

Name: Key

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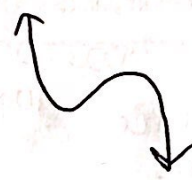
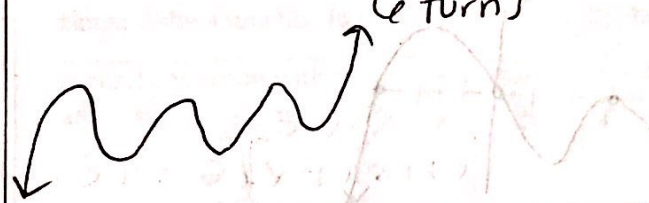
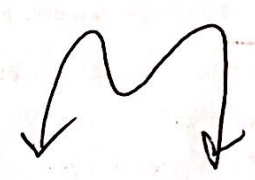
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Chapter 5 Review

Directions: Write each polynomial in standard form. Then, classify by degree and number of terms.

1. $-9v^2 - 4v - v^4$ $-v^4 - 9v^2 - 4v$ Quartic Trinomial	2. $-3 + 9x^3 + x^4 + 2x$ $x^4 + 9x^3 + 2x - 3$ Quartic Polynomial
3. 5 Constant Monomial	4. $2(x^3 + 1) - x^2$ $2x^3 + 2 - x^2$ $2x^3 - x^2 + 2$ Cubic Trinomial

Directions: Describe the end behavior of each function. Then draw a sketch of what the function could look like using the end behavior and number of turns.

5. $f(x) = 2x^2 + 12x + 15$ up-up 1 turn 	6. $f(x) = -x^3 + 14x^2 - 64x + 97$ up-down 2 turns 
7. $f(x) = 3x^7 + 6$ down-up 6 turns 	8. $f(x) = -x^4 + 6x + 2$ down-down 3 turns 

Directions: Factor the following completely.

9. $x^3 - x^2 - 20x = 0$ $x(x^2 - x - 20)$ $x(x - 5)(x + 4)$	10. $x^3 - 5x^2 - 3x + 15 = 0$ $x^2(x - 5) - 3(x - 5)$ $(x^2 - 3)(x - 5)$
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$$11. x^4 - 5x^2 + 4 = 0$$

$$(x^2 - 4)(x^2 - 1)$$

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

$$12. x^4 - 5x^2 - 6 = 0$$

$$(x^2 - 6)(x^2 + 1)$$

$$13. x^3 + 64 = 0$$

$$(x+4)(x^2 - 4x + 16)$$

$$14. x^3 - 125 = 0$$

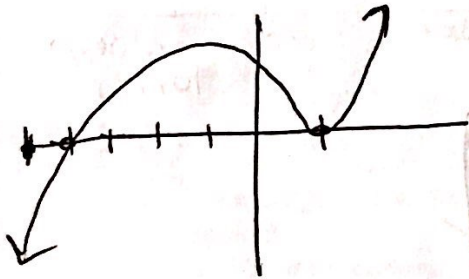
$$(x-5)(x^2 + 5x + 25)$$

Directions: State the zeros and their multiplicities. Then graph the function.

$$15. f(x) = (x-1)^2(x+4)^3$$

$X=1$  mult 2 bounce  
 $X=-4$  mult 3 cross

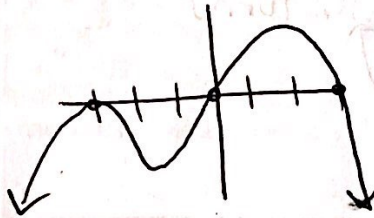
pos-odd  
down-up



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

$X=0$  mult 1 cross  
 $X=3$  mult 1 cross  
 $X=-3$  mult 2 bounce

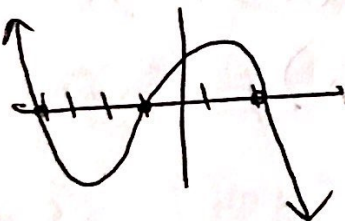
neg-even  
D-D



$$17. f(x) = -(x+1)(x-2)(x+4)$$

$X=-1$  mult 1 cross  
 $X=2$  mult 1 cross  
 $X=-4$  mult 1 cross

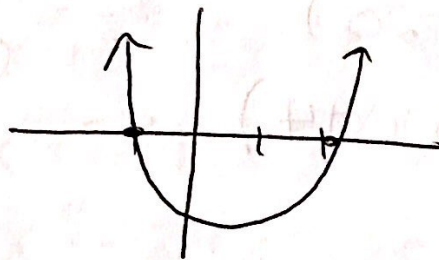
neg-odd  
up-down



$$18. f(x) = (x+1)(x-2)^2$$

$X=-1$  mult 1 cross  
 $X=2$  mult 1 cross

pos-even  
up-up





Directions: Divide using any method.

19.  $(x^3 - 3x^2 - 16x - 72) \div (x - 7)$

$$\begin{array}{r} 7 \overline{) 1 \quad -3 \quad -16 \quad -72} \\ + \quad \downarrow \quad 7 \quad 28 \quad 84 \\ \hline 1 \quad 4 \quad 12 \quad \underline{12} \\ x^2 + 4x + 12 \quad R \ 12 \end{array}$$

20.  $(4x^3 - 28x^2 - 63x - 82) \div (x - 9)$

$$\begin{array}{r} 9 \overline{) 4 \quad -28 \quad -63 \quad -82} \\ + \quad \downarrow \quad 36 \quad 72 \quad 81 \\ \hline 4 \quad 8 \quad 9 \quad \underline{-1} \\ 4x^2 + 8x + 9 \quad R \ -1 \end{array}$$

21.  $(x^3 - 5x - 7) \div (x + 1)$

$$\begin{array}{r} -1 \overline{) 1 \quad 0 \quad -5 \quad -7} \\ + \quad \downarrow \quad -1 \quad 1 \quad 4 \\ \hline 1 \quad -1 \quad -4 \quad \underline{-3} \\ x^2 - x - 4 \quad R \ -3 \end{array}$$

22.  $(4x^3 + x - 2) \div (x + 2)$

$$\begin{array}{r} -2 \overline{) 4 \quad 0 \quad 1 \quad -2} \\ + \quad \downarrow \quad -8 \quad 16 \quad -34 \\ \hline 4 \quad -8 \quad 17 \quad \underline{-36} \\ 4x^2 - 8x + 17 \quad R \ -36 \end{array}$$

Directions: State the possible rational roots for the following polynomials.

23.  $f(x) = 5x^3 - 17x^2 + 213x - 2$

$$\pm \left\{ 1, 2, \frac{1}{5}, \frac{2}{5} \right\}$$

24.  $f(x) = 3x^7 + 12x^4 + 2x^2 - 12$

$$\pm \left\{ 1, 2, 3, 4, 6, 12, \frac{1}{3}, \frac{2}{3}, \frac{4}{3} \right\}$$

Directions: Write a function in standard form with the following degrees and zeros.

25. A quartic function with its only real zeros at  $x = -3$  and  $x = 2$   $x = -3$   $x = 2$   $x = i$   $x = -i$

$$\begin{aligned} & [(x+3)(x-2)] [(x-i)(x+i)] \\ & (x^2 + x - 6)(x^2 + 1) \\ & x^4 + x^2 + x^3 + x - 6x^2 - 6 \\ & x^4 + x^3 - 5x^2 + x - 6 \end{aligned}$$

26. A cubic function with zeros at  $x = 3i$  and  $x = -1$   $x = 3i$   $x = -3i$   $x = -1$

$$\begin{aligned} & [(x-3i)(x+3i)] (x+1) \\ & (x^2 - 9i^2)(x+1) \\ & (x^2 + 9)(x+1) \\ & x^3 + x^2 + 9x + 9 \end{aligned}$$

27. A quartic function with zeros at  $x = 3$ ,  $x = -4$  and  $x = \sqrt{5}$   $x = 3$   $x = -4$   $x = \sqrt{5}$   $x = -\sqrt{5}$

$$\begin{aligned} & [(x-3)(x+4)] [(x-\sqrt{5})(x+\sqrt{5})] \\ & (x^2 + x - 12)(x^2 - \sqrt{5}x + \sqrt{5}x - 5) \\ & (x^2 + x - 12)(x^2 - 5) \\ & x^4 - 5x^2 + x^3 - 5x - 12x^2 + 60 \\ & x^4 + x^3 - 17x^2 - 5x + 60 \end{aligned}$$

28. A quartic function with its only real zeros at  $x = 4$  and  $x = 6$   $x = 4$   $x = 6$   $x = i$   $x = -i$

$$\begin{aligned} & (x-4)(x-6)(x-i)(x+i) \\ & (x^2 - 10x + 24)(x^2 + 1) \\ & x^4 + x^2 - 10x^3 - 10x + 24x^2 + 24 \\ & x^4 - 10x^3 + 25x^2 - 10x + 24 \end{aligned}$$



