x-3)(5x+2)$

$x^2(5x^2+2x-15x-6)$

$5x^4-13x^3-6x^2$

8. x = $\sqrt{7}, -\sqrt{7}, 2, 3$

$(x-\sqrt{7})(x+\sqrt{7})$

$(x^2-7)(x-2)(x-3)$

$(x^2-7)(x^2-5x+6)$

$x^4-5x^3+6x^2-7x^2+35x-42$

$x^4-5x^3-x^2+35x-42$

9. x = $2i\sqrt{3}, -2i\sqrt{3}, 3$

$(x-2i\sqrt{3})(x+2i\sqrt{3})(x-3)$

$(x^2-4i^2(3))(x-3)$

$(x^2+12)(x-3)$

$x^3-3x^2+12x-36$

10. x = $1 + i\sqrt{5}$

$(x-(1+i\sqrt{5}))(x-(1-i\sqrt{5}))$

$x^2-x(1-i\sqrt{5})-x(1+i\sqrt{5})+(1+i\sqrt{5})(1-i\sqrt{5})$

$x^2-x+\cancel{xi\sqrt{5}}-x-\cancel{xi\sqrt{5}}+1-i^2 5$

$x^2-2x+1+5 = x^2-2x+6$

Check:

$\frac{2 \pm \sqrt{4-4(6)}}{2}$

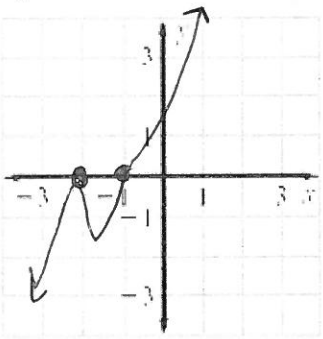
$1 \pm \frac{\sqrt{-20}}{2}$

$1 \pm \frac{2i\sqrt{5}}{2}$

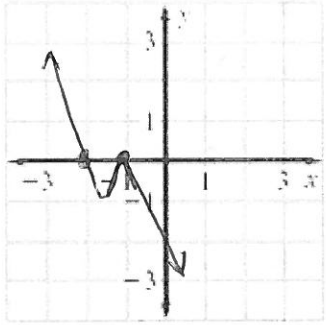
$1 \pm i\sqrt{5}$

Sketch the graph with the given information.

11. Zero: -2, multiplicity: 2
Zero: -1, multiplicity: 1
Degree: 3
Leading Coefficient: positive



12. Zero: -1, multiplicity: 2
Zero: -2, multiplicity: 1
Degree: 3
Leading Coefficient: negative



Without a calculator, use the intermediate value theorem to approximate the zeros of each function.

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

x	y
1	2
0	-2

zero on interval $0<x<1$

14. $b(x) = 5 - x^2 + 2x$

x	y
1	6
2	5
3	2
4	-3

Zero on interval $\boxed{3<x<4}$

True or False

15. A 10th degree polynomial can have 3 zeros. Truth

16. A cubic polynomial can have 3 turning points. Nah

must be n-1 turning points

17. If f(x) has a zero at x = -3 then f(x + 4) must have a zero at x = 1. Most Definitely

18. If g(x) has a relative min on the interval -2<x<-1 then –g(x) must have a relative max on the interval -2<x<-1.

See answer for 17.