p. 335 and P. 326

p. 335

Name: Key Hr________ Date________

Sketch the graph of polynomial functions with the following characteristics.

27. an odd function with zeros at $-5, -3, 0, 2$ and 4

28. an even function with zeros at $-2, 1, 3,$ and 5

29. a 4-degree function with a zero at -3, maximum at $x = 2$, and minimum at $x = -1$

30. a 5-degree function with zeros at $-4, -1,$ and 3, maximum at $x = -2$

31. an odd function with zeros at $-1, 2,$ and 5 and a negative leading coefficient

32. an even function with a minimum at $x = 3$ and a positive leading coefficient

On #34-39:

Complete each of the following.

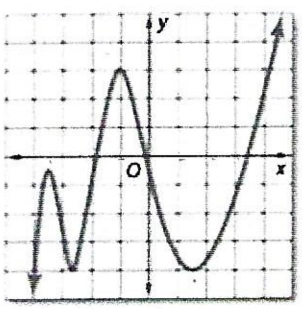
a. **Estimate the x-coordinate of every turning point and determine if those coordinates are relative maxima or relative minima.**

b. **Estimate the x-coordinate of every zero.**

c. **Determine the smallest possible degree of the function.**

d. **Determine the domain and range of the function.**

34.



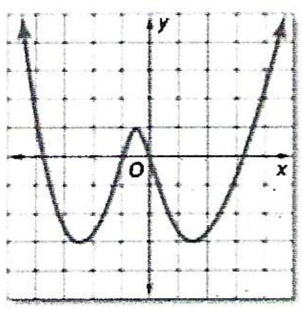
a) -3.5(max), -2.5(min), -1(max), 1.5(min)

b) -2, 0, 3.5

c) 5

d) D: $(-\infty, \infty)$ R: $(-\infty, \infty)$

35.



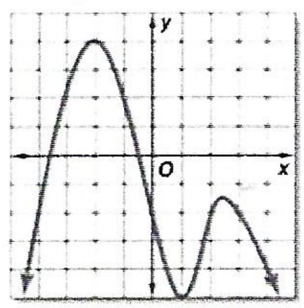
a) -2.5(min), -.5(max), 1.5(min)

b) -3.75, -1, 0, 3.25

c) 4

d) D: $(-\infty, \infty)$ R: $[-3, \infty)$

36.



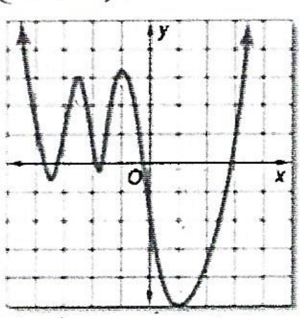
a) -2(max), -1(min), 2.25(max)

b) -3.75, -.5

c) 4

d) D: $(-\infty, \infty)$ R: $(-\infty, 4]$

37.



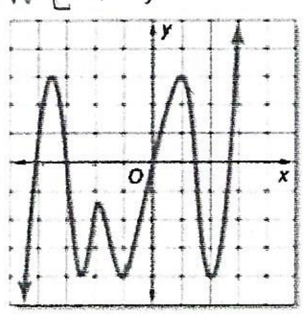
a) -3.5(min), -2.5(max), -1.75(min), -1(max), 1(min)

b) -3.75, -3.25, -2, -1.75, -.25, 3

c) 6

d) D: $(-\infty, \infty)$ R: $[-5, \infty)$

38.



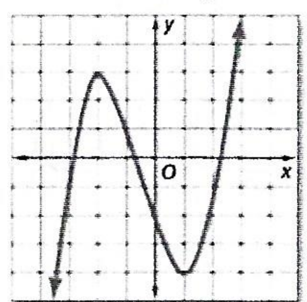
a) -3.5(max), -2.5(min), -2(max), -1(min), 1(max), 2(min)

b) -4, -3, 0, 1.5, 2.75

c) 7

d) D: $(-\infty, \infty)$ R: $(-\infty, \infty)$

39.



a) -2(max), 1(min)

b) -3, -.75, 2.25

c) 3

d) D: $(-\infty, \infty)$ R: $(-\infty, \infty)$

p. 335 and P. 326 Name:________________________________Hr________________Date________

p. 326

Find $p(-6)$ and $p(3)$ for each function.

24. $p(x) = -3x^3 - 2x^2 + 4x - 6$

$-3(-6)^3 - 2(-6)^2 + 4(-6) - 6$

$-3(-216) - 2(36) - 24 - 6$

$648 - 72 - 24 - 6$

$\boxed{p(-6) = 546}$

$-3(3)^3 - 2(3)^2 + 4(3) - 6$

$-81 - 18 + 12 - 6$

$\boxed{p(3) = -93}$

26. $p(x) = x^4 - 4x^3 + 3x^2 - 5x + 24$

$(-6)^4 - 4(-6)^3 + 3(-6)^2 - 5(-6) + 24$

$1296 + 864 + 108 + 30 + 24$

$\boxed{p(-6) = 2322}$

$(3)^4 - 4(3)^3 + 3(3)^2 - 5(3) + 24$

$81 - 108 + 27 - 15 + 24$

$\boxed{p(3) = 9}$

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

$2(-6)^4 + (-6)^3 - 4(-6)^2$

$2592 - 216 - 144$

$\boxed{p(-6) = 2232}$

$2(3)^4 + (3)^3 - 4(3)^2$

$162 + 27 - 36$

$\boxed{p(3) = 153}$

If $c(x) = 2x^2 - 4x + 3$ and $d(x) = -x^3 + x + 1$, find each value.

30. $5d(2a)$

$5(-(2a)^3 + 2a + 1)$

$5(-8a^3 + 2a + 1)$

$\boxed{-40a^3 + 10a + 5}$

32. $d(4a^2)$

$-(4a^2)^3 + 4a^2 + 1$

$\boxed{-64a^6 + 4a^2 + 1}$

$(a^2+1)(a^2+1)(a^2+1)$

$a^4 + a^2 + a^2 + 1$

$(a^4 + 2a^2 + 1)(a^2 + 1)$

$a^6 + a^4 + 2a^4 + 2a^2 + a^2 + 1$

If $c(x) = x^3 - 2x$ and $d(x) = 4x^2 - 6x + 8$, find each value.

52. $-2d(2a + 3) - 4c(a^2 + 1)$

$-2[4(2a+3)^2 - 6(2a+3) + 8] - 4[(a^2+1)^3 - 2(a^2+1)]$

$-2[4(4a^2 + 12a + 9) - 12a - 18 + 8] - 4[a^6 + 3a^4 + 3a^2 + 1 - 2a^2 - 2]$

$-2[16a^2 + 48a + 36 - 12a - 18 + 8] - 4[a^6 + 3a^4 + a^2 - 1]$

$-2(16a^2 + 36a + 26) - 4a^6 - 12a^4 - 4a^2 + 4$

$-32a^2 - 72a - 52 - 4a^6 - 12a^4 - 4a^2 + 4$

$\boxed{-4a^6 - 12a^4 - 36a^2 - 72a - 48}$

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56. **MULTIPLE REPRESENTATIONS** Consider $g(x) = (x - 2)(x + 1)(x - 3)(x + 4)$.

a. Analytical Determine the x- and y-intercepts, roots, degree, and end behavior of $g(x)$.

b. Algebraic Write the function in standard form

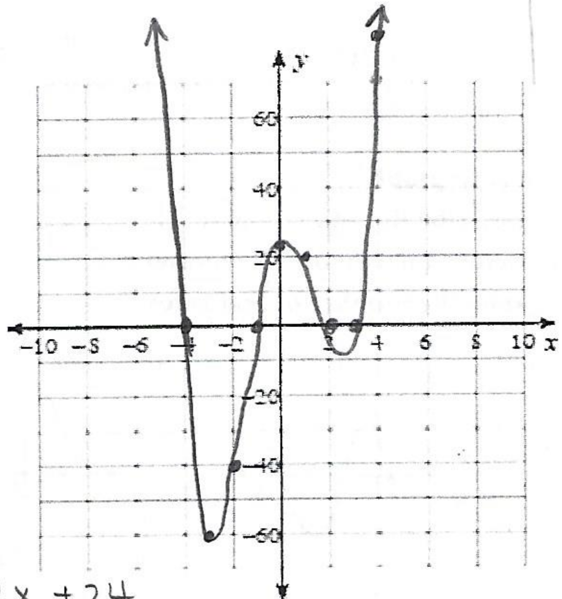
c. Tabular Make a table of values for the function.

d. Graphical Sketch a graph of the function by plotting points and connecting them with a smooth curve.

(c)

x	y
-5	224
-4	0
-3	-60
-2	-40
-1	0
0	24
1	20
2	0
3	0
4	80
5	324

(a) x-int: 2, -1, 3, -4
y-int: 24
Roots: 2, -1, 3, 4
Degree: 4
End Behavior: $g(x) \to +\infty$ as $x \to -\infty$
$g(x) \to +\infty$ as $x \to +\infty$



(b) $(x-2)(x+1)(x-3)(x+4)$
$(x^2-x-2)(x^2+x-12)$
$x^4+x^3-12x^2-x^3-x^2+12x-2x^2-2x+24$
$\boxed{g(x)=x^4-15x^2+10x+24}$

Describe the end behavior of the graph of each function.

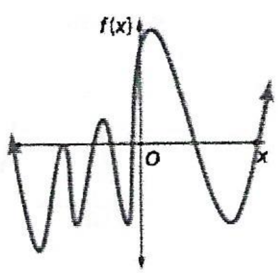
58. $g(x) = 2x^5 + 6x^4$

$g(x) \to -\infty$ as $x \to -\infty$
$g(x) \to +\infty$ as $x \to +\infty$

60. $f(x) = 6x - 7x^2$

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

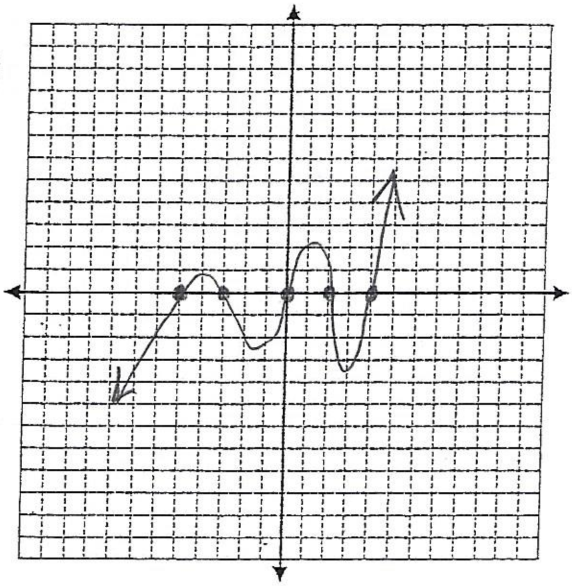
63. **CCSS CRITIQUE** Shenequa and Virginia are determining the number of real zeros of the graph at the right. Is either of them correct? Explain your reasoning.



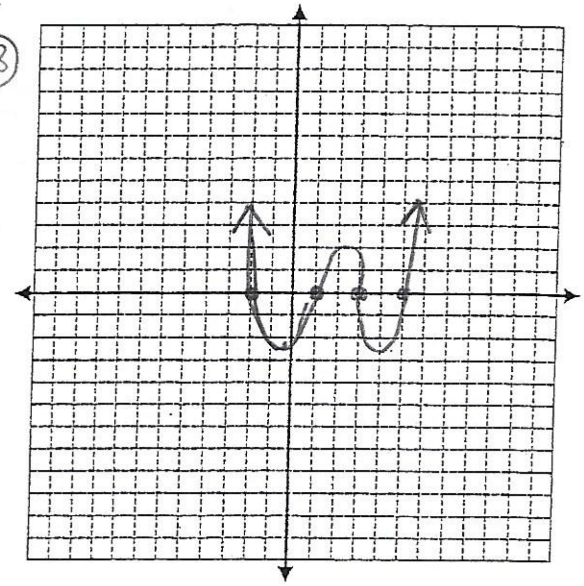
Shenequa	Virginia
There are 7 real zeros because the graph intersects the x-axis 7 times.	*There are 8 real zeros because the graph intersects the x-axis 7 times, and there is a double zero.*

Virginia. An even function has an even number of zeros. The place where it bounces, indicates two zeros.

27



28



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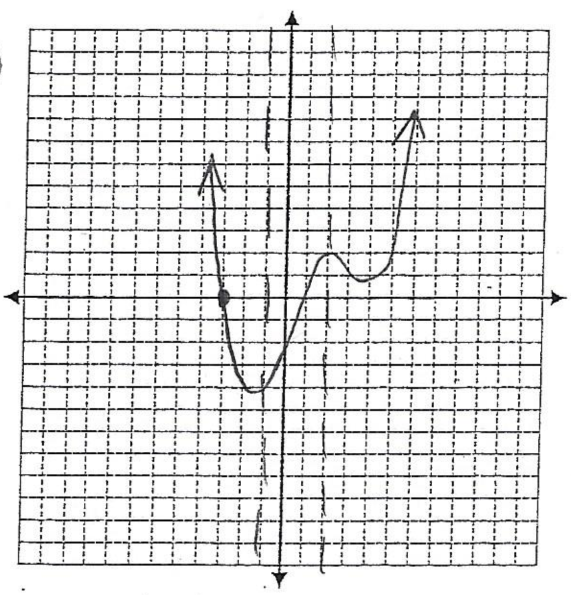

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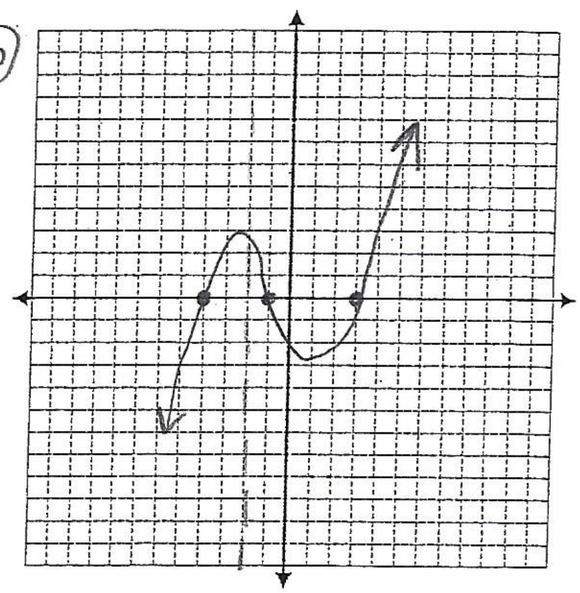

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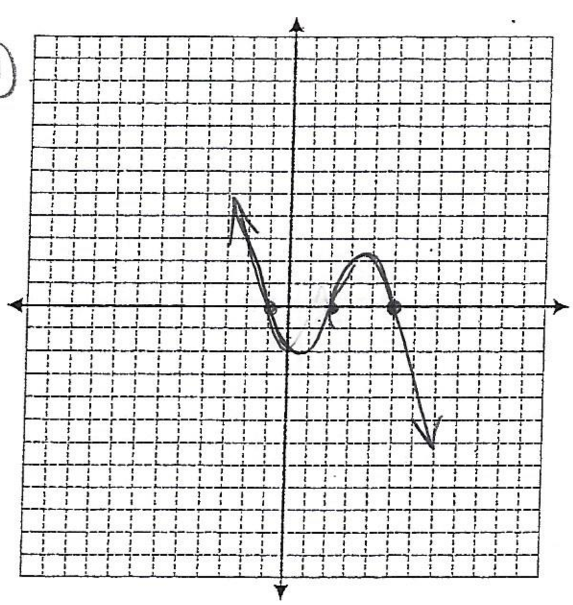

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