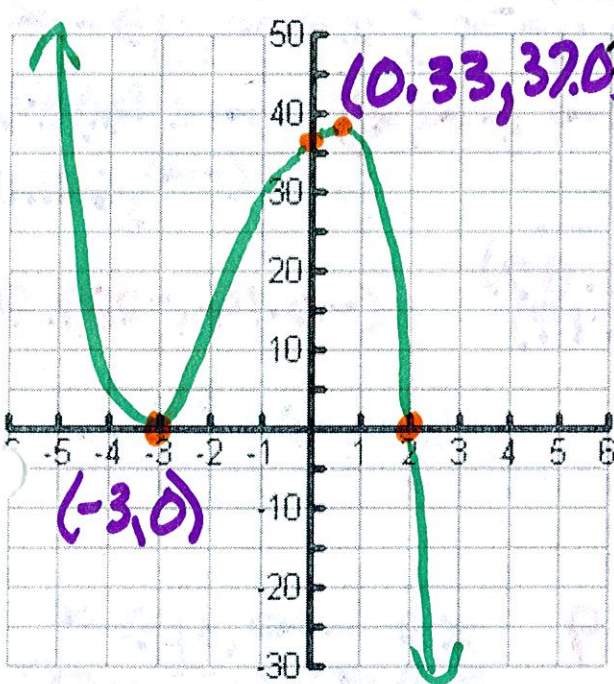


USE the Graphing Calculator on this portion of the review!

1. Factor function completely, graph and find all characteristics.

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

Factored form  $f(x) = -2(x+3)^2(x-2)$



Zeros:  $x = -3$  w/mult  $2$ ,  $2$   
 x-intercepts:  $(-3, 0)$   $(2, 0)$  y-int:  $(0, 36)$   
 end behaviors:  $x \rightarrow -\infty, y \rightarrow \infty$ ;  $x \rightarrow \infty, y \rightarrow -\infty$   
 Domain:  $-\infty < x < \infty$  Range:  $-\infty < f(x) < \infty$   
 Global max:  $\infty$  G. min:  $-\infty$   
 Local max:  $(0.33, 37.04)$  L. min:  $(-3, 0)$   
 Int. of Inc.:  $(-3, 0.33)$  Int. of Dec.:  $(-\infty, -3) \cup (0.33, \infty)$

Solve the systems of equations using the graphing calculator.

2) Solve:  $g(x) = 5x^2 - 2x - 20$   
 $f(x) = -3x^3 - 12x^2 + 17x + 3$

$\{(-6.463, 201.782), (-0.761, -15.578), (1.558, -10.981)\}$   
 ~~$(-0.4, 30.8)$~~

3) A box has a width of  $x$ , a height of 7 less than  $x$  and length of 9 more than  $x$ .

a. Write a function,  $V(x)$ , which describes the volume of the box.

$$V(x) = x^3 + 2x^2 - 63x$$

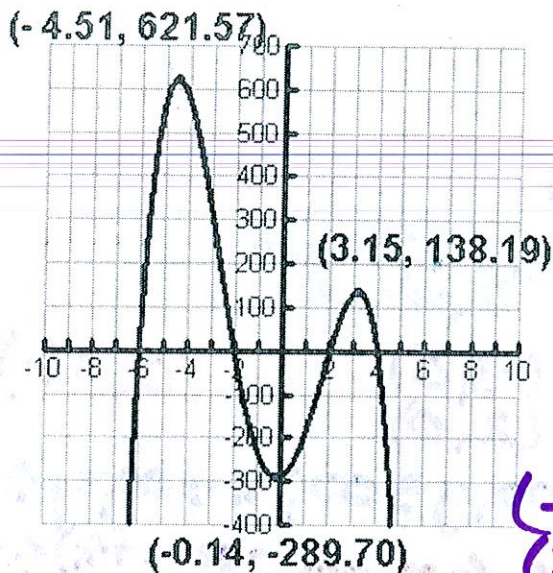
b. What is the dimensions of the box if the volume of the box is 880 cubic units?

$$w = 11; h = 4; l = 20$$

NO GRAPHING CALCULATOR from here on through the rest of the review!

4. Given the graph, find all the characteristics of the graph.

$$f(x) = -3x^4 - 6x^3 + 84x^2 + 24x - 288$$



Zeros:  $x = -6, -2, 2, 4$

x-intercepts:  $(-6, 0), (-2, 0), (2, 0), (4, 0)$   
y-int:  $(0, -288)$

end behaviors:

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

Domain:

$-\infty < x < \infty$  Range:  $-\infty < f(x) \leq 621.57$

Global max:

$y = 621.57$

G. min:

$(-\infty, 621.57]$

Local max:

$(-4.51, 621.57)$

L. min:

$(-0.14, -289.70)$

Int. of Inc.:

$(-0.14, 3.15)$

Int. of Dec.:

$(-4.51, -0.14) \cup (3.15, \infty)$

Given the functions, for 4 & 6 find the possible number of vertices, for 5 & 7 find the degree of the function, and for all state the end behaviors.

5.  $y = x^4 - 3x^2 + 2$

3, 1  $x \rightarrow -\infty, y \rightarrow \infty$   
 $x \rightarrow \infty, y \rightarrow \infty$

6.  $-4x(x+2)^4(x+1)^3(x-8) = 0$

deg 9  $x \rightarrow -\infty, y \rightarrow \infty$   
 $x \rightarrow \infty, y \rightarrow -\infty$

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

4, 2, 0  $x \rightarrow -\infty, y \rightarrow \infty$   
 $x \rightarrow \infty, y \rightarrow -\infty$

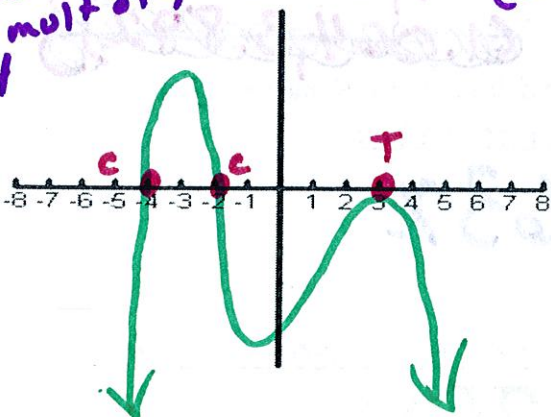
8.  $f(x) = 2x^3(x+5)(x-1)^2$

deg 6  $x \rightarrow -\infty, y \rightarrow \infty$   
 $x \rightarrow \infty, y \rightarrow \infty$

Given the function, draw a sketch of what the graph might look like.

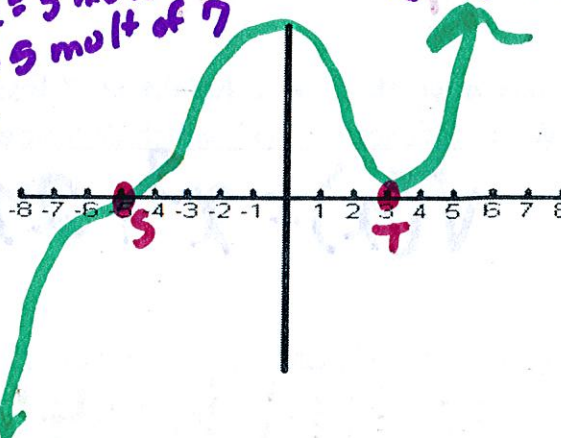
9.  $f(x) = -(x+2)(x-3)^4(x+4)$

$x = -2$   
 $x = 3$  mult of 4  
 $x = -4$   
LC  
-  
deg even



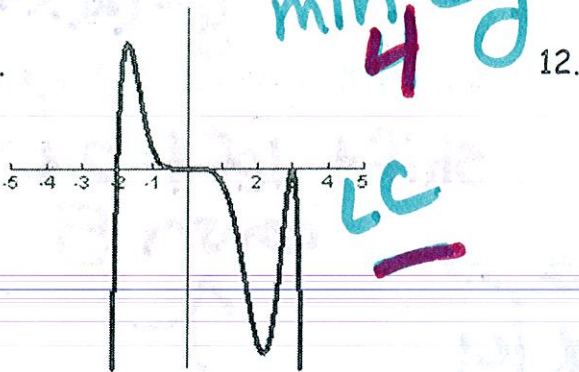
10.  $f(x) = 2(x-3)^2(x+5)^7$

$x = 3$  mult of 2  
 $x = -5$  mult of 7  
LC +  
odd

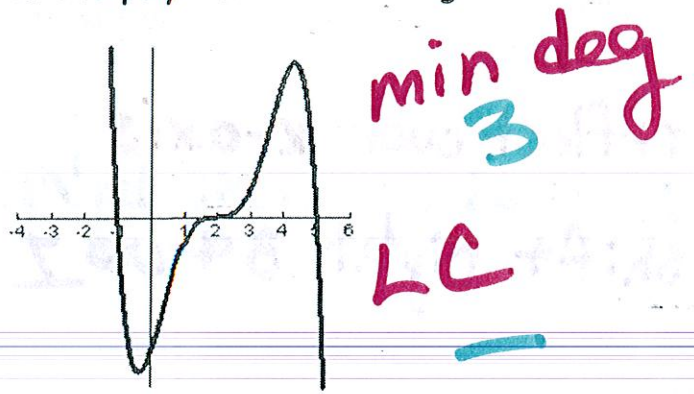


Given the graph, determine the minimum degree of the polynomial and the sign of the leading coefficient

11.



12.



13. Complete the table.

Degree of $f(x)$	Sign of the leading coefficient	as $x \rightarrow -\infty$ , $y \rightarrow$ _____	as $x \rightarrow \infty$ , $y \rightarrow$ _____	maximum # of real zeros	maximum # of vertices	maximum number of local minimums	maximum number of local maximums
a. 14	+	$\infty$	$\infty$	14	13	7	6
b. 9	-	$\infty$	$-\infty$	9	8	4	4
c. 10	-	$-\infty$	$-\infty$	10	9	4	5

Write equations to reflect the transformations described.

14. The parent graph of  $y = x^5$  is vertically compressed by a factor of one fourth and is translated right 3 units.

$$y = \frac{1}{4}(x-3)^5$$

15. The parent graph of  $y = x^6$  is reflected over the y axis and is translated up 3 units.

$$y = (-(x))^6 + 3$$

16. The parent graph of  $y = x^9$  is horizontally compressed by a factor of one fifth and is translated left 5 units and down 2 units.

$$y = (5(x+5))^9 - 2$$

For each equation, a) state the parent graph and the transformation described and b) then graph the equation. Label each point you graph.

17.  $y = -\frac{1}{2}(x-3)^2 + 1$

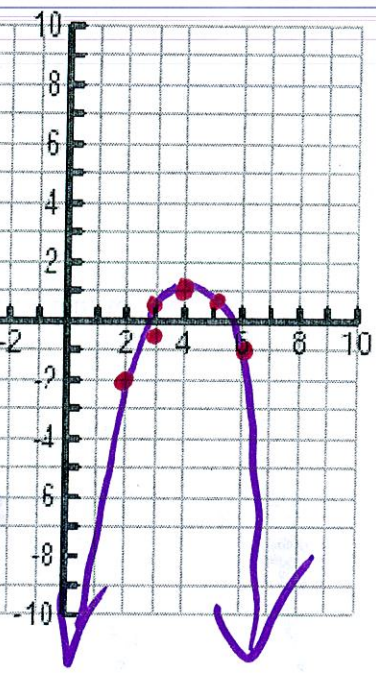
reflect over x-axis  
vertical compress by 1/2  
shift right 3 + up 1

18.  $y = (2x+4)^3 - 5$

$y = (2(x+2))^3 - 5$   
horizontal compress by 1/2  
shift left 2 + down 5

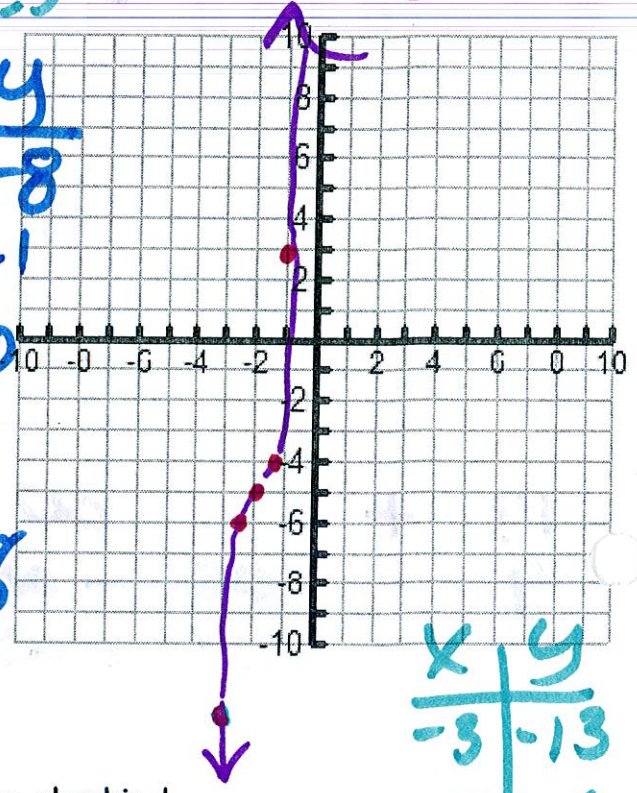
~~2 4~~  
~~-2 -8~~  
~~1 1/2~~  
~~0 0~~  
~~-1/2 -1~~  
~~1/2 1~~  
~~2 8~~

x	y
1	-1
2	1/2
3	1
4	1/2
5	-1



-2 -5

x	y
-1	-8
-1/2	-1
0	0
1/2	1
1	8



x	y
-3	-13
-2 1/2	-6
-2	-5
-1 1/2	-4
-1	3

Solve the system of polynomials algebraically. Practice checking!

19)  $g(x) = 8x + 78$   
 $f(x) = 4x^3 + 12x^2 - 17x + 3$

$\{(-3, 54), (-1/2, 58), (5/2, 98)\}$

