

Test Drive #4: Not For A Grade

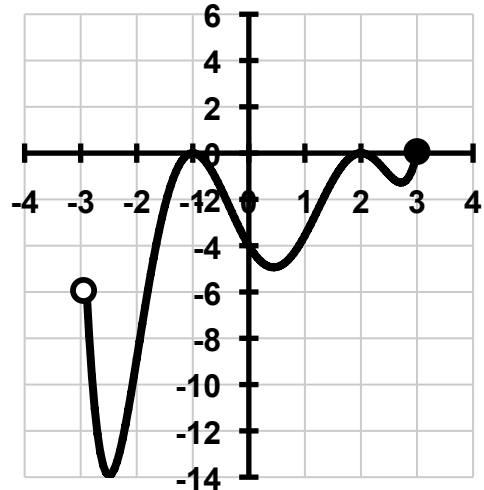
All Electronic Devices Including Cell Phones Must Be Turned Off During the Test. Be sure to show all your work. Circle your final answer and turn in all scratch paper. No Work, No Credit! You are allowed to use a Scientific Calculator, but Not a Graphing Calculator.

Determine whether the relation is a function. Give the domain and range of the relation:

1a) Is this a function?

1b) What is the domain of f ?

1c) What is the range of f ?



Give the domain of the following functions. Write your answers in interval notation:

2) $f(x) = \sqrt{7x-4}$

3) $g(x) = \frac{3x}{x^2-2x-15}$

Find the following:

4) Find $f(-4)$ when $f(x) = -5x^3 - 8x^2 + 11x - 300$.

Select the function that best matches the graph.

Constant Function: $f(x) = b$

Identity Function: $f(x) = x$

Square Function: $f(x) = x^2$

Cube Function: $f(x) = x^3$

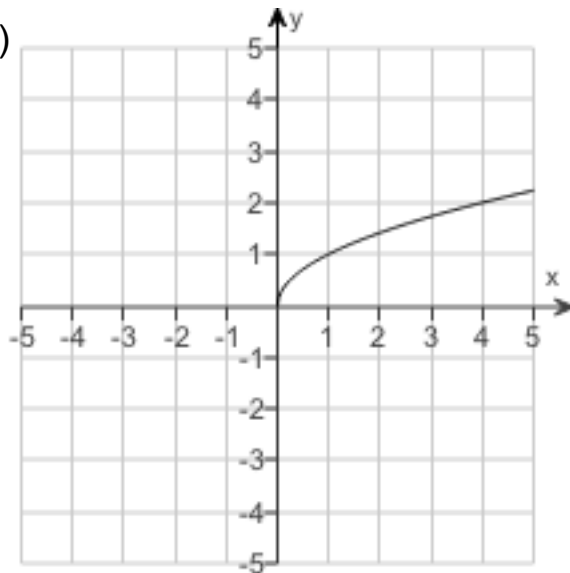
Square Root Function: $f(x) = \sqrt{x}$

Cube Root Function: $f(x) = \sqrt[3]{x}$

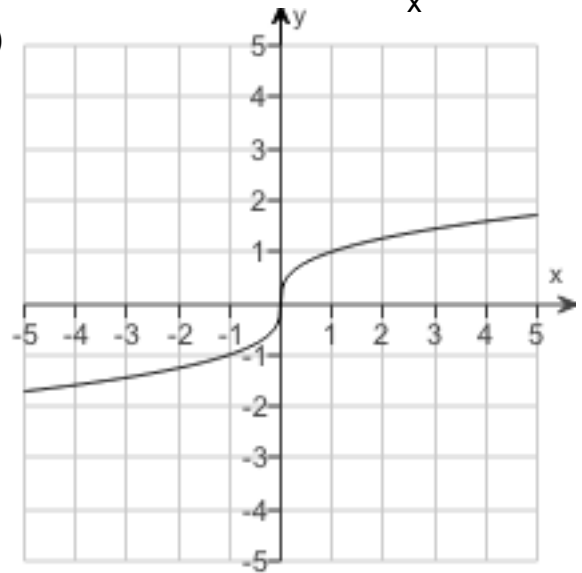
Absolute Value Function: $f(x) = |x|$

Reciprocal Function: $f(x) = \frac{1}{x}$

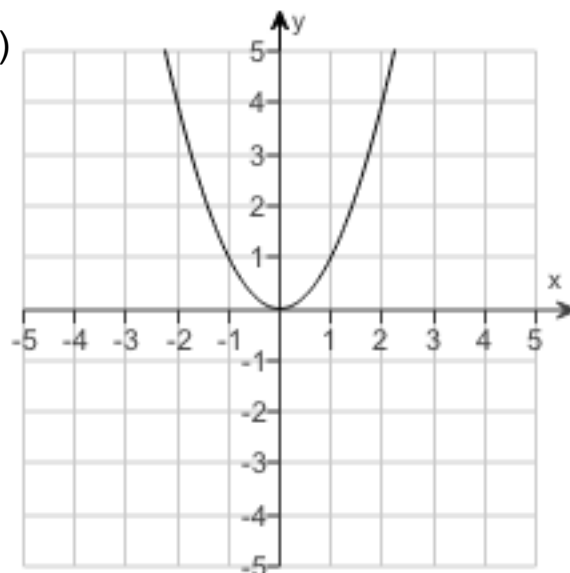
5a)



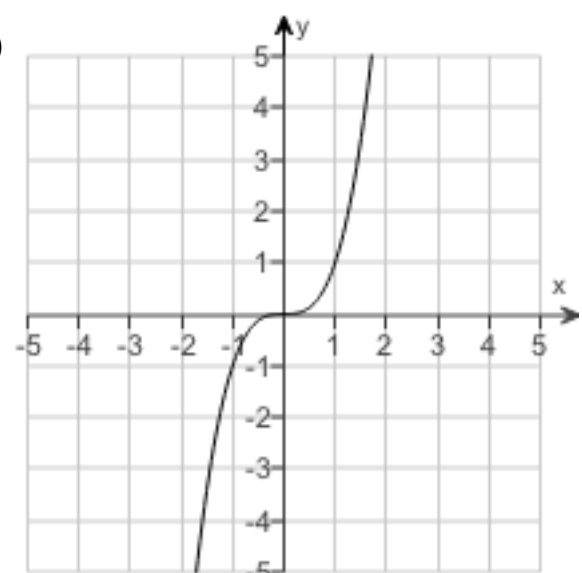
5b)



6a)



6b)



Select the function that best matches the graph.

Constant Function: $f(x) = b$

Identity Function: $f(x) = x$

Square Function: $f(x) = x^2$

Cube Function: $f(x) = x^3$

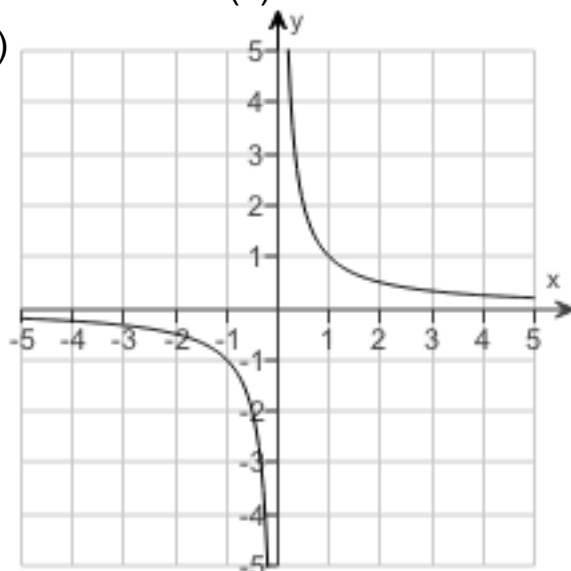
Square Root Function: $f(x) = \sqrt{x}$

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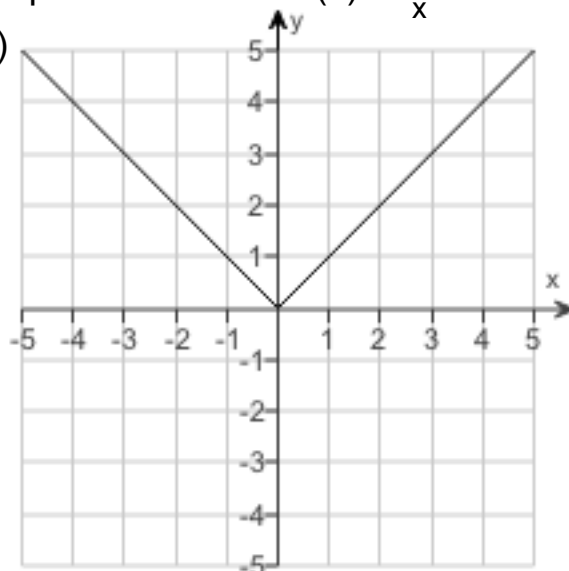
Absolute Value Function: $f(x) = |x|$

Reciprocal Function: $f(x) = \frac{1}{x}$

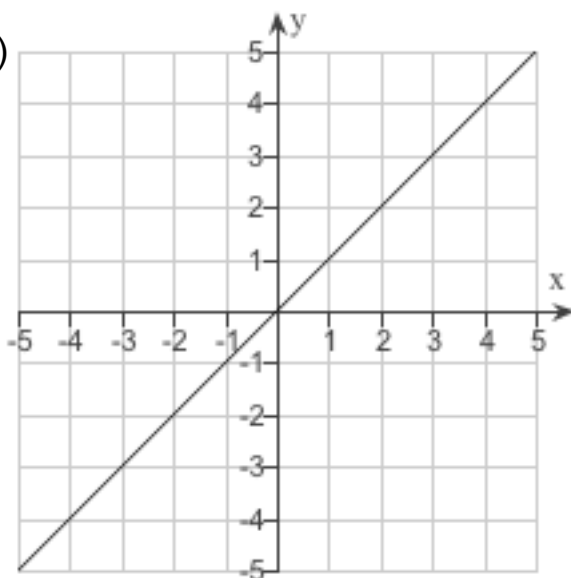
7a)



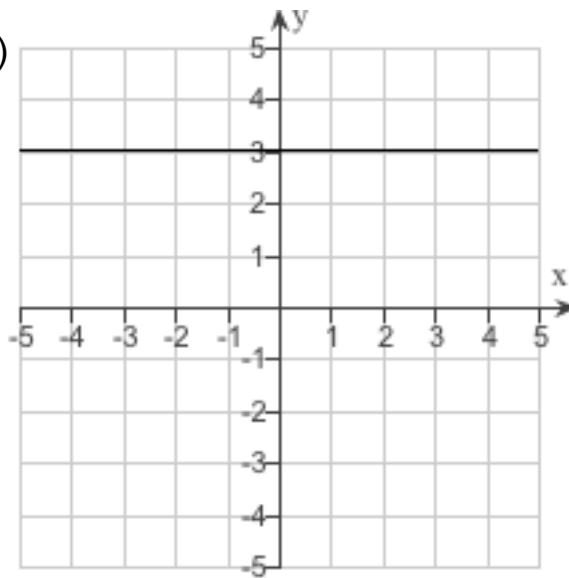
7b)



8a)



8b)



Use the piecewise-defined function to find the following values:

$$f(x) = \begin{cases} -x^3 + 7, & x < -2 \\ 5x - 11, & -2 \leq x < 3 \\ -x^2 - 6, & x \geq 3 \end{cases}$$

9a) $f(0)$

9b) $f(-4)$

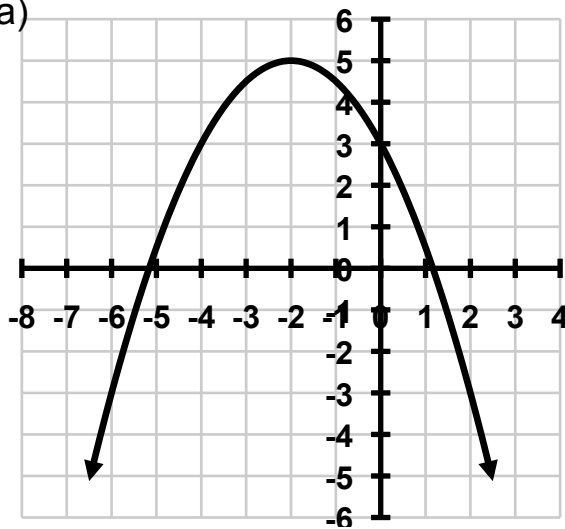
9c) $f(3)$

9d) $f(-2)$

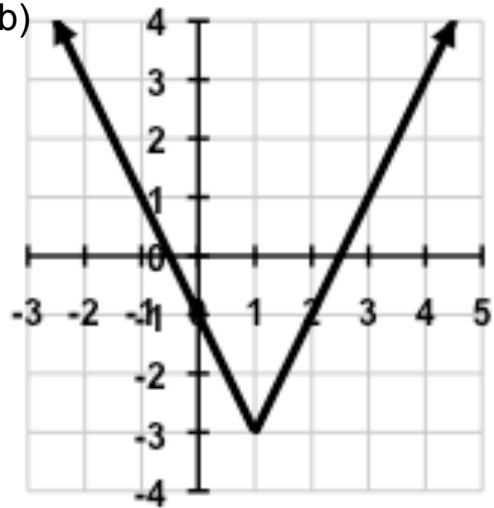
9e) $f(5)$

Write the equation of the graphs below.

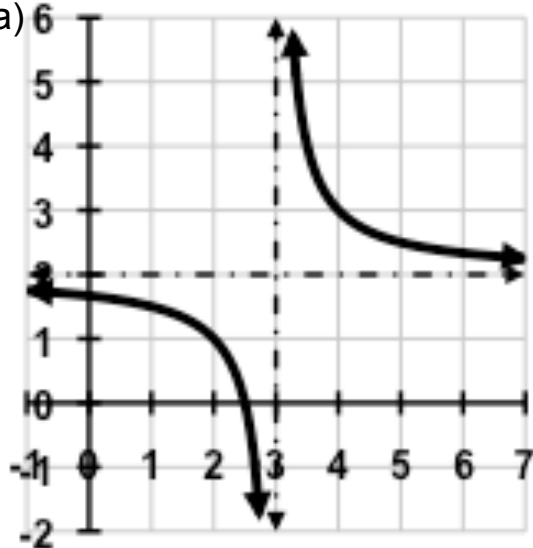
10a)



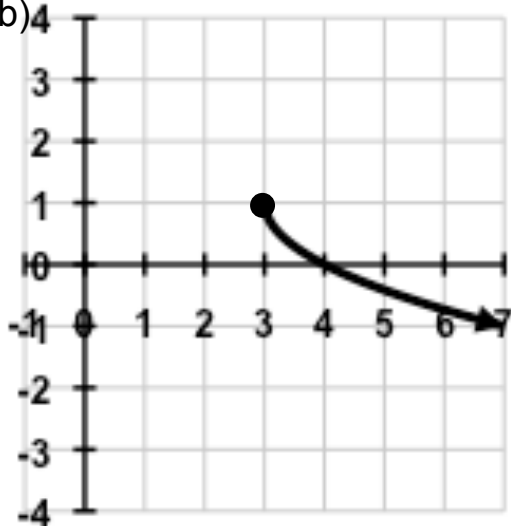
10b)



11a)



11b)



Let $f(x) = 3x^2 - 7x - 9$ and $g(x) = 4 + 5x$. Find:

12a) $(f + g)(x)$

12b) $(f - g)(x)$

12c) $(fg)(x)$

12d) $\left(\frac{f}{g}\right)(x)$

Let $f(x) = 3x^2 - 6x + 4$ and $g(x) = 7x - 25$. Find:

13a) $(g \circ f)(-2)$

13b) $(f \circ g)(3)$

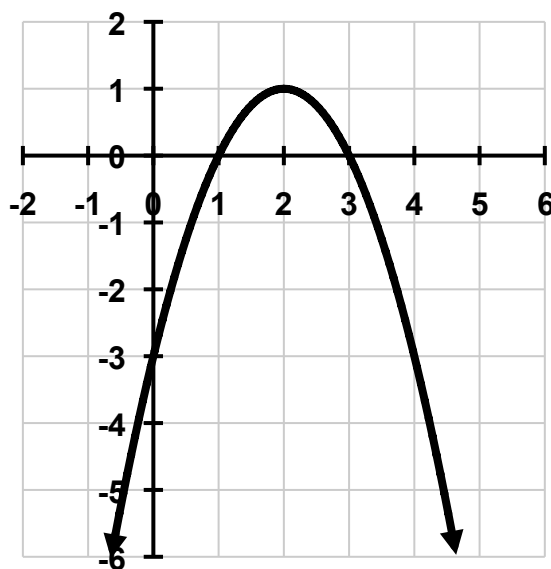
Use graph of the quadratic function on the right to answer the following.

14a) Give the domain and range.
(Type your answer in interval notation.)

14b) Give coordinates of the vertex.
(Type an ordered pair.)

14c) Give the equation of the axis of symmetry.

14d) Find the x-intercept(s).
(Type an ordered pair. Use a comma to separate answers as needed.)



Suppose that $f(x) = x^2 - 10x + 21$:

15a) What is the vertex of f ?

15b) What is the y-intercept of the graph of f ?

15c) Graph the function.

Solve the following:

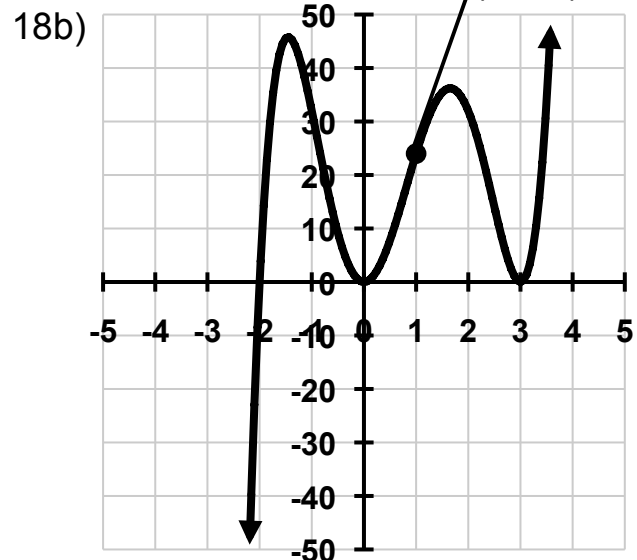
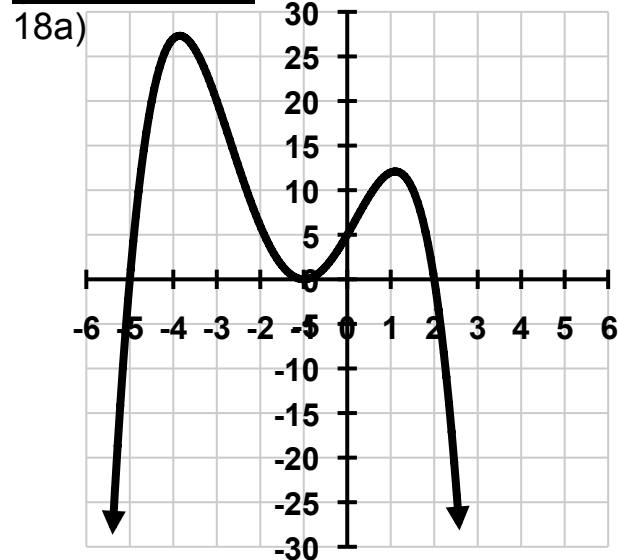
16) A company finds that their daily costs to produce USB hubs are approximated by $C(x) = 2x^2 - 120x + 2205$, where $C(x)$ is the cost in dollars to sell x USB hubs. Find the number of hubs that the company should sell to minimize their costs. What is the minimum cost?

Find the correct end behavior diagram for the given polynomial function.

17a) $f(x) = -7x^8 + 5x^3 + 3x - 18$

17b) $g(x) = 10x^7 + 15x^5 + 9x - 12$

Find a polynomial function $f(x)$ of least possible degree having the graph shown.

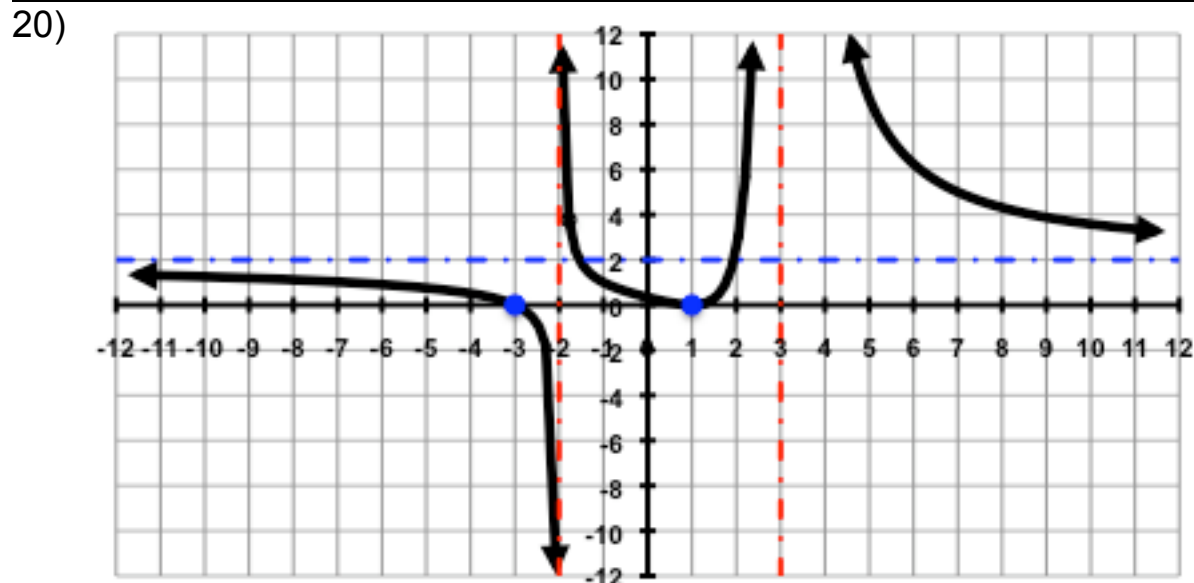


Give the equations of any vertical or horizontal asymptotes for the graph of the following rational function.

19a) $r(x) = \frac{3x^2 + 11x - 4}{4x^2 - 4x - 3} = \frac{(3x-1)(x+4)}{(2x-3)(2x+1)}$

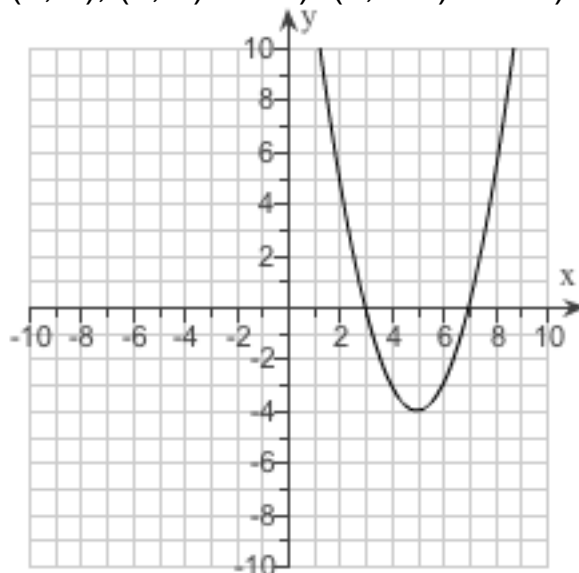
19b) $r(x) = \frac{3x^2 + 5x - 12}{3x^3 - 40x^2 - 128x} = \frac{(x+3)(3x-4)}{x(3x+8)(x-16)}$

Find an equation for the rational function graph shown to the right.



Answers:1a) Yes 1b) $(-3, 3]$ 1c) $[-14, 0]$ 2) $[4/7, \infty)$ 3) $(-\infty, -3) \cup (-3, 5) \cup (5, \infty)$ 4) -152 5a) Square Root Function: $f(x) = \sqrt{x}$ 5b) Cube Root Function: $f(x) = \sqrt[3]{x}$ 6a) Square Function: $f(x) = x^2$ 6b) Cube Function: $f(x) = x^3$ 7a) Reciprocal Function: $f(x) = \frac{1}{x}$ 7b) Absolute Value Function: $f(x) = |x|$ 8a) Identity Function: $f(x) = x$ 8b) Constant Function: $f(x) = 3$ 9a) -11 9b) 71 9c) -15 9d) -21 9e) -31 10a) $f(x) = -0.5(x+2)^2 + 5$ 10b) $f(x) = 2|x-1| - 3$ 11a) $f(x) = \frac{1}{x-3} + 2$ 11b) $f(x) = -\sqrt{x-3} + 1$ 12a) $3x^2 - 2x - 5$ 12b) $3x^2 - 12x - 13$ 12c) $15x^3 - 23x^2 - 73x - 36$ 12d) $\frac{3x^2 - 7x - 9}{5x+4}$ 13a) 171 13b) 76 14a) Domain: $(-\infty, \infty)$; Range: $(-\infty, 1]$ 14b) $(2, 1)$ 14c) $x = 2$ 14d) $(1, 0), (3, 0)$ 15a) $(5, -4)$ 15b) $(0, 21)$

15c)



16) Number of Hubs: 30 hubs

Minimum Cost: \$405

17a) $\downarrow \downarrow$ 17b) $\uparrow$ $\downarrow$ 18a) $f(x) = -\frac{1}{2}(x+1)^2(x-2)(x+5)$ 18b) $f(x) = 2x^2(x+2)(x-3)^2$ 19a) V.A.: $x = \frac{3}{2}$ and $x = -\frac{1}{2}$ H.A.: $y = \frac{3}{4}$ 19a) V.A.: $x = 0, x = -\frac{8}{3}$ & $x = 16$ H.A.: $y = 0$

$$20) R(x) = \frac{2(x+3)(x-1)^2}{(x+2)(x-3)^2} = \frac{2x^3 + 2x^2 - 10x + 6}{x^3 - 4x^2 - 3x + 18}$$