

SEND - IN ASSIGNMENT**UNIT 2****RADICAL AND RATIONAL FUNCTIONS**

Name: _____

Teacher: _____

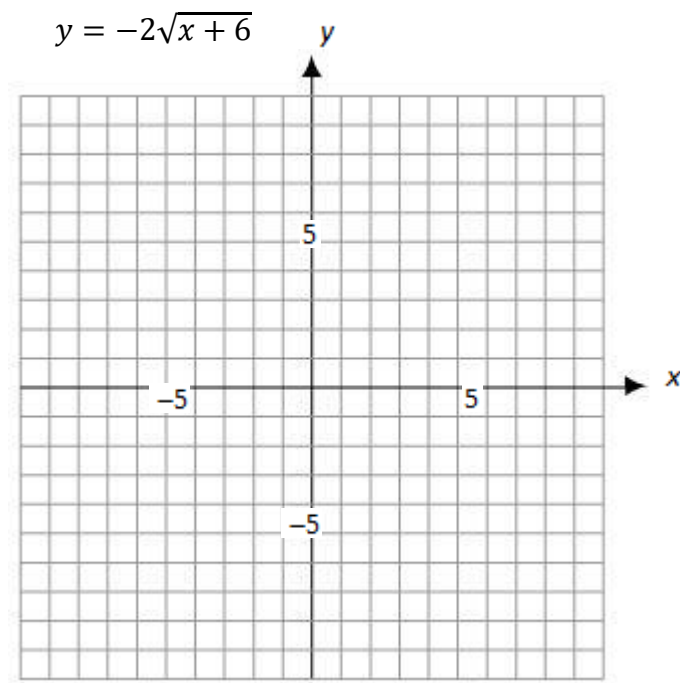
If you are cross enrolled, state your other school besides DESK.

Date assignment submitted: _____

- Be sure to show ALL work so you can receive full credit for the questions.

Total _____ = _____ %
100

1. Graph of the following function. Show clearly 3 coordinates. State the domain and range.



Domain: _____
1 mark

Range: _____
1 mark

2 marks

2. Identify the transformations for each of the following from $y = \sqrt{x}$

a. $y = -\sqrt{4(x+2)}$

2 marks

b. $y = 5\sqrt{3x-6}$

2 marks

c. $2y - 8 = -\frac{1}{3}\sqrt{-3x-9}$

2 marks

3. Write the equation of the radical function that results from the following transformations on the graph of $y = \sqrt{x}$ in the order presented.

a. Horizontal compression by a factor of one fourth and a vertical translation down 7 units.

a. _____
2 marks

b. Vertical expansion by a factor of 5, reflection in the x axis, horizontal translation 4 units right.

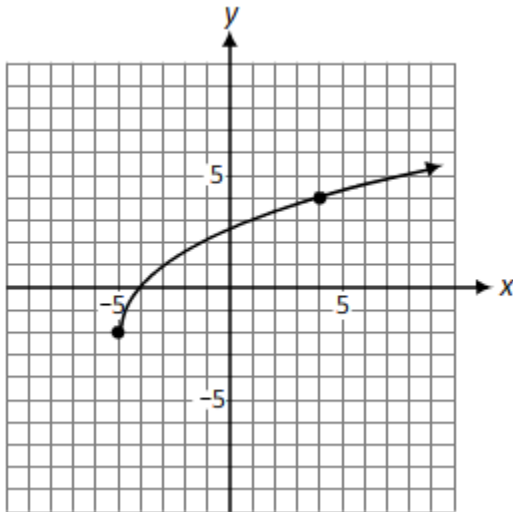
b. _____
2 marks

c. Vertical expansion by a factor of four, reflection in the x axis, horizontal expansion by a factor of 3 and a translation 2 units left and 7 units up.

c. _____
2 mark

4. Write the equation of each of the following. Use the form $y = a\sqrt{b(x-h)} + k$. Show your work as I should see substitution of the vertex and a point to determine the a and/or b value.

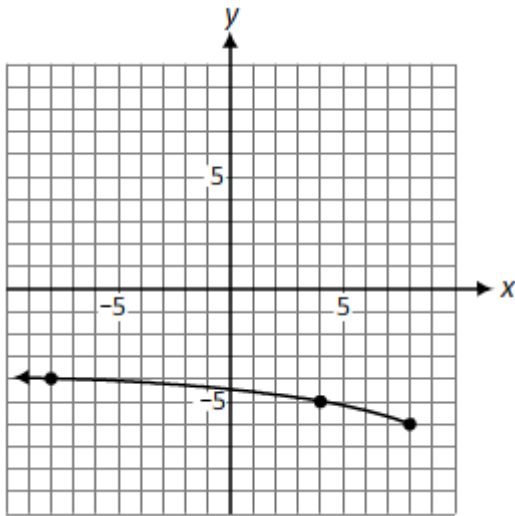
a.



Equation: _____

2 marks

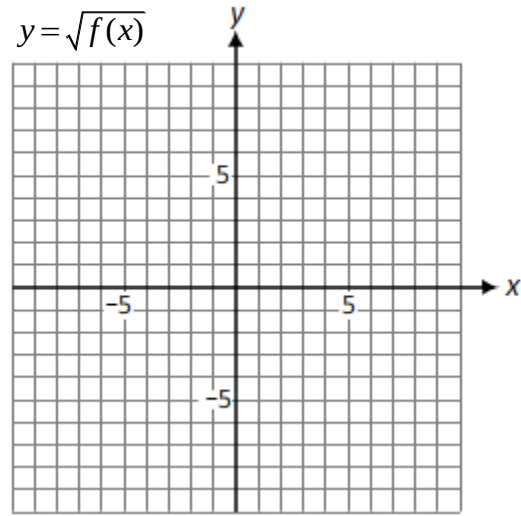
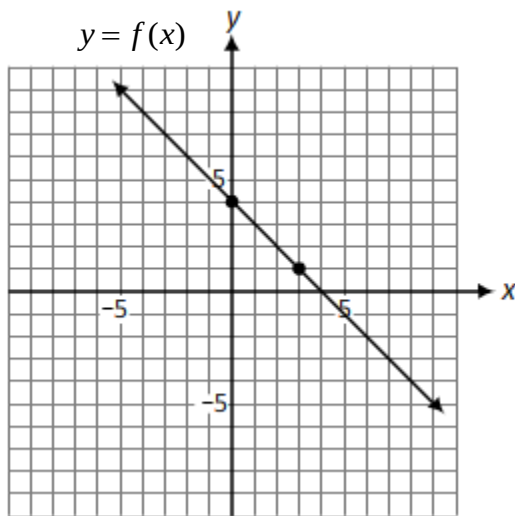
b)



Equation: _____

2 marks

5. Given the graph of $y = f(x)$ graph the function that would represent $y = \sqrt{f(x)}$
List the domain and range of each graph, list the **EXACT VALUES** of any invariant points.



2 marks

Domain $f(x)$: _____

1 mark

Domain $\sqrt{f(x)}$: _____

1 mark

Range $f(x)$: _____

1 mark

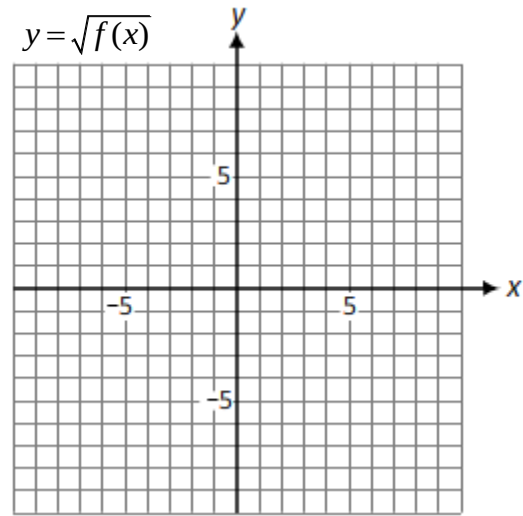
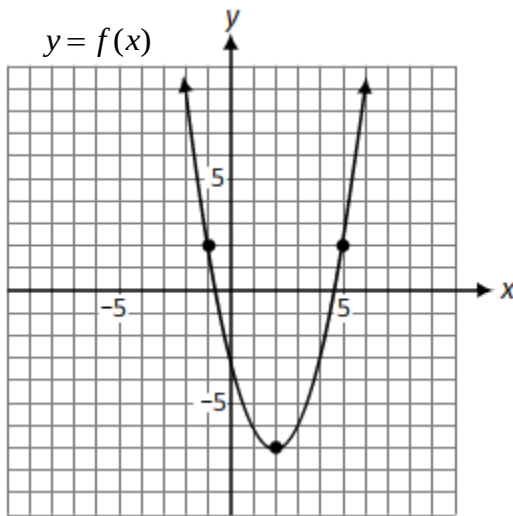
Range $\sqrt{f(x)}$: _____

1 mark

Invariant Points: _____

2 marks

6. Given the graph of $y = f(x)$ on the left, and $f(x) = (x-2)^2 - 7$ graph the function that would represent $y = \sqrt{f(x)}$. List the domain and range of each graph, list the **EXACT VALUES** of any invariant points.



2 marks

Domain $f(x)$: _____
1 mark

Domain $\sqrt{f(x)}$: _____
1 mark

Range $f(x)$: _____
1 mark

Range $\sqrt{f(x)}$: _____
1 mark

Invariant Points: _____

2 marks

7. Compare the domains and ranges of the following two functions. Answer using exact values. (1 mark each)

$$f(x) = 40 - 5x^2 \quad \text{and} \quad f(x) = \sqrt{40 - 5x^2}$$

Domain $f(x)$: _____

Domain $\sqrt{f(x)}$: _____

Range $f(x)$: _____

Range $\sqrt{f(x)}$: _____

8. Solve each of the following algebraically for their exact values.

a. $\sqrt{5x + 4} = 8$

a. _____
2 marks

b. $\frac{2}{5}\sqrt{x - 3} - 1 = 9$

b. _____
2 marks

c. $\sqrt{-2x - 5} - 4 = x$

c. _____
3 marks

9. Sketch the graphs of the following functions and show all asymptotes with a dotted line. You should show your work AND be able to graph WITHOUT a graphing calculator. (3 marks for graph)

a. $y = \frac{3x}{x-2} - 4$.

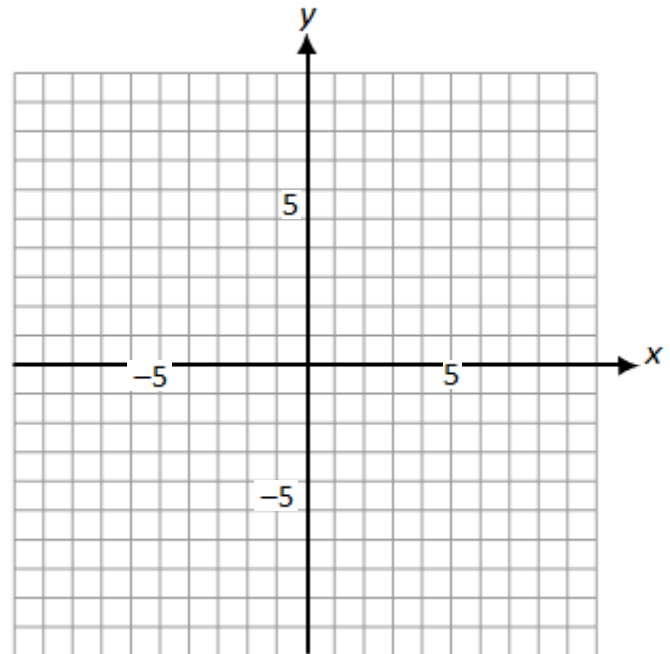
i) Equation of any vertical asymptote(s)

_____ 1 mark

ii) State any restrictions or non-permissible value(s)

_____ 1 mark

iii) Determine coordinates of any intercept(s). (algebraically)



3 marks

_____ 2 marks

iv) Describe the behavior of the function as it approaches and leaves vertical asymptotes and/or point of discontinuity.

_____ 1 mark

v) State the horizontal asymptote.

_____ 1 mark

vi) State the Domain and Range

_____ 2 mark

b. $y = \frac{2x+1}{x^2-2x-3}$

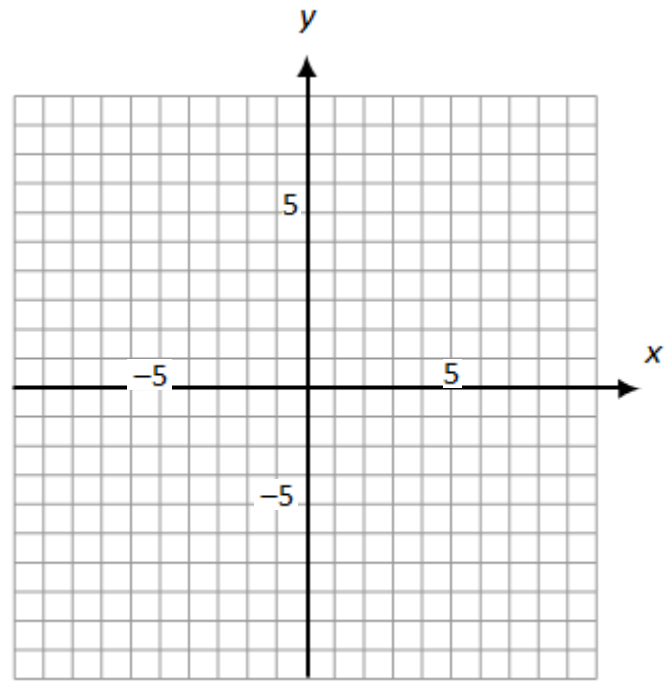
i) Equation of any vertical asymptote(s)

_____ 1 mark

ii) State any restrictions or non-permissible value(s)

_____ 1 mark

iii) Determine coordinates of any intercept(s). (*algebraically*)



3 marks

_____ 2 marks

iv) Describe the behavior of the function as it approaches and leaves vertical asymptotes and/or point of discontinuity.

_____ 1 mark

v) State the horizontal asymptote _____.

_____ 1 mark

vi) State the Domain and Range

_____ 2 mark

c. $y = \frac{2x^2 - 16x + 30}{x^2 + x - 12}$

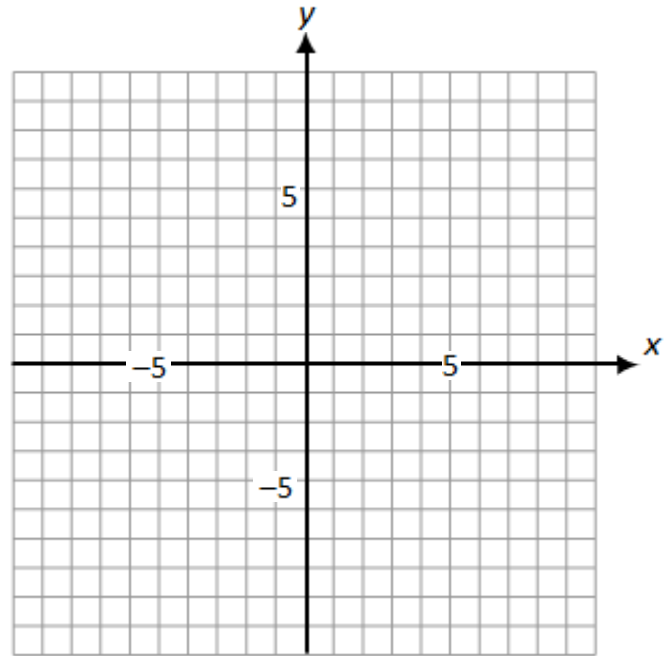
i) Equation of any vertical asymptote(s)

_____ 1 mark

ii) State any restrictions or non-permissible value(s)

_____ 1 mark

iii) Determine coordinates of any intercept(s). (algebraically)



3 marks

_____ 2 marks

iv) Describe the behavior of the function as it approaches and leaves vertical asymptotes and/or point of discontinuity.

_____ 1 mark

v) State the horizontal asymptote.

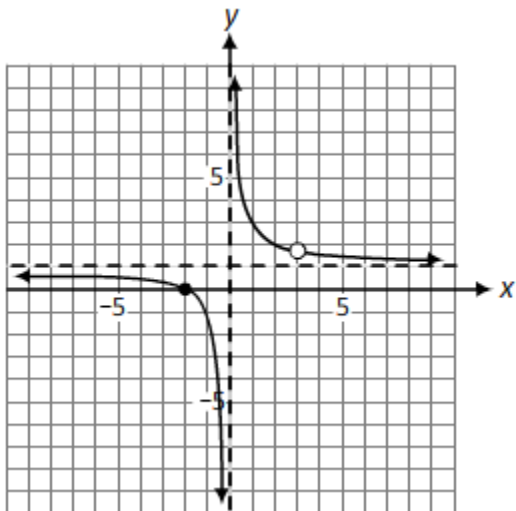
_____ 1 mark

vi) State the Domain and Range

_____ 2 mark

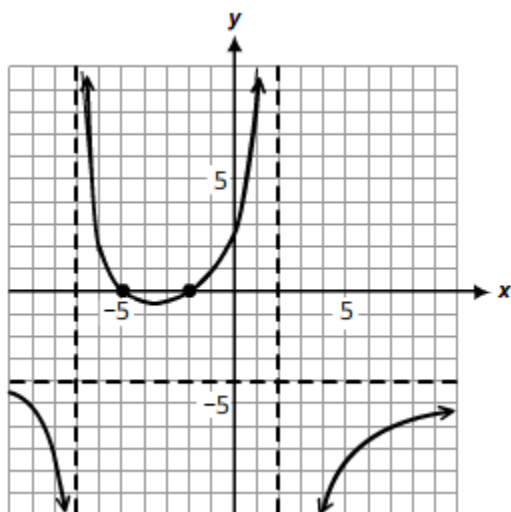
10. Write a possible equation for each of the following graphs. Explain your reasoning.

a.



a. _____
3 marks

b.



b. _____
3 marks

11. Write the equation of a possible rational function with the following characteristics. Explain your reasoning.

- a) Vertical asymptotes at $x = 5$ and $x = 3$, x intercepts of $x = 4$ and $x = -2$, and a horizontal asymptote of $y = \frac{3}{2}$

a. _____
2 marks

- b) Vertical asymptotes at $x = \frac{-1}{4}$, x intercept of $x = 0$, and a discontinuous point at $\left(2, \frac{2}{9}\right)$

b. _____
2 marks

12. Solve each of the following rational functions algebraically for their exact values.

a) $\frac{24}{(x-5)^2} = 2$

a. _____
3 marks

b) $\frac{1}{x} = \frac{2x}{9x+5}$

b. _____
3 marks

$$c) \frac{2x}{x-4} - \frac{x}{x^2-x-12} = \frac{x-2}{x+3} - 2$$

c. _____
3 marks

13. A river boat can travel at 24 km per hour in still water. The boat travels 40 km upstream against the current then turns around and travels the same distance back with the current. If the total trip took 7 hours, what is the speed of the current? Solve this question algebraically.

3 marks