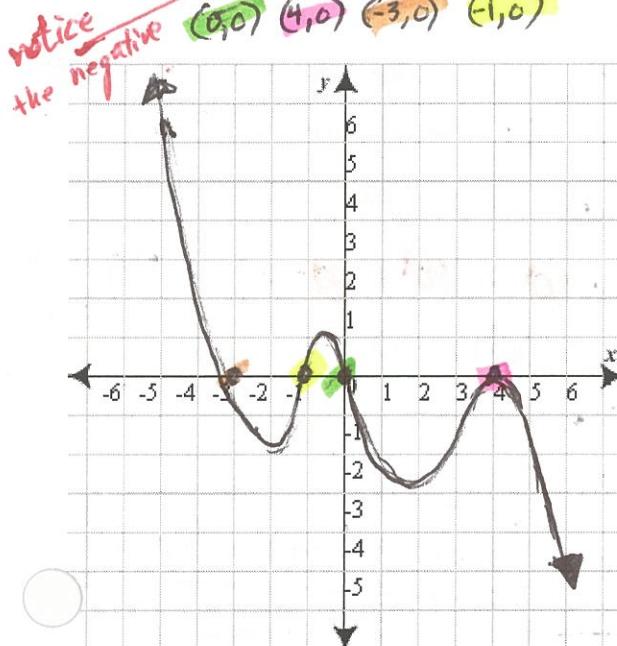


Chapter 8 Assessment. Complete these problems. Show all work.

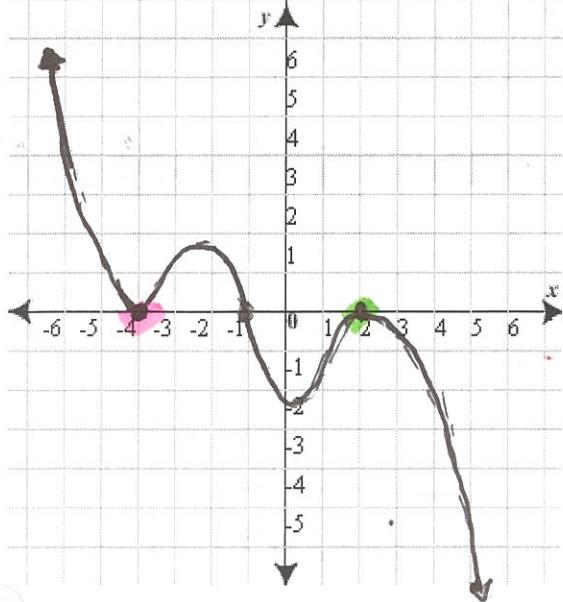
For each of the following functions, sketch the graph of the polynomial, also state the degree of the polynomial:

*double root; the graph will bounce here*

1.  $f(x) = -x(x-4)^2(x+3)(x+1)$  degree: 5

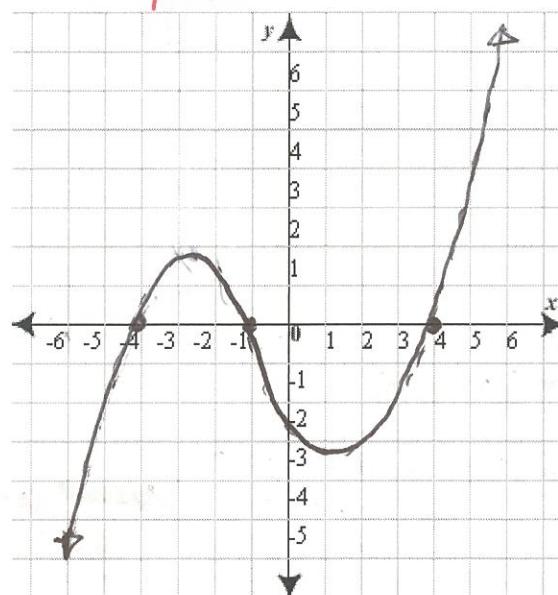


3.  $h(x) = -(x+4)^2(x+1)(x-2)^2$  degree: 5



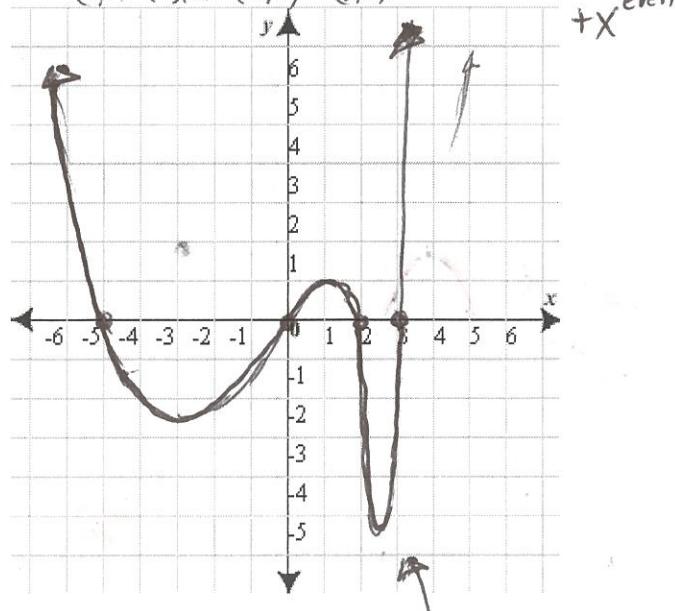
2.  $g(x) = (x+4)(x+1)(x-4)$

*notice positive* (4,0) (-1,0) (4,0) degree: 3  $+x^{\text{odd}}$



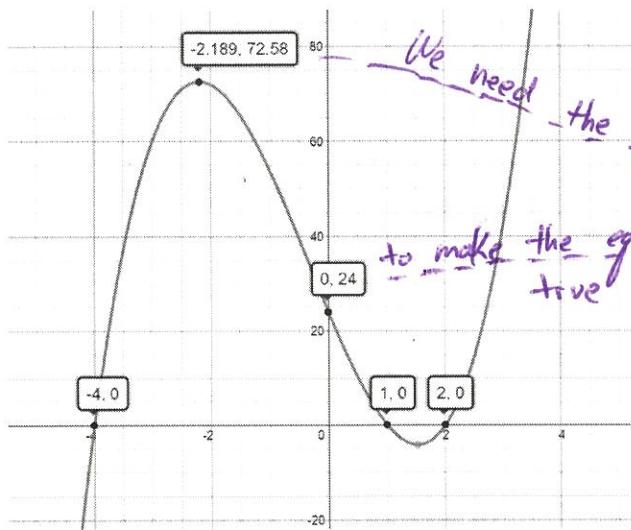
4.  $j(x) = x(x+5)(x-2)(x-3)$

(0,0) (-5,0) (2,0) (3,0) degree: 4



I just made this  
down for a  
Sun sketch

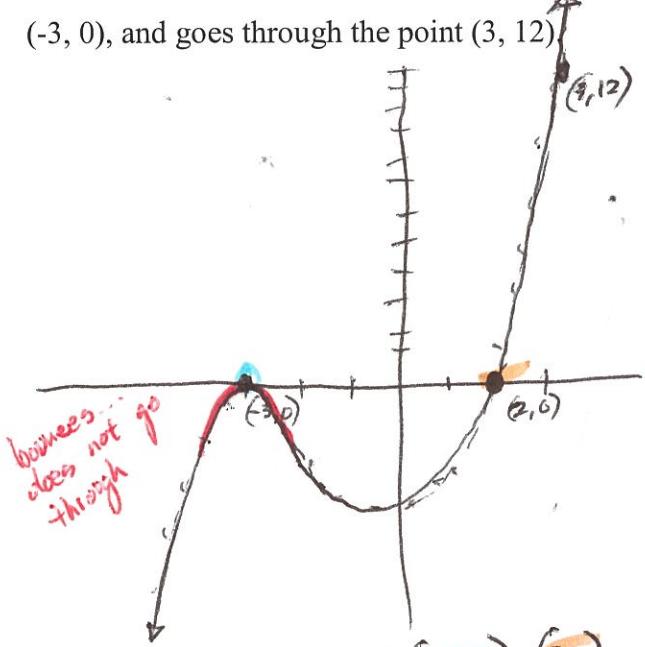
5.) Given the graph, write an accurate equation of the graph



what are the roots? Root = x-intercepts  
 $(-4, 0)$   $(0, 0)$   $(2, 0)$

↳ what are the factors of the equation?  $(x+4)$   $(x-1)$   $(x-2)$

6.) Write a polynomial equation for a function with a graph that bounces off the x-axis at  $(2, 0)$ , crosses it at  $(-3, 0)$ , and goes through the point  $(3, 12)$



what are the roots?  $(-3, 0)$   $(2, 0)$

↳ what are the factors

$$(x+3)^2 \quad (x-2)$$

↳ this one bounces... double root... squared

$\Rightarrow f(x) = (x+4)(x-1)(x-2)$

An accurate graph means ...

$\Rightarrow f(-2.18) = 72.58$

or

$\Rightarrow f(0) = 24$  ... to make it accurate solve for the stretch factor

$f(x) = a(x+4)(x-1)(x-2)$

$24 = a(0+4)(0-1)(0-2)$

$24 = a(4)(-1)(-2)$

$24 = 8a$

$3 = a$

accurate:  $f(x) = 3(x+4)(x-1)(x-2)$

Plug in for x and  $f(x)$ .

Solve for a

\* I messed this up so I changed the problem.

inaccurate

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

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

$12 = a(3+3)^2(3-2)$

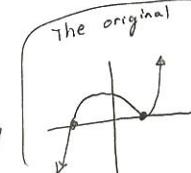
$12 = a \cdot 36$

$\frac{1}{3} = a$

$f(x) = \frac{1}{3}(x+3)^2(x-2)$

the only point we have is  $f(3, 12)$

Use a point (not a x-int) to solve for a.



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

$12 = a(3+3)(3-2)^2$

$12 = 36a$

$2 = a$

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

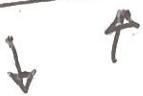
- 7.) Investigate  $f(x) = (x - 3)^2(x + 4)^3$ . Make sure to discuss important points, interesting features of the graph, include a table and scale your graph to make it accurate.

Degre: 5

usually  $\rightarrow$  4 bumps/squiggles

x-ints:  $(3, 0)$   $\leftarrow$  double root  $(x-3)^2$   
 $(-4, 0)$   $\leftarrow$  triple root  $(x+4)^3$

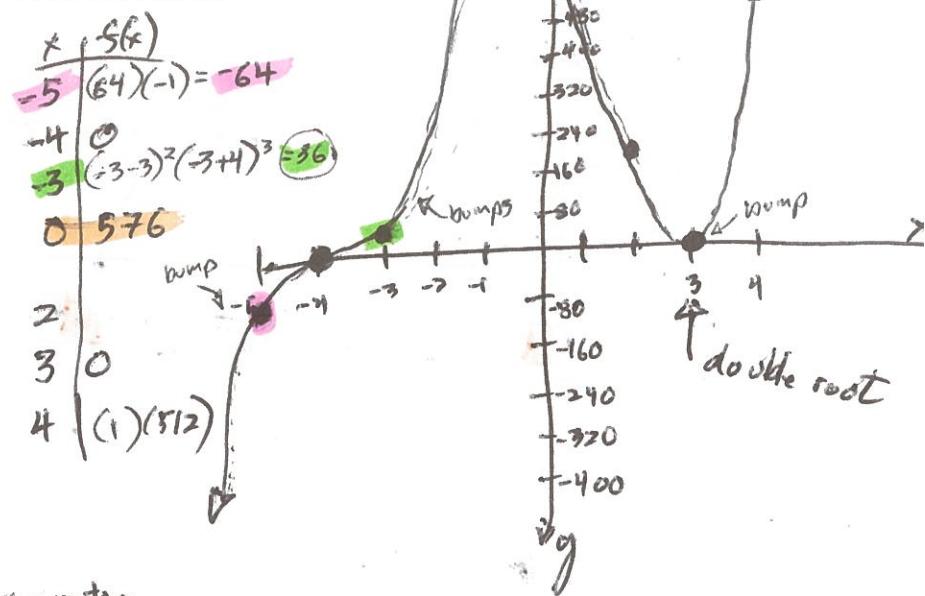
End-behavior



y-int ( $x=0$ ):  $f(0) = (0-3)^2(0+4)^3$   
 $= (9)(64)$

$$\begin{array}{r} \overset{3}{6} \\ \times \overset{3}{6} \\ \hline \overset{3}{5} \overset{3}{6} \end{array}$$

no symmetry  
neither even nor odd



- 8.) Simplify each expression.

a.)  $(6 + 3i) + (8 - i)$

$$\boxed{14+2i}$$

b.)  $(9 + 7i)^2$

$$(9+7i)(9+7i)$$

$$81 + 63i + 63i + 49i^2$$

$$81 - 49 + 126i$$

$$\boxed{32 + 126i}$$

c.)  $(11 + i)(11 - i)$

$$121 + 11i - 11i - i^2$$

$$\boxed{122}$$

d.)  $(7i)(2i)^3$

$$(7i)(8i^3)$$

$$56i^4$$

$$\boxed{56}$$

f.)  $i^{64}$

$$\boxed{1}$$

g.)  $i^{13}$

$$i^{12} \cdot i = \boxed{i}$$

9.) Solve  $f(x) = x^2 + 5x + 8$ .

$$ax^2 + bx + c \\ a=1 \quad b=5 \quad c=8$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(1)(8)}}{2(1)}$$

$$x = \frac{-5 \pm \sqrt{25 - 32}}{2}$$

$$x = \frac{-5 \pm \sqrt{-7}}{2}$$

rewrite  $\sqrt{-1}$  as  $i$

$$x = \frac{-5 \pm i\sqrt{7}}{2}$$

Remember  $(-1) = i^2 \quad \sqrt{i^2} = i \quad \sqrt{-1} = i$

10.) Given that a quadratic function has the complex roots  $x = 3 \pm 2i$ . What is the equation of the function in standard form?

$$\rightarrow ax^2 + bx + c = f(x)$$

4  
two roots  
 $3+2i$  and  $3-2i$

sum

$$(3+2i) + (3-2i)$$

6

product

$$(3+2i)(3-2i)$$

$$9 + 6i - 6i - 4i^2$$

$$9 - 4(-1)$$

$$9 + 4 \\ 13$$

opposite  
of "b"

"c"

$$f(x) = x^2 - 6x + 13$$

11.) Graph the following complex numbers:

a.)  $3 + 5i$

b.)  $-8i$

c.)  $-4 - 6i$

d.)  $0$

e.)  $-2 + 8i$

f.)  $-6$

g.)  $5i$

h.)  $5 - 7i$

