Kuta Software - Infinite Algebra 2 T5-3 Name Key

Graphing Polynomial Functions: Basic Shape

Date _____ Period ____

Describe the end behavior of each function.

1) $f(x) = x^3 - 4x^2 + 7$

ODD +

as $x \to \infty$ $y \to \infty$
as $x \to -\infty$ $y \to -\infty$

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

3) $f(x) = x^3 - 9x^2 + 24x - 15$

ODD +

as $x \to \infty$ $y \to \infty$
as $x \to -\infty$ $y \to \infty$

4) $f(x) = x^2 - 6x + 11$

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

ODD +
as $x \to \infty$ $y \to \infty$
as $x \to -\infty$ $y \to -\infty$

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

EVEN −
As $x \to \infty$ $y \to -\infty$
As $x \to -\infty$ $y \to -\infty$

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

EVEN +
as $x \to \infty$ $y \to \infty$
as $x \to -\infty$ $y \to \infty$

8) $f(x) = x^2 - 8x + 18$

State the maximum number of turns the graph of each function could make.

9) $f(x) = x^5 - 4x^3 + 5x + 1$

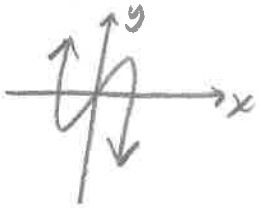
4 turns

10) $f(x) = -x^2 - 1$

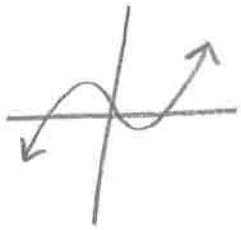
1 turn

Sketch the general shape of each function.

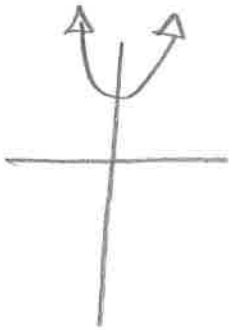
11) $f(x) = -x^2 - 6x - 7$



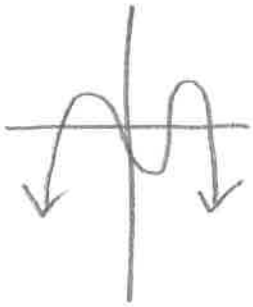
12) $f(x) = x^3 - 2x^2 + 1$



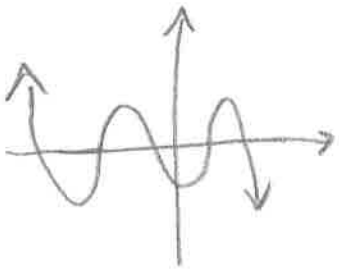
13) $f(x) = x^2 + 2$



14) $f(x) = -x^4 + 3x^3 - 2 - 5x$

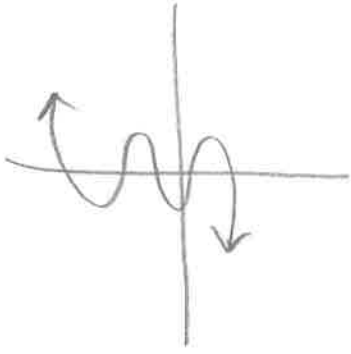


15) $f(x) = -x^5 + 4x^3 - x + 1$

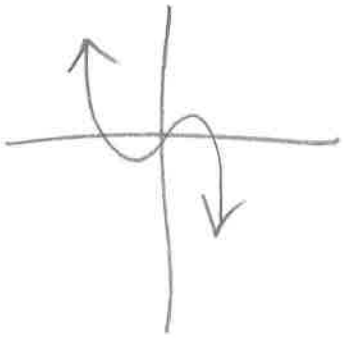


16) $f(x) = x^3 - 2x^2 - 3$

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



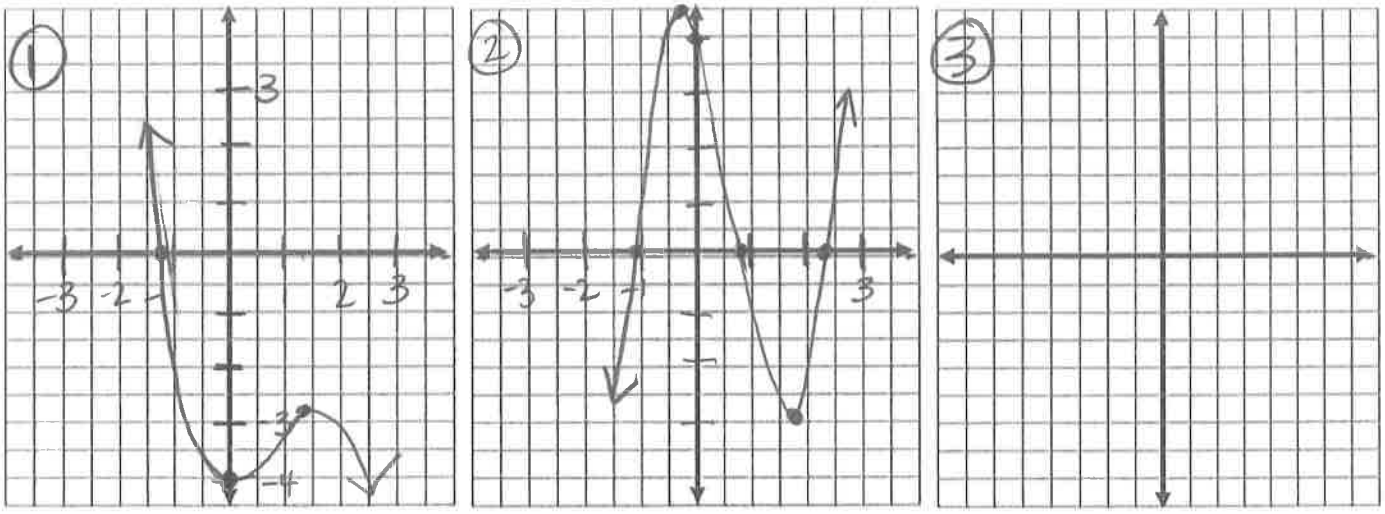
18) $f(x) = -x^3 + 10x^2 - 33x + 32$

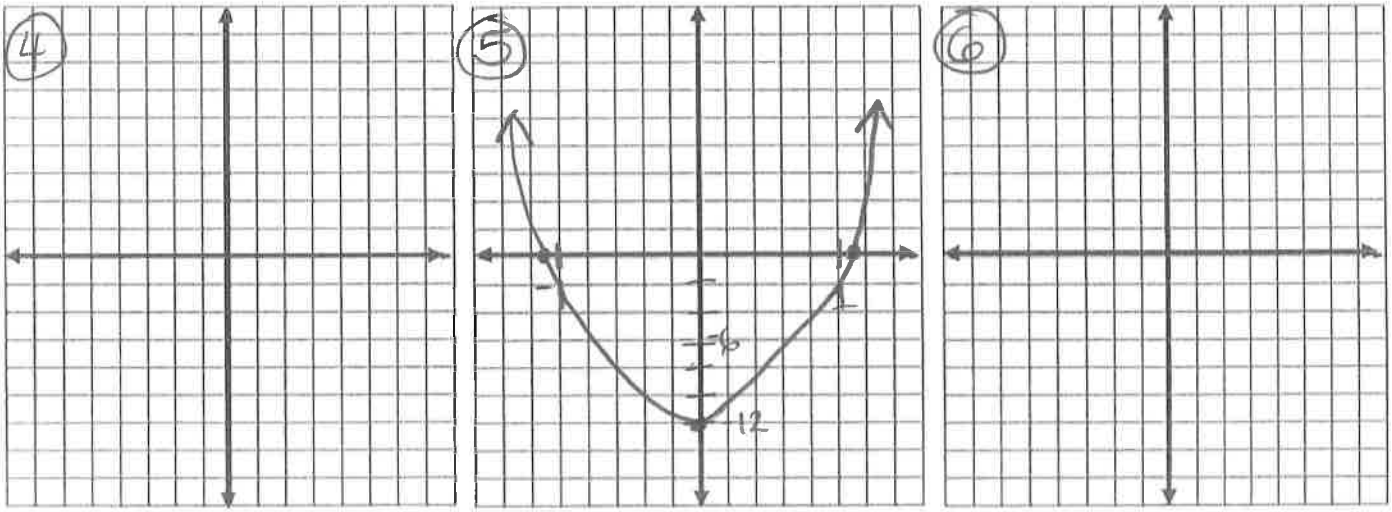


T 5.4 Analyzing Graphs of Polynomials

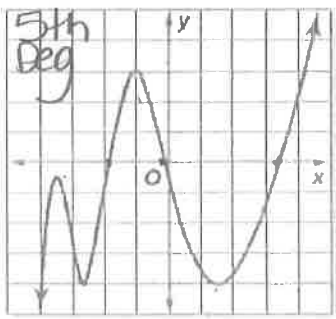
Using a calculator sketch the following functions. Determine and label all x-intercepts, y-intercepts, local and relative maximums and minimums.

1. $f(x) = -x^3 + 2x^2 - 4$
2. $f(x) = 2x^3 - 4x^2 - 3x + 4$
3. $f(x) = x^3 + 3x^2 - 6x - 6$
4. $f(x) = 2x^3 - 5x^2 + 3x + 1$
5. $f(x) = x^4 + 8x^2 - 12$
6. $f(x) = -2x^4 + 5x^3 - 4x^2 + 3x - 7$

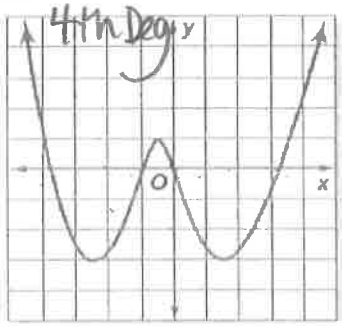




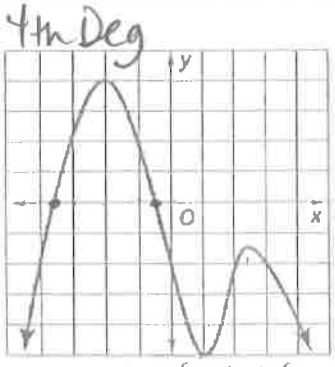
For the following estimate the every zero, y-intercept, local and relative minimums and minimums and determine the smallest possible degree of the function.



zeros: (-.1, 0) (2.9, 0) (3.2, 0)



zeros: (-3.8, 0) (-1, 0) (0, 0) (3.2, 0)



zeros: (3.4, 0) (-.5, 0)

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

zero $(-1.13, 0)$

min $(0, -4)$ also y-int

max $(1.33, -2.8)$

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

zero $(-1.08, 0)$

Max $(-.3, 4.5)$

zero $(.81, 0)$

Min $(1.6, -2.9)$

y-int $(0, 4)$

zero $(2.27, 0)$

5. $f(x) = x^4 + 8x^2 - 12$

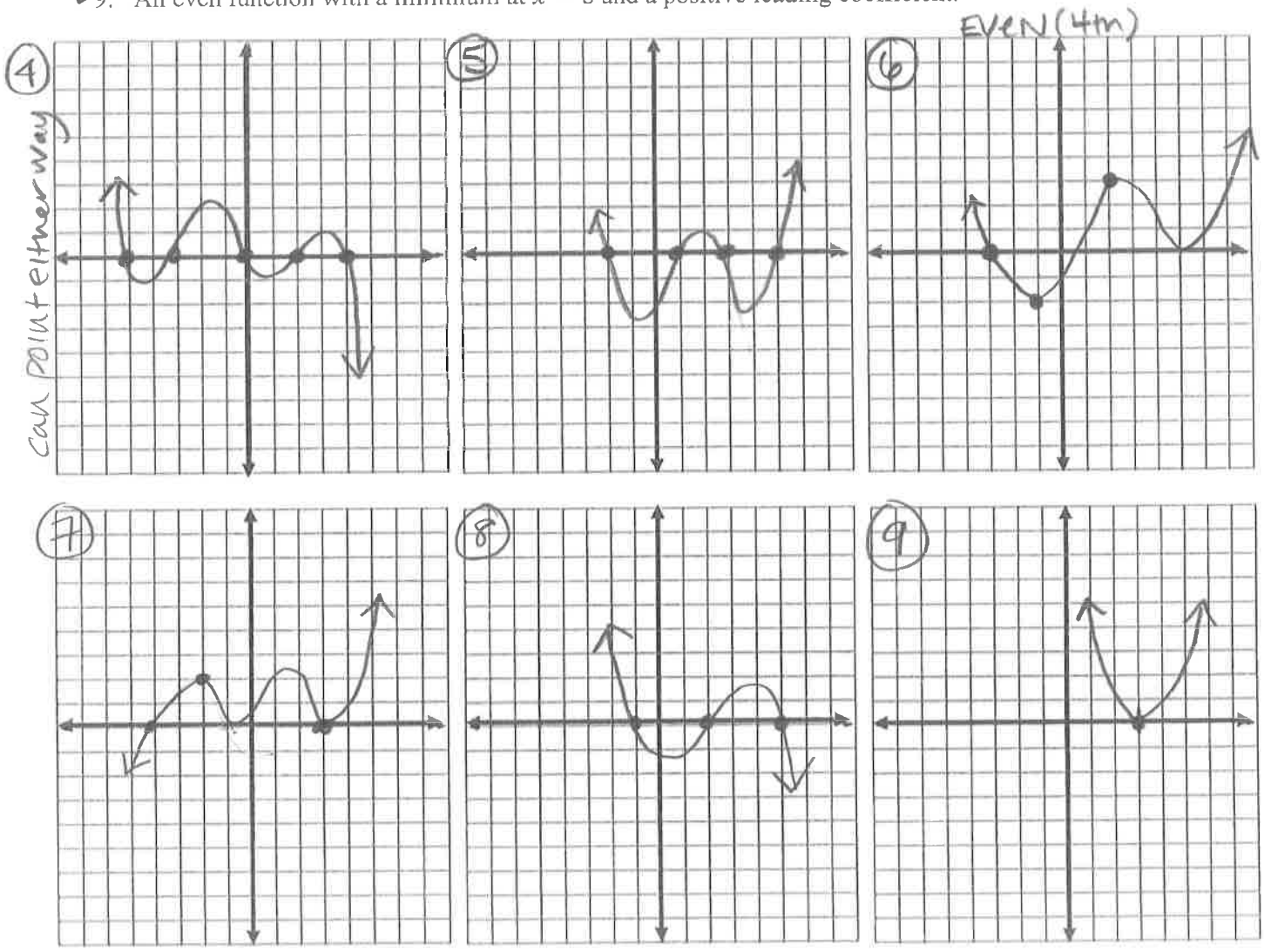
y-int $(0, -12)$

zero $(-1.13, 0)$

zero $(1.13, 0)$

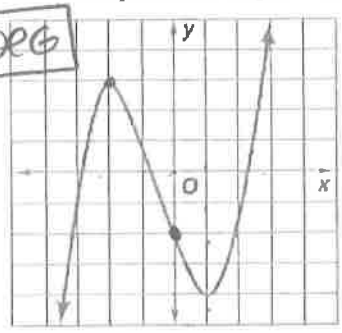
Sketch the graph of polynomial functions with the following characteristics.

✓4. An odd function with zeros at -5, -3, 0, 2 and 4.
✓5. An even function with zeros at -2, 1, 3 and 5.
✓6. A 4th-degree function with a zero at -3, maximum at $x = 2$, and minimum at $x = -1$.
✓7. A 5th-degree function with zeros at -4, -1, and 3, maximum at $x = -2$.
✓8. An odd function with zeros at -1, 2 and 5 and a negative leading coefficient.
✓9. An even function with a minimum at $x = 3$ and a positive leading coefficient.



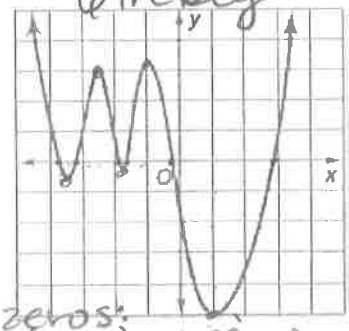
For the following estimate the every zero, y-intercept, local and relative minimums and minimums and determine the smallest possible degree of the function.

3rd DEG



(-.80,0) (0,-2) y-int
(-2.8,0) (-2,3) max
(2.2,0) (1,-4) min

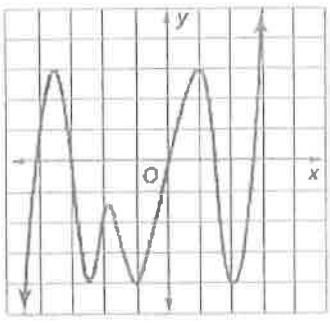
6th Deg



zeros:
(-.3,0) (-3.8,0)
(-1.7,0)
(-1.9,0)
(-3.2,0)

max:
(-2.5,3)
(-1, 3.2)

mins:
(-3.5,-.5)
(-1.8,-.2)
(1,-5)

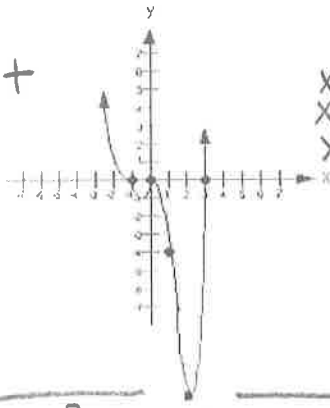


Algebra II
T5-5 Graphing Polynomials

Name:_____
Per:____ Date:_____

Identify the zeroes and y-intercept for each graph and then write the equation in factored form.

1.



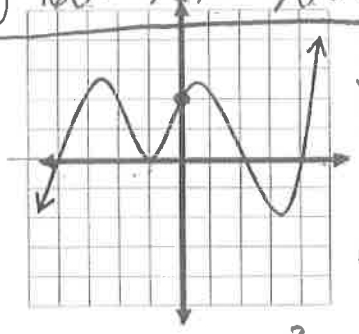
EVEN +

$x=-1$
$x=0$ (twice)
$x=3$

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

2. ODD +

$y=\frac{1}{16}(x+1)^2(x+4)(x-2)(x-4)$



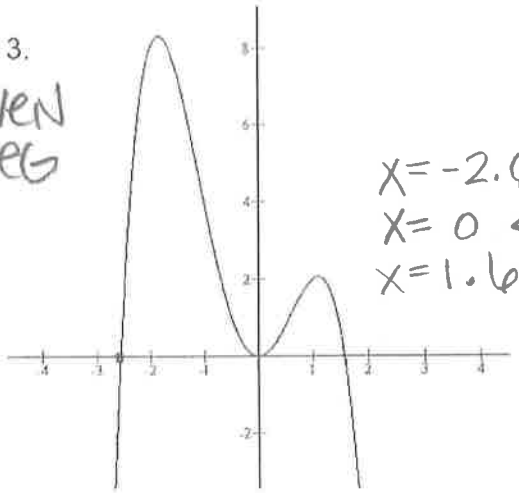
$x=-1$ (twice)
$x=-4$
$x=2$
$x=4$
(0,2) y-int

$y=a(x+1)^2(x+4)(x-2)(x-4)$

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

$\frac{2}{32}=\frac{a(32)}{32}$

3.

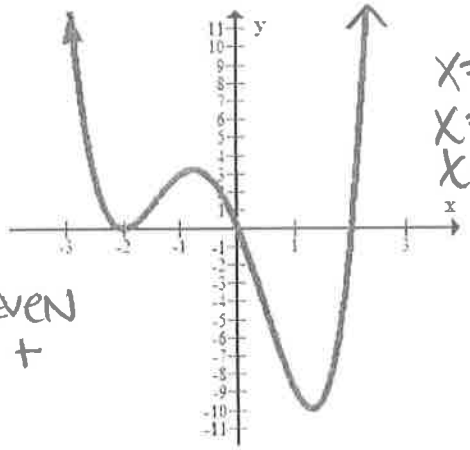


EVEN
NEG

$x=-2.6$
$x=0$ ← twice
$x=1.6$

$y=-x^2(x+2.6)(x-1.6)$

4.

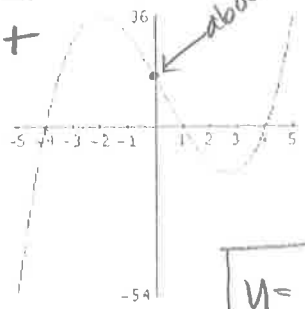


EVEN
+

$x=-2$, (twice)
$x=0$
$x=2$

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

5.



ODD +

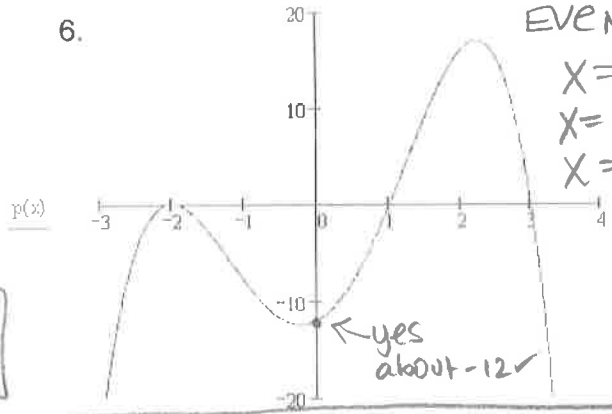
about 16

$x=-4$
$x=1$
$x=4$

$y=(x+4)(x-1)(x-4)$

verify y-int:
$y=(4)(-1)(-4)=16$
OK

6.



EVEN −

$x=-2$ twice
$x=1$
$x=3$

yes about −12 ✓

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

check y-int

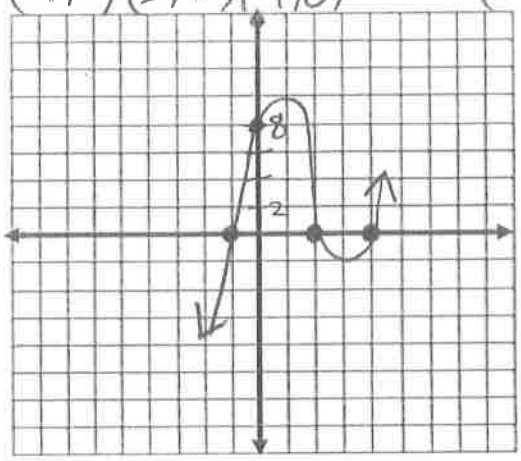
$y=-(2)^2(-1)(-3)=-4(-1)(-3)=-12$ ✓

For #6-10, identify the zeroes and y-intercept for each equation. Then sketch the graph of each function.

$-(3)(2)(-1)^2 = -6$

6. $f(x) = (x + 1)(x - 2)(x - 4)$

(-1,0) (2,0) (4,0) (0,8)

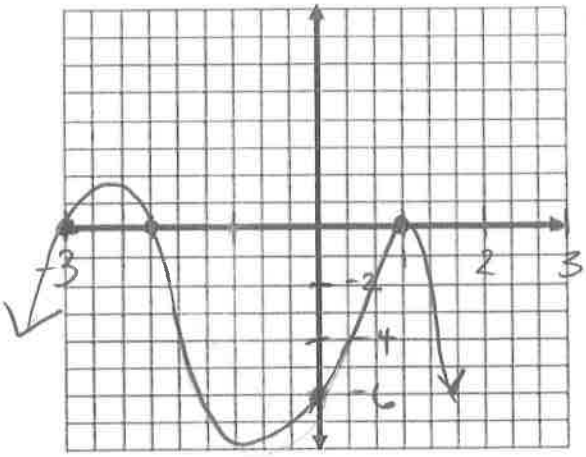


7. $f(x) = -(x + 3)(x + 2)(x - 1)^2$

zeros: (-3,0) (-2,0) (1,0) ← TURN

(0,-6)

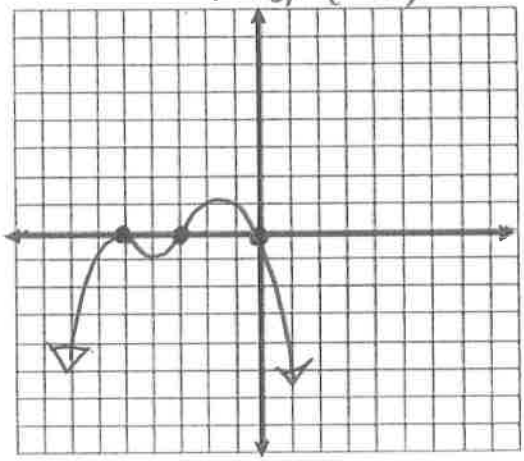
4TH EVEN −



squared!

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

$-X(X+5)^2(X+3)$ 4Th (NEG)

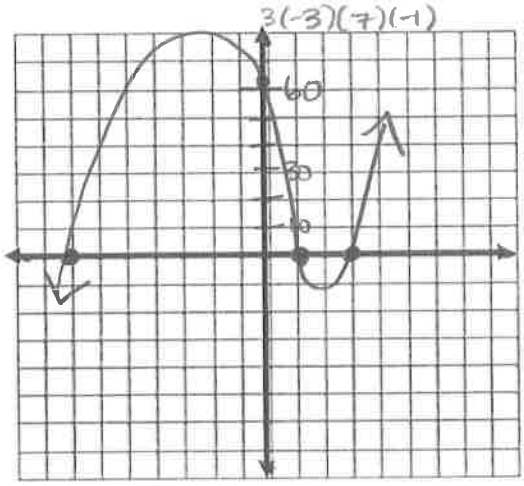


9. $f(x) = 3(x - 3)(x + 7)(x - 1)$

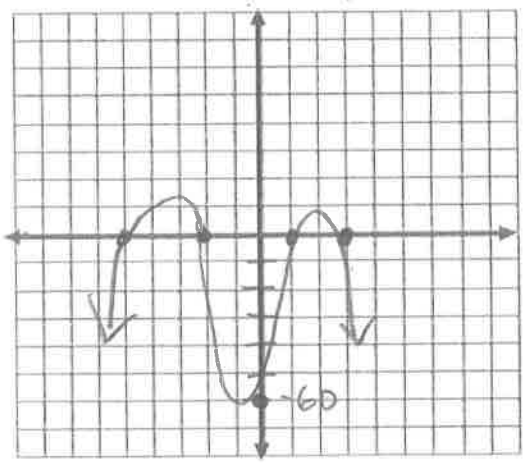
$3(-3)(7)(-1)$

ODD + 3rd

(0,63)



10. $f(x) = -2(x - 1)(x + 2)(x + 5)(x - 3)$



$y = -2(-1)(2)(5)(-3)$

$y = -60$

4th (neg