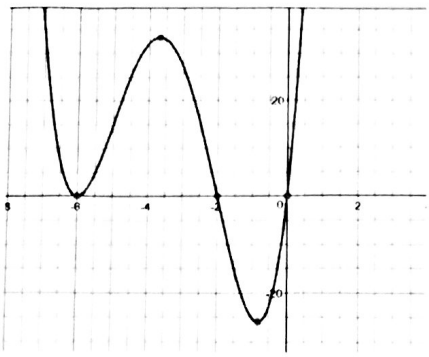
GSE Algebra 2 Support Name key

Review for Polynomials Test #3: Polynomial Graph Analysis Multiple Choice: **Refer to the graph at the right for #1 - 7.**



C 1. How many extrema does this function have?

A. 1 B. 2 C. 3 D. 4

D 2. What is the least possible degree of the function?

A. 1 B. 2 C. 3 D. 4

T 3. TRUE or FALSE

The domain is $(-\infty, \infty)$

F 4. TRUE or FALSE

The function has no extrema.

A 5. The leading coefficient of this function must be ___.

A. positive B. negative

C 6. Which best represents the range of the function? (hint: least to greatest)

A. $(-\infty, \infty)$ B. $[-6, 0]$ C. $[-24, +\infty)$ D. $(\infty, -24]$

D 7. Which statement is true regarding the end behavior of the function?

A. as x $\to +\infty$, $f(x) \to -\infty$

C. as x $\to +\infty$, f(x) $\to$ -∞

B. x as x $\to -\infty$, $f(x) \to -\infty$

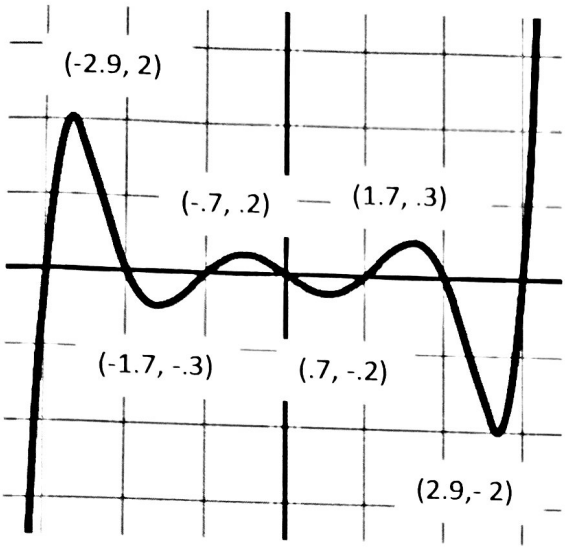
D. as x $\to$ -∞, f(x) $\to +\infty$

D 8. Which of the following is an *odd function*?

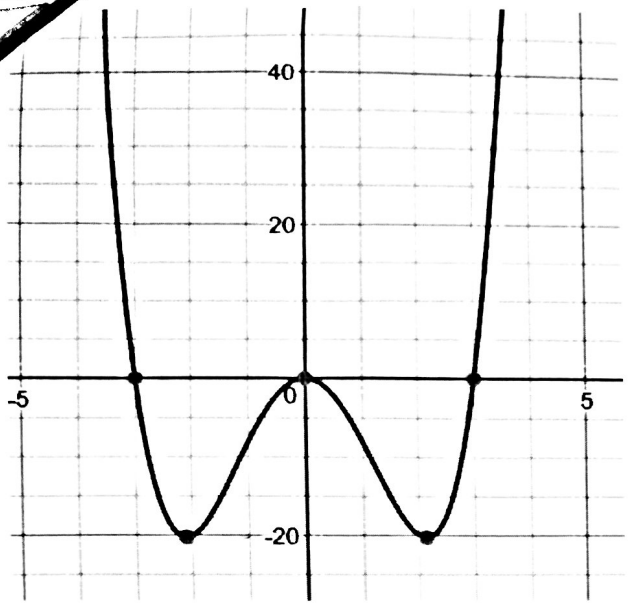
a. $f(x) = 19x^0$ b. $f(x) = x^7 + 17x^0$ c. $x^8 - 11x^6 - 2x^1$ d. $f(x) = 6x^5 - 8x^1$

Complete the graph analysis for each function.

9.

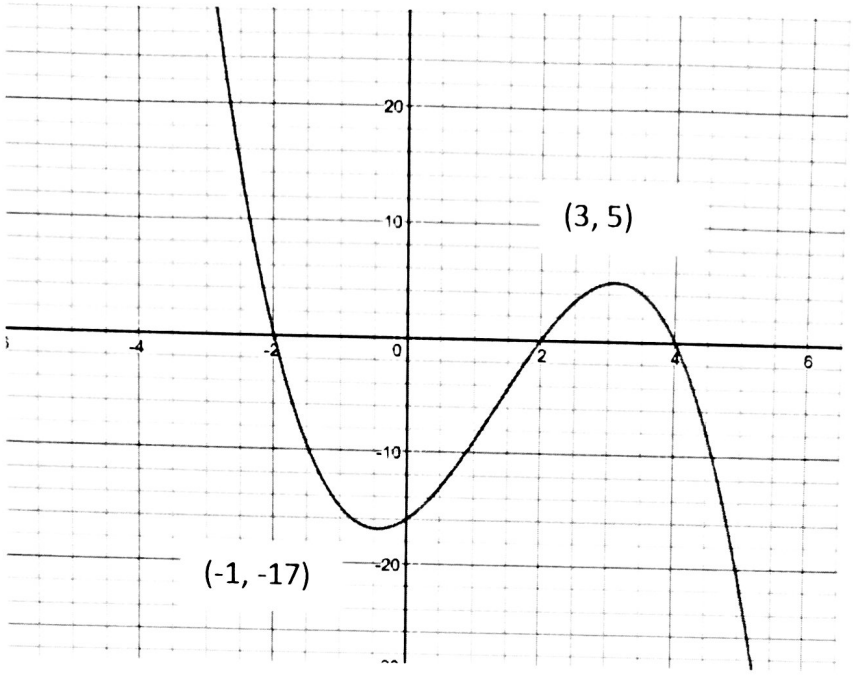


a. Domain	$(-\infty, \infty)$
b. Range	$(-\infty, \infty)$
c. Zeros	$-3, -2, -1, 0, 1, 2, 3$
d. y-intercept	$(0, 0)$
e. # extrema	6
f. least possible degree of the polynomial	7
g. Is there an absolute extrema?	NO
h. Interval(s) of Increase	$(-\infty, -2.9)$ $(-1.7, -.7)$ $(.7, 1.7)$ $(2.9, \infty)$
i. Interval(s) of Decrease	$(-2.9, -1.7)$ $(-.7, .7)$ $(1.7, 2.9)$
j. End behavior for both sides: as $x \to \infty$ $f(x) \to$ ∞ as $x \to -\infty$ $f(x) \to$ $-\infty$	

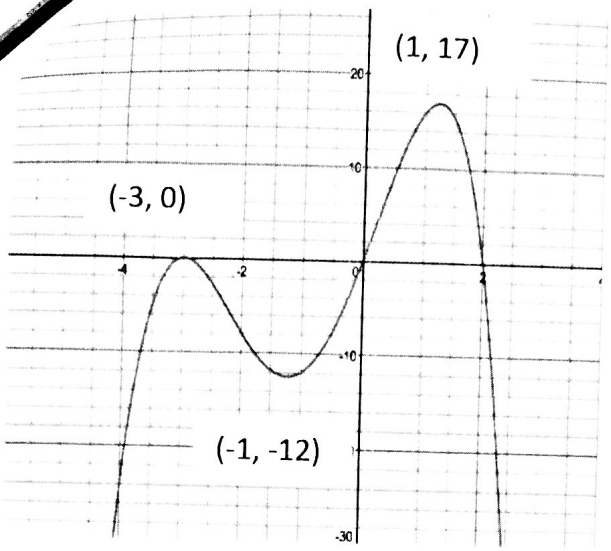


a. Domain	$(-\infty, \infty)$
b. Range	$[-20, \infty)$
c. Zeros	$-3, 0, 0, 3$
d. y-intercept	$(0, 0)$
e. # extrema	3
f. least possible degree of the polynomial	4
g. Is there an absolute extrema?	yes
h. Interval(s) of Increase	$(-2, 0)$ $(2, \infty)$
i. Interval(s) of Decrease	$(-\infty, -2)$ $(0, 2)$
j. End behavior for both sides: as $x \to \infty$ $f(x) \to$ ∞ as $x \to -\infty$ $f(x) \to$ ∞	

11.



a. Domain	$(-\infty, \infty)$
b. Range	$(-\infty, \infty)$
c. Zeros	$-2, 2, 4$
d. y-intercept	$(0, -16)$
e. # extrema	2
f. least possible degree of the polynomial	3
g. Is there an absolute extrema?	NO
h. Interval(s) of Increase	$(-1, 3)$
i. Interval(s) of Decrease	$(-\infty, -1)$ $(3, \infty)$
j. End behavior for both sides: as $x \to \infty$ $f(x) \to$ $-\infty$ as $x \to -\infty$ $f(x) \to$ ∞	



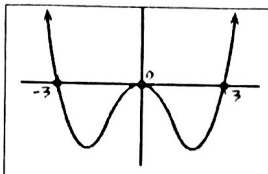
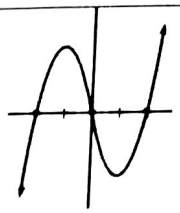
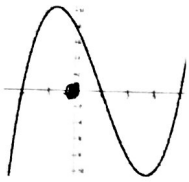
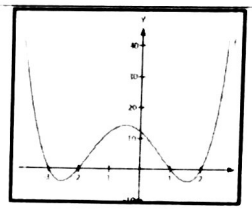
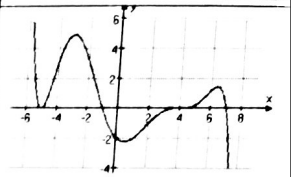
a. Domain	$(-\infty, \infty)$
b. Range	$(-\infty, 17]$
c. Zeros	$-3, -3, 0, 2$
d. y-intercept	$(0, 0)$
e. # extrema	3
f. least possible degree of the polynomial	4
g. Is there an absolute extrema?	yes $(1, 17)$
h. Interval(s) of Increase	$(-\infty, -3)$ $(-1, 1)$
i. Interval(s) of Decrease	$(-3, -1)$ $(1, \infty)$

j. End behavior for both sides:

as $x \to \infty$ $f(x) \to \underline{-\infty}$

as $x \to -\infty$ $f(x) \to \underline{-\infty}$

13. Determine whether each of the given functions is *odd*, *even* or neither. Write O, E or N

 E	$f(x) = -4x^5 + 2x^3 + x^1$ O	$f(x) = 8x^0$ E	 O	$f(x) = x + 2x^0$ N
 N	$f(x) = 5x^2 + 7x^0$ E	 N	$f(x) = x^3 + 2x^1 + 4x^0$ N	 N

Sketch the graph of the polynomial with the given information.

14. The degree is odd, the leading coefficient is positive, and there are zeros at -2, 1 and 4 with a multiplicity of 3

ends opp
Right end up

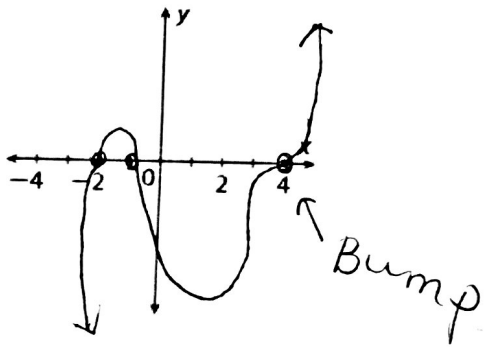
i. Zeros (x-intercepts): $-2, 1, 4, 4, 4$ Bump

ii. y- intercepts: ——

iii. End Behavior: as $x \to -\infty, f(x) \to$ $-\infty$ (L)

as $x \to +\infty, f(x) \to$ ∞ (R)

iv. Sketch with correct multiplicities



15. $f(x) = -x^3 - 3x^2 + 4x + 12$ with zeros at -3,-2,2

odd – ends opp.
neg – right end down

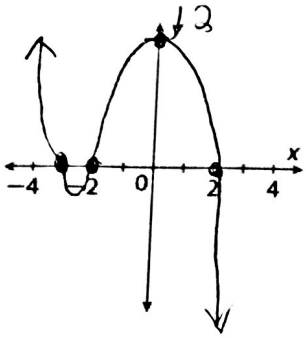
i. Zeros (x-intercepts): $-3, -2, 2$

ii. y- intercepts: $(0, 12)$

iii. End Behavior: as $x \to -\infty, f(x) \to$ ∞ (L)

as $x \to +\infty, f(x) \to$ $-\infty$ (R)

iv. Sketch with correct multiplicities



degree 3, odd, pos

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

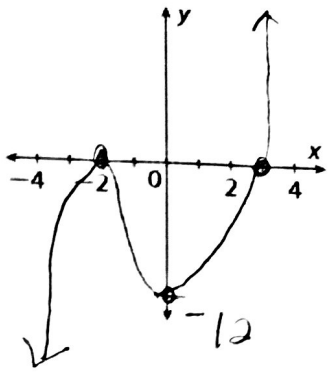
i. Zeros (x-intercepts): 3, -2, -2

ii. y- intercepts: -12

iii. End Behavior: as $x \to -\infty, f(x) \to$ $-\infty$

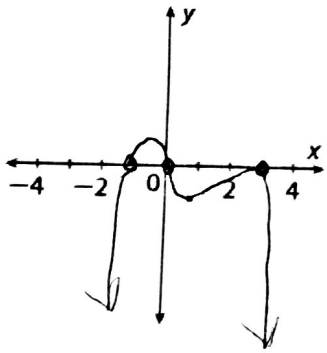
as $x \to +\infty, f(x) \to$ ∞

iv. Sketch with correct multiplicities



17.

The degree is even, the leading coefficient is negative, and there are zeros at -1, 0 and 3 with a multiplicity of 2



i. Zeros (x-intercepts): -1, 0, 3, 3 Bounce

ii. y- intercepts: —

iii. End Behavior: as $x \to -\infty, f(x) \to$ $-\infty$

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

iv. Sketch with correct multiplicities