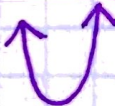
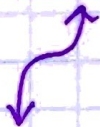
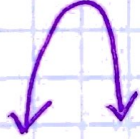

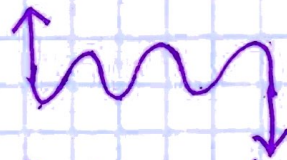


	EVEN DEGREE	ODD DEGREE
Positive LC	$y = x^2$  right $x \rightarrow \infty$ $y \rightarrow \infty$ left $x \rightarrow -\infty$ $y \rightarrow \infty$	$y = x^3$  right $x \rightarrow \infty$ $y \rightarrow \infty$ $x \rightarrow -\infty$ $y \rightarrow -\infty$
Negative LC	$y = -x^2$  right $x \rightarrow \infty$ $y \rightarrow -\infty$ $x \rightarrow -\infty$ $y \rightarrow -\infty$	$y = -x^3$  right $x \rightarrow \infty$ $y \rightarrow -\infty$ $x \rightarrow -\infty$ $y \rightarrow \infty$

$$y = -3x^{\textcircled{7}} + 6x^2 + 4$$

  
 #extrema / turns = Degree - 1

## 4.7 Solving Polynomials

Solve - identify multiple roots.

$$\textcircled{1} (x+2)(x^2-4) = 0$$

$$(x+2)(x+2)(x-2) = 0$$

$$x+2=0$$

$$x = -2$$

$$x-2=0$$

$$x = 2$$

double  $\rightarrow$  BOUNCE!  
root

\* degree =

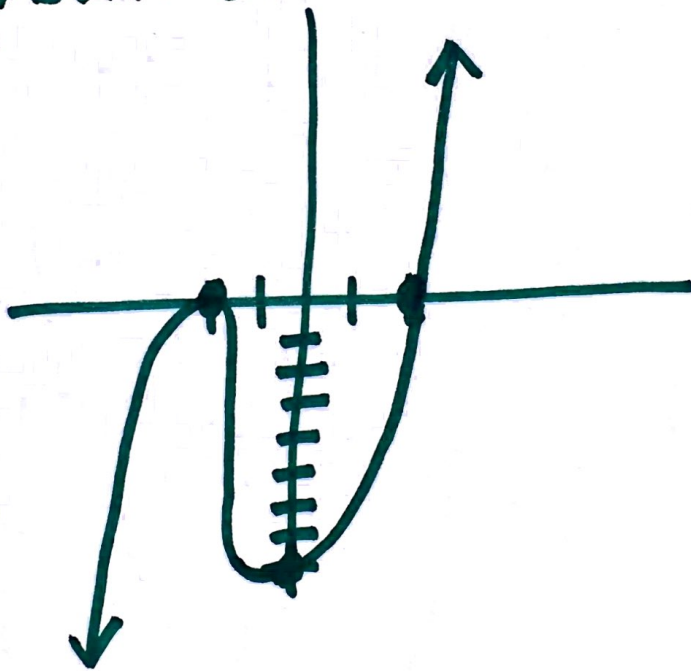
3

$\downarrow$

3 roots!

+ LC

y-intercept  
(0, -8)



$$x^2(x^4 + 16) = 8x^4$$

$$x^6 + 16x^2 - 8x^4 = 0$$

$$x^6 - 8x^4 + 16x^2 = 0$$

FACTOR -  
GCF

$$x^2(x^4 - 8x^2 + 16) = 0$$

$$x^2(x^2 - 4)(x^2 - 4) = 0$$

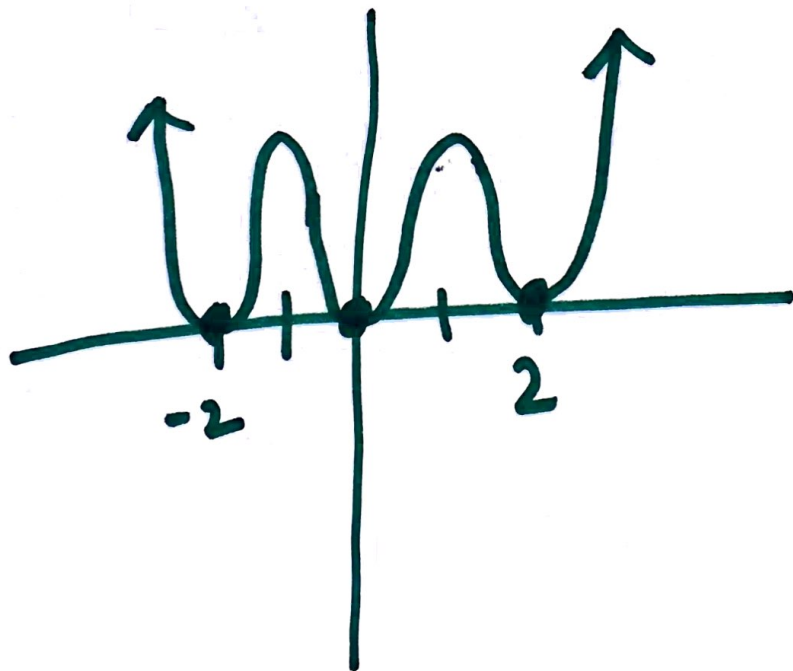
$$x^2(x+2)^2(x-2)^2 = 0$$

$x = 0$   
double  
root

$x = -2$   
double  
root

$x = 2$   
double  
root

y-int. (0,0)



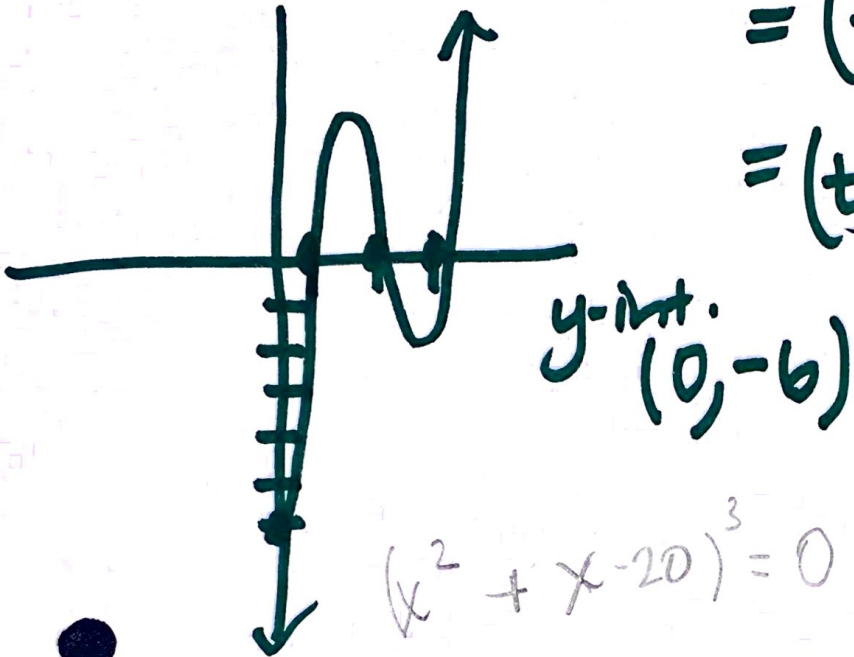
$$(t-2)^3 - (t-2) = 0 \quad a = t-2$$

$$a^3 - a = 0 = a(a^2 - 1) = a(a+1)(a-1)$$

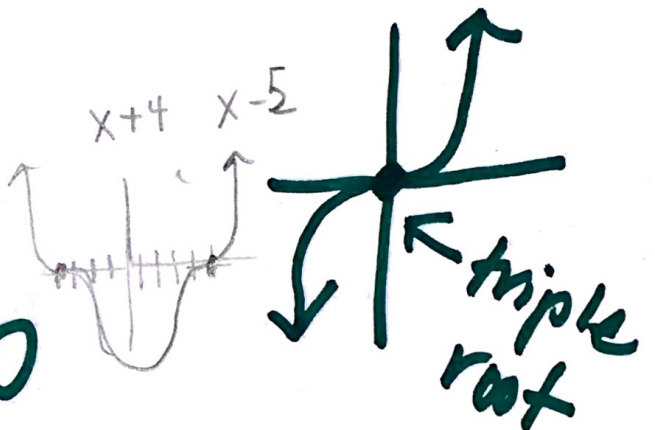
$$= (t-2)(t-2+1)(t-2-1)$$

$$= (t-2)(t-1)(t-3) = 0$$

$$t = 1, 2, 3$$



$$(x^2 + x - 20)^3 = 0$$



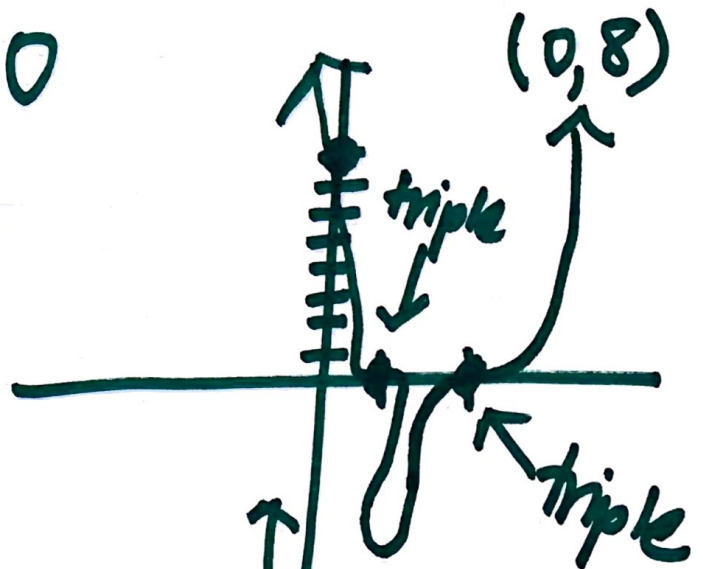
$$\textcircled{4} (x^2 - 3x + 2)^3 = 0$$

$$[(x-2)(x-1)]^3 = 0$$

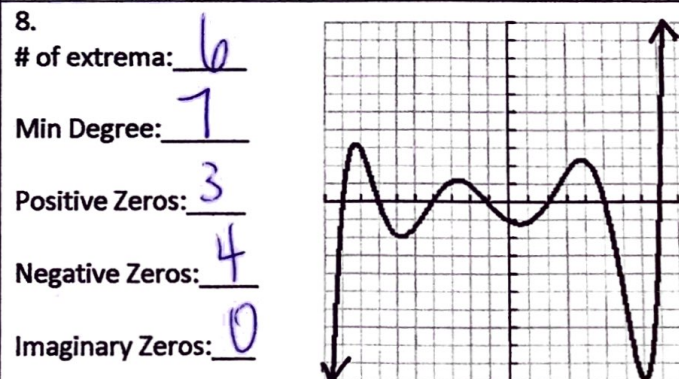
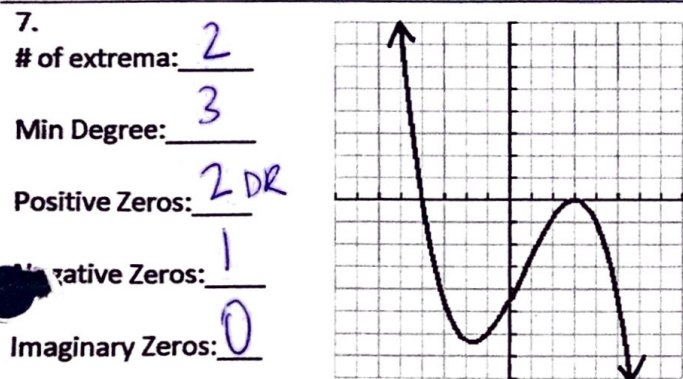
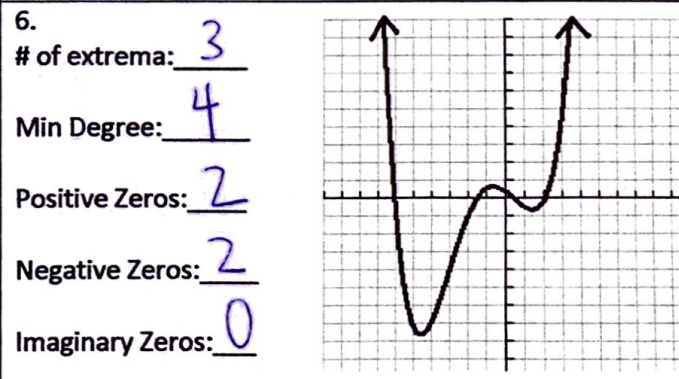
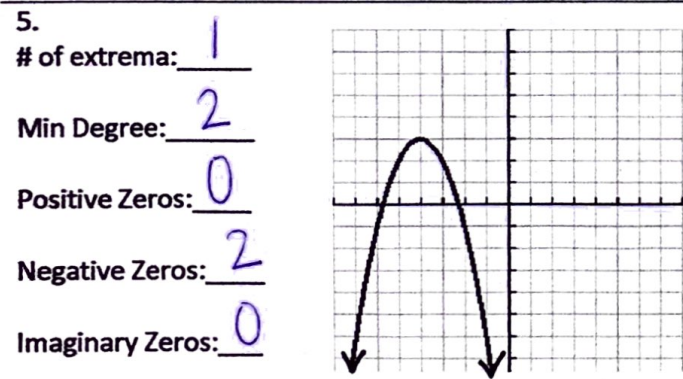
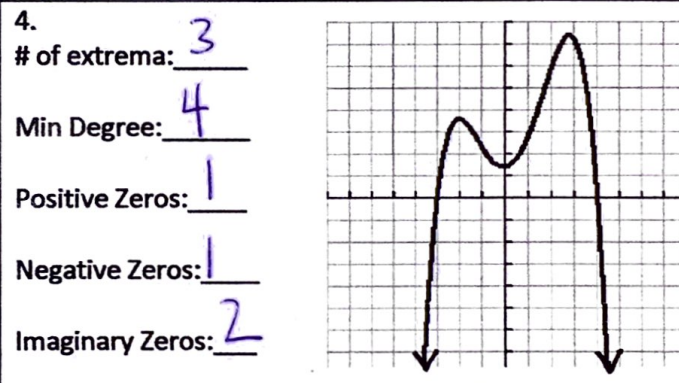
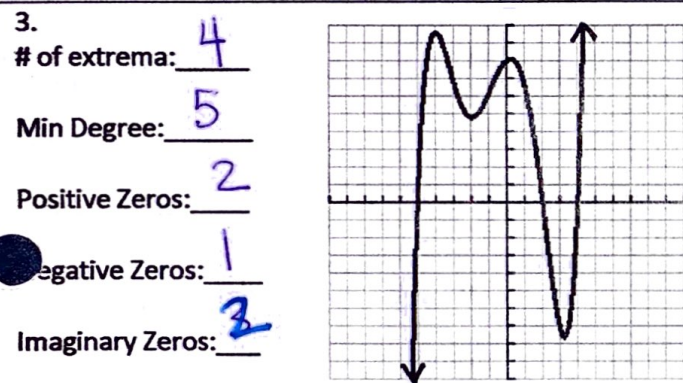
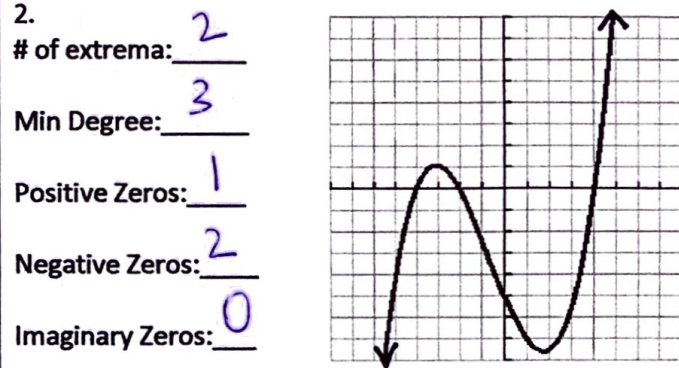
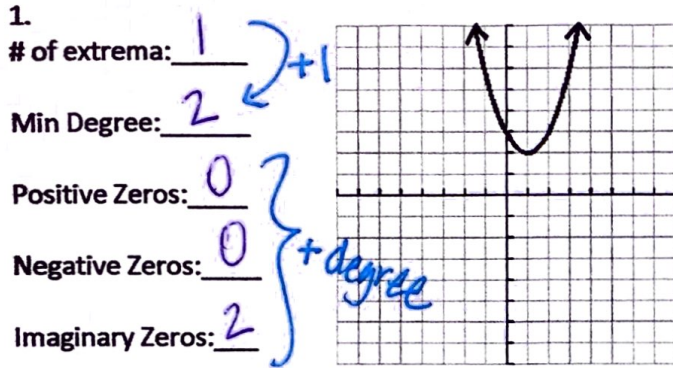
$$(x-2)^3 (x-1)^3 = 0$$

$x=2$   
triple  
root

$x=1$   
triple  
root



9.2: Graphs of Polynomial Functions



For each of the following, state the # of extrema and the right and left end behaviors.

9)  $f(x) = -2x^4 + 3x^7 - 5$  degree 7

# of extrema 6

R  $x \rightarrow \infty$ ,  $y \rightarrow +\infty$

Why?

positive LC

L  $x \rightarrow -\infty$ ,  $y \rightarrow -\infty$

Why?

odd degree - opposite of R

10)  $f(x) = 3x^5 - x^8 - 1$

# of extrema 7

$x \rightarrow \infty$ ,  $y \rightarrow -\infty$

Why?

negative LC

$x \rightarrow -\infty$ ,  $y \rightarrow -\infty$

Why?

even degree - same as R

11)  $f(x) = -5x^3 + 2x^2 + 9$

# of extrema 2

$x \rightarrow \infty$ ,  $y \rightarrow -\infty$

Why?

negative LC

$x \rightarrow -\infty$ ,  $y \rightarrow \infty$

Why?

odd degree - opposite of R

12)  $f(x) = x^4 + x^2 + 2$

# of extrema 3

$x \rightarrow \infty$ ,  $y \rightarrow \infty$

Why?

positive LC

$x \rightarrow -\infty$ ,  $y \rightarrow \infty$

Why?

even degree - same as R