

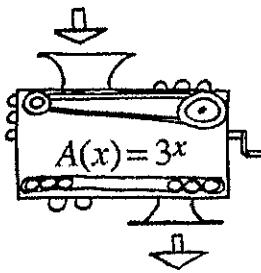
Honors Algebra 2 – Unit 5 Day #1
Homework – Inverse Functions

Name Key

1. Antonio's function machine is shown at the right.

a. What is $A(2)$?

$$A(2) = 9$$



b. If 81 came out, what was dropped in?

$$3^x = 81 \quad x = 4$$

c. If 8 came out, what was dropped in? Round to two decimal places.

$$3^x = 8$$

guess and check or graph it.
 $x \approx 1.89$

2. Write the inverse equation for each of the following:

a. $y = 3x - 8$

$$y = \frac{1}{3}x + \frac{8}{3}$$

b. $y = \frac{x+6}{2}$

$$y = 2x - 6$$

c. $y = 16x^2 - 49$

$$\begin{aligned} y &= \pm \sqrt{\frac{x+49}{16}} \\ &= \pm \frac{\sqrt{x+49}}{4} \end{aligned}$$

3. The function $f(x)$ is represented by the graph. Draw the graph of its inverse. State the domain and range for $f(x)$ and $f^{-1}(x)$.

| X | f(x) |
|----|------|
| -2 | -3 |
| 0 | -2 |
| 1 | 0 |
| 2 | 2 |
| 5 | 3 |

$$f(x)$$

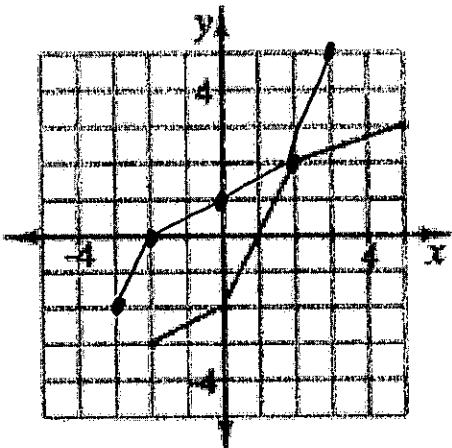
$$D: \{x | x \in \mathbb{R}, -2 \leq x \leq 5\}$$

$$R: \{y | y \in \mathbb{R}, -3 \leq y \leq 3\}$$

$$f^{-1}(x)$$

$$D: \{x | x \in \mathbb{R}, -3 \leq x \leq 3\}$$

$$R: \{y | y \in \mathbb{R}, -2 \leq y \leq 5\}$$



4. If $10^x = 10^y$, what is true about x and y ?

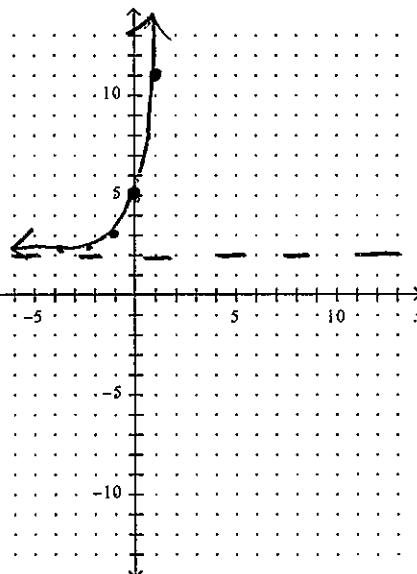
then $x = y$

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5. Graph the function. Be sure to include an x/y chart. $y = (3)^{x+1} + 2$

| $x - 1$ | x | y | $+ 2$ |
|---------|-----|---------------|----------------|
| -3 | -2 | $\frac{1}{9}$ | $2\frac{1}{9}$ |
| -2 | -1 | $\frac{1}{3}$ | $2\frac{1}{3}$ |
| -1 | 0 | 1 | 3 |
| 0 | 1 | 3 | 5 |
| 1 | 2 | 9 | 11 |



Describe the transformation in words

Translated one left
and 2 up

Domain:

$$\{x | x \in \mathbb{R}\}$$

Range:

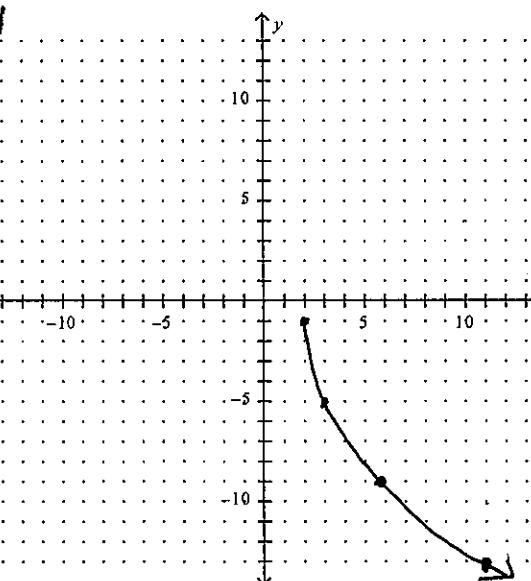
$$\{y | y \in \mathbb{R}, y > 2\}$$

Asymptote(s):

$$y = 2$$

6. Graph the function. Be sure to include an x/y chart. $y = -4\sqrt{x-2} - 1$

| $x + 2$ | x | y | $-4y - 1$ |
|---------|-----|-----|-----------|
| 2 | 0 | 0 | -1 |
| 3 | 1 | 1 | -5 |
| 6 | 4 | 2 | -9 |
| 11 | 9 | 3 | -13 |
| 18 | 16 | 4 | -17 |



Describe the transformation in words

Reflected over x-axis
stretched by 4

Translated 2 right
and one down

Domain:

$$\{x | x \in \mathbb{R}, x \geq 2\}$$

Range:

$$\{y | y \in \mathbb{R}, y \leq -1\}$$

Asymptote(s):

None

Solve the following equations.

7. $\frac{6}{15} = 2 - \frac{x}{5}$

8. $4(3x + 1)^2 + 8 = -72$

$$\frac{6}{15} = \frac{30}{15} - \frac{3x}{15}$$

$$(3x+1)^2 = -20$$

$$-24 = -3x$$

$$3x+1 = \pm 2i\sqrt{5}$$

$$8 = x$$

$$x = \frac{-1 \pm 2i\sqrt{5}}{3}$$

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9. $-2|4x - 7| + 12 = 10x - 8$

$$|4x-7| = -5x+10$$

$$4x-7 = -5x+10$$

$$9x = 17$$

$$x = \frac{17}{9} \checkmark$$

$$4x-7 = 5x-10$$

$$-x = -3$$

$$x = 3$$

extraneous

10. $5|4x - 2| - 8 > 12$

$$|4x-2| > 4$$

$$4x-2 > 4 \text{ or } 4x-2 < -4$$

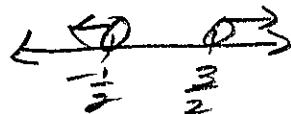
$$4x > 6$$

$$4x < -2$$

$$x > \frac{3}{2}$$

$$x < -\frac{1}{2}$$

$$x < -\frac{1}{2} \text{ or } x > \frac{3}{2}$$



11. $\sqrt{x+7} + 5 = x$

$$\sqrt{x+7} = x-5$$

$$x+7 = x^2 - 10x + 25$$

$$0 = x^2 - 11x + 18$$

$$0 = (x-9)(x-2)$$

$$x = 9 \checkmark$$

$$x = 2$$

extraneous

12. $16x^4 - 625 = 0$

$$(4x^2 + 25)(4x^2 - 25) = 0$$

$$x^2 = \frac{-25}{4} \quad x^2 = \frac{25}{4}$$

$$x = \pm \frac{5}{2}$$

$$x = \pm \frac{5}{2}$$

13. Let $f(x) = 4x + 1$ and $g(x) = -3x^2 - 5x + 7$

a. Find $f \circ g(-2)$

$$g(-2) = -12 + 10 + 7 = 5$$

$$f(5) = 20 + 1$$

$$f(g(-2)) = 21$$

b. Find $f(g(x))$

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

$$= -12x^2 - 20x + 29$$

c. Find $g(f(x))$

$$= -3(16x^2 + 8x + 1)$$

$$= -48x^2 - 44x - 1$$

d. If $g(x) = -5$, what is the value(s) of x ?

$$-3x^2 - 5x + 7 = -5$$

$$-3x^2 - 5x + 12 = 0$$

$$3x^2 + 5x - 12 = 0$$

$$(3x-4)(x+3) = 0$$

$$x = \frac{4}{3} \quad x = -3$$

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Simplify without your calculator.

$$14. \left(16,384^{\frac{4}{7}} \right)^{\frac{3}{8}} = (256)^{\frac{3}{8}} = 8$$

$$\begin{array}{l} 4.8.6 \\ 12 \cdot 12 / 6 \cdot 6 \end{array}$$

$$16. \left(\frac{1024}{1,048,576} \right)^{\frac{3}{10}} \cdot \left(\frac{512}{19,683} \right)^{\frac{2}{9}} = \frac{8}{64} \cdot \frac{4}{9} = \frac{1}{8}$$

$$17. \left(\frac{117,649x^{\frac{4}{10}}}{46,656x^{\frac{5}{3}}} \right)^{-\frac{1}{6}} = \frac{\frac{4}{10} - \frac{5}{3}}{\frac{12}{30} - \frac{50}{30}} = \frac{-\frac{38}{30}}{\frac{12}{30}} = -\frac{19}{15}$$

$$= \frac{6}{7} x^{\frac{19}{90}}$$

$$+ \frac{19}{15} \cdot + \frac{1}{6}$$

$$18. \left(\left(\frac{x^{\frac{3}{4}}y^{-3}}{x^{\frac{-5}{2}}y^{\frac{1}{6}}} \right)^{\frac{-8}{3}} \cdot x^{-4} \right)^{-\frac{8}{3}} = \left(\frac{x^{\frac{13}{4}}}{y^{\frac{19}{6}}} \right)^{-\frac{8}{3}} = \frac{y^{76/9}}{x^{+26/3}} \circ x^{-4} = \left(\frac{y^{76/9}}{x^{38/3}} \right)^{-2} = \frac{x^{76/3}}{y^{152/9}}$$

19. Rewrite in radical form.
Simplify the radical if necessary.

$$\begin{aligned} & \left(4x^{\frac{9}{8}}y^{\frac{7}{4}}z^{\frac{12}{16}} \right)^2 \\ &= 16x^{\frac{9}{4}}y^{\frac{7}{2}}z^{\frac{12}{8}} \\ &= 16x^{\frac{9}{4}}y^{\frac{7}{2}}z^{\frac{3}{2}} \\ &= 16 \sqrt[4]{x^9 y^{14} z^6} \\ &= 16x^2 y^3 z \sqrt[4]{x y^2 z^2} \end{aligned}$$

$$\begin{array}{l} \frac{3}{7} + \frac{5}{2} = \frac{13}{4} \\ -3 - \frac{1}{6} = -\frac{19}{6} \\ \frac{13}{4} \cdot -\frac{8}{3} = -\frac{26}{3} \\ \frac{19}{6} \cdot -\frac{8}{3} = -\frac{76}{9} \\ + \frac{26}{3} + \frac{4}{3} = \frac{38}{3} \end{array}$$

20. Rewrite in exponential form.
All variables should be in the numerator

$$\begin{aligned} & \sqrt[4]{\frac{2 \left(x^{\frac{1}{2}} y^{-\frac{2}{3}} \right)^2}{32z^{-\frac{4}{5}}}} \\ &= \sqrt[4]{\frac{xy^{-4/3}}{2z^{-4/5}}} \\ &= \frac{x^{\frac{1}{4}} y^{-\frac{1}{3}}}{16^{\frac{1}{4}} z^{-\frac{1}{5}}} \\ &= \frac{1}{2} x^{\frac{1}{4}} y^{\frac{1}{3}} z^{\frac{1}{5}} \end{aligned}$$