Day 6-MCR3U

Name:_____

Date:_____

## Part 3: Exploring Reflections About the x-Axis: y = - f(x)

A) Quadratic Function: $y = x^2$

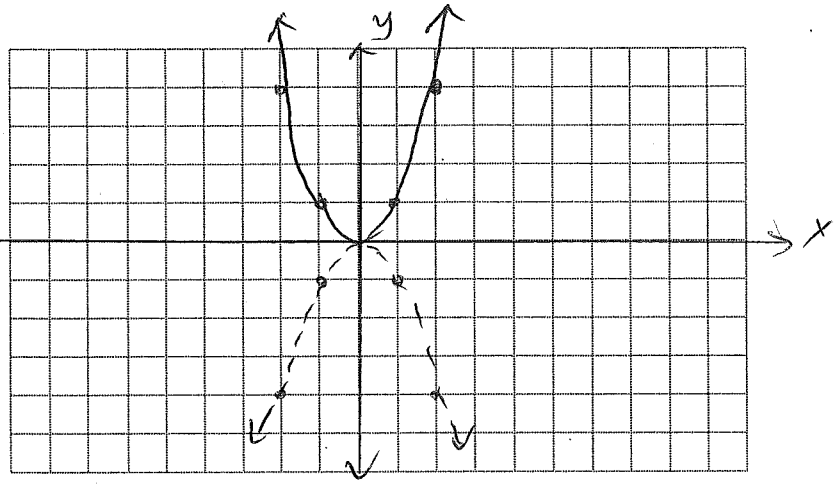
Complete the following tables of values and use them to graph and label each function.

| x | $y = x^2$ |
|---|---|
| -2 | 4 |
| -1 | 1 |
| 0 | 0 |
| 1 | 1 |
| 2 | 4 |

(a)

| x | $y = -x^2$ |
|---|---|
| -2 | -4 |
| -1 | -1 |
| 0 | 0 |
| 1 | -1 |
| 2 | -4 |

(b)




Compare the transformed function to the first function, $y = x^2$. Notice the similarities and differences of the coordinates of the points.

Reflection on x-axis.
y-values are negated.
(0,0) is the invariant point.

B) Square Root Function: $y = \sqrt{x}$

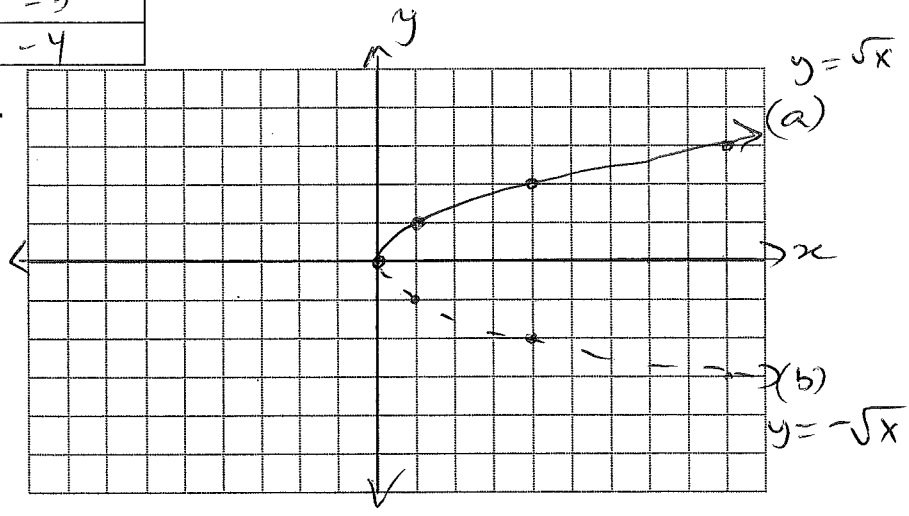
Complete the following tables of values and use them to graph and label each function.

| x | $y = \sqrt{x}$ |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 4 | 2 |
| 9 | 3 |
| 16 | 4 |

(a)

| x | $y = -\sqrt{x}$ |
|---|---|
| 0 | 0 |
| 1 | -1 |
| 4 | -2 |
| 9 | -3 |
| 16 | -4 |

(b)




Compare the transformed function to the first function, $y = \sqrt{x}$. Notice the similarities and differences of the coordinates of the points.

graph reflected around x-axis.
(0,0) invariant point
y-values are negated.

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C) Reciprocal Function: $y = \frac{1}{x}$

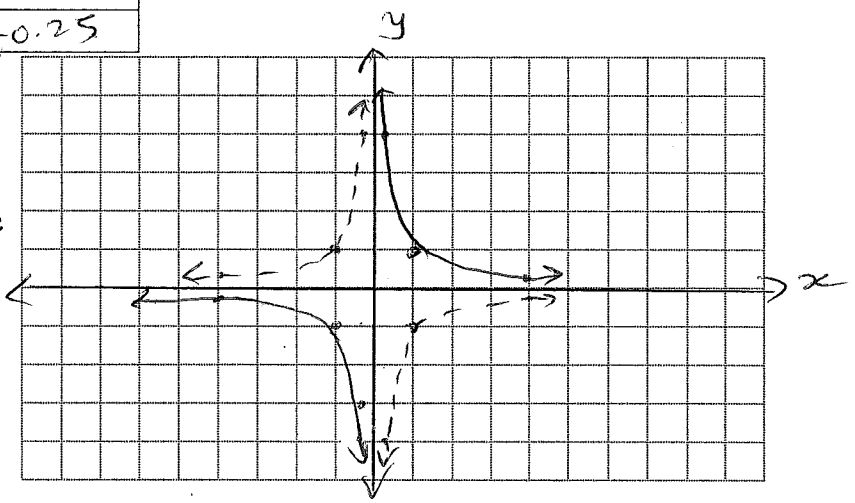
Complete the following tables of values and use them to graph and label each function.

| x | $y = \frac{1}{x}$ |
|---|---|
| -4 | -0.25 |
| -1 | -1 |
| $-\frac{1}{4}$ | -4 |
| $\frac{1}{4}$ | 4 |
| 1 | 1 |
| 4 | 0.25 |

(a)

| x | $y = -\frac{1}{x}$ |
|---|---|
| -4 | 0.25 |
| -1 | 1 |
| $-\frac{1}{4}$ | 4 |
| $\frac{1}{4}$ | -4 |
| 1 | 1 |
| 4 | -0.25 |

(b)




Compare the transformed function to the first function, $y = \frac{1}{x}$. Notice the similarities and differences of the coordinates of the points.

→ Reflection around x-axis

→ No invariant point

→ y-values are negated

SUMMARY

If y = f(x) is transformed to y = af(x), describe the transformation:

1. If a = -1, then the graph will be reflected around x-axis
2. Any point (x, y) under this transformation becomes ( x , -y ).

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## Part 4: Exploring Reflections About the y-Axis: y = f(-x)

A) Quadratic Function: $y = x^2$

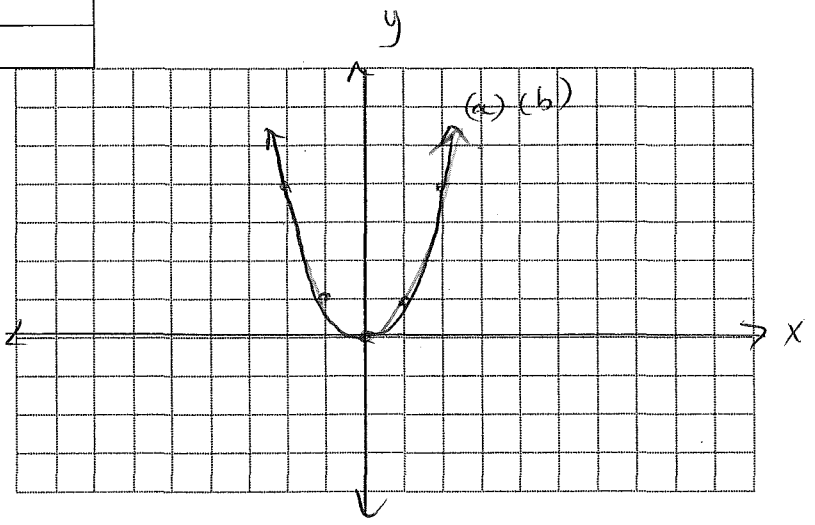
Complete the following tables of values and use them to graph and label each function.

| x | $y = x^2$ |
|---|---|
| -2 | 4 |
| -1 | 1 |
| 0 | 0 |
| 1 | 1 |
| 2 | 4 |

(a)

| x | $y = (-x)^2$ |
|---|---|
| 2 | 4 |
| 1 | 1 |
| 0 | 0 |
| -1 | 1 |
| -2 | 4 |

(b)




Compare the transformed function to the first function, $y = x^2$. Notice the similarities and differences of the coordinates of the points.

same parabola

(Reflection in y-axis)

B) Square Root Function: $y = \sqrt{x}$

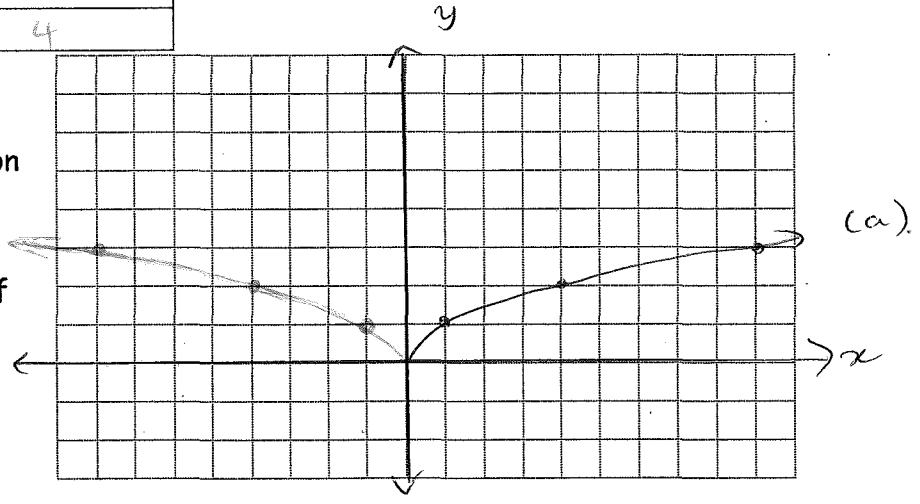
Complete the following tables of values and use them to graph and label each function.

| x | $y = \sqrt{x}$ |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 4 | 2 |
| 9 | 3 |
| 16 | 4 |

(a)

| x | $y = \sqrt{-x}$ |
|---|---|
| 0 | 0 |
| -1 | 1 |
| -4 | 2 |
| -9 | 3 |
| -16 | 4 |

(b)




Compare the transformed function to the first function, $y = \sqrt{x}$. Notice the similarities and differences of the coordinates of the points.

↳ Reflection around y-axis.

↳ (0,0) invariant

↳ x-values are negated.

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C) Reciprocal Function: $y = \frac{1}{x}$

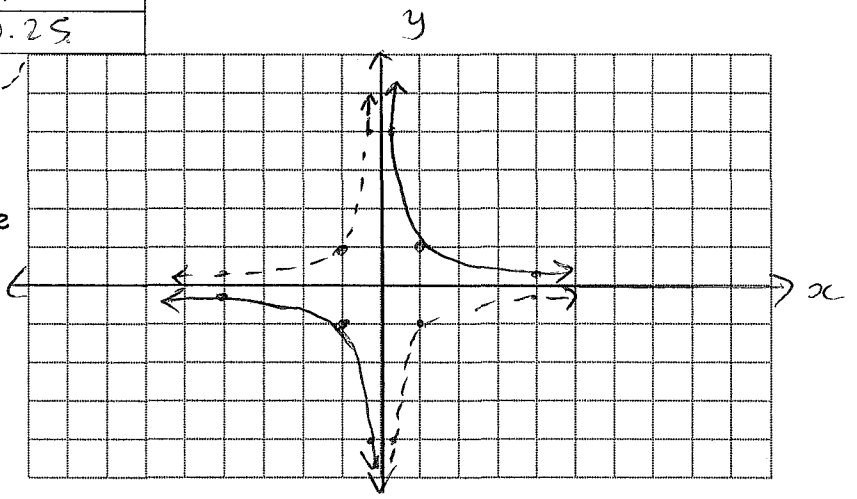
Complete the following tables of values and use them to graph and label each function.

| x | $y = \frac{1}{x}$ |
|---|---|
| -4 | -0.25 |
| -1 | -1 |
| $-\frac{1}{4}$ | -4 |
| $\frac{1}{4}$ | 4 |
| 1 | 1 |
| 4 | 0.25 |

(a)

| x | $y = \frac{1}{(-x)}$ |
|---|---|
| 4 | -0.25 |
| 1 | -1 |
| $\frac{1}{4}$ | -4 |
| $-\frac{1}{4}$ | 4 |
| -1 | 1 |
| -4 | 0.25 |

(b)




Compare the transformed function to the first function, $y = \frac{1}{x}$. Notice the similarities and differences of the coordinates of the points.

SUMMARY

If y = f(x) is transformed to y = f(kx), describe the transformation:

1. If k = -1, then the graph will be reflected around y-axis

2. Any point (x, y) under this transformation becomes ( $-x$ , $y$ ).

Homework: p. 51 #2