

Math Sheet

Name _____ Score _____ / 12 Teacher _____ Date _____

Inverse Functions

Use the printed domains. Identify inverse pairs or find the inverse, as directed. Show your work. R means all real numbers.

1. Are f and g inverses?

$$f(x) = -\frac{3}{8} \cdot x - 4$$

D(f): R

$$g(x) = \frac{8 \cdot x + 32}{-3} + 2$$

D(g): R

2. Are f and g inverses?

$$f(x) = \frac{-2 \cdot x + 3}{5}$$

D(f): R

$$g(x) = \frac{5 \cdot x - 3}{-2}$$

D(g): R

3. Are f and g inverses?

$$f(x) = -5 \cdot x - 5$$

D(f): R

$$g(x) = \frac{x + 5}{-5} + 4$$

D(g): R

4. Are f and g inverses?

$$f(x) = (x - 8)^2$$

D(f): $x \geq 8$

$$g(x) = \sqrt{x} + 8$$

D(g): $x \geq 0$

5. Are f and g inverses?

$$f(x) = -7 \cdot (x - 6)^4$$

D(f): $x \leq 6$

$$g(x) = -4\sqrt{\frac{x}{-7}} + 6 + 3$$

D(g): $x \leq 0$

6. Are f and g inverses?

$$f(x) = 5 \cdot x$$

D(f): R

$$g(x) = \frac{x}{5}$$

D(g): R

7. Find the inverse of f.

$$f(x) = \frac{1}{3} \cdot x - 8$$

D(f): R

8. Find the inverse of f.

$$f(x) = \frac{6 \cdot x + 9}{4}$$

D(f): R

9. Find the inverse of f.

$$f(x) = 4 \cdot x + 3$$

D(f): R

10. Find the inverse of f.

$$f(x) = (x + 8)^2$$

D(f): $x \leq -8$

11. Find the inverse of f.

$$f(x) = 2 \cdot (x + 5)^4$$

D(f): $x \leq -5$

12. Find the inverse of f.

$$f(x) = -2 \cdot x$$

D(f): R

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Answer key

Use the printed domains. Identify inverse pairs or find the inverse, as directed. Show your work. R means all real numbers.

1. Are f and g inverses?

$$f(x) = -\frac{3}{8} \cdot x - 4$$

$$D(f): \mathbb{R}$$

$$g(x) = \frac{8 \cdot x + 32}{-3} + 2$$

$$D(g): \mathbb{R}$$

No. One counterexample:

$$f(1) = \frac{-35}{8}$$

$$g(f(1)) = 3$$

Correct inverse

$$f^{-1}(x) = \frac{8 \cdot x + 32}{-3}$$

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

2. Are f and g inverses?

$$f(x) = \frac{-2 \cdot x + 3}{5}$$

$$D(f): \mathbb{R}$$

$$g(x) = \frac{5 \cdot x - 3}{-2}$$

$$D(g): \mathbb{R}$$

Yes, on the shown domains.

$$f(g(x)) = x; g(f(x)) = x$$

Correct inverse

$$f^{-1}(x) = \frac{5 \cdot x - 3}{-2}$$

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

3. Are f and g inverses?

$$f(x) = -5 \cdot x - 5$$

$$D(f): \mathbb{R}$$

$$g(x) = \frac{x + 5}{-5} + 4$$

$$D(g): \mathbb{R}$$

No. One counterexample:

$$f(3) = -20$$

$$g(f(3)) = 7$$

Correct inverse

$$f^{-1}(x) = \frac{x + 5}{-5}$$

Domain: $\mathbb{R}$

Range: $\mathbb{R}$

4. Are f and g inverses?

$$f(x) = (x - 8)^2$$

$$D(f): x \geq 8$$

$$g(x) = \sqrt{x} + 8$$

$$D(g): x \geq 0$$

Yes, on the shown domains.

$$f(g(x)) = x; g(f(x)) = x$$

Correct inverse

$$f^{-1}(x) = \sqrt{x} + 8$$

Domain: $x \geq 0$

Range: $x \geq 8$

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5. Are f and g inverses?

$$f(x) = -7 \cdot (x - 6)^4$$

$$D(f): x \leq 6$$

$$g(x) = -4\sqrt[4]{\frac{x}{-7}} + 6 + 3$$

$$D(g): x \leq 0$$

No. One counterexample:

$$f(-2) = -28672$$

$$g(f(-2)) = 1$$

Correct inverse

$$f^{-1}(x) = -4\sqrt[4]{\frac{x}{-7}} + 6$$

$$\text{Domain: } x \leq 0$$

$$\text{Range: } x \leq 6$$

6. Are f and g inverses?

$$f(x) = 5 \cdot x$$

$$D(f): \mathbb{R}$$

$$g(x) = \frac{x}{5}$$

$$D(g): \mathbb{R}$$

Yes, on the shown domains.

$$f(g(x)) = x; g(f(x)) = x$$

Correct inverse

$$f^{-1}(x) = \frac{x}{5}$$

$$\text{Domain: } \mathbb{R}$$

$$\text{Range: } \mathbb{R}$$

7. Find the inverse of f.

$$f(x) = \frac{1}{3} \cdot x - 8$$

$$D(f): \mathbb{R}$$

Swap x and y

$$x = \frac{1}{3} \cdot y - 8$$

$$3 \cdot y = 9 \cdot x + 72$$

Correct inverse

$$f^{-1}(x) = \frac{9 \cdot x + 72}{3}$$

$$\text{Domain: } \mathbb{R}$$

$$\text{Range: } \mathbb{R}$$

8. Find the inverse of f.

$$f(x) = \frac{6 \cdot x + 9}{4}$$

$$D(f): \mathbb{R}$$

Swap x and y

$$x = \frac{6 \cdot y + 9}{4}$$

$$6 \cdot y = 4 \cdot x - 9$$

Correct inverse

$$f^{-1}(x) = \frac{4 \cdot x - 9}{6}$$

$$\text{Domain: } \mathbb{R}$$

$$\text{Range: } \mathbb{R}$$

9. Find the inverse of f.

$$f(x) = 4 \cdot x + 3$$

$$D(f): \mathbb{R}$$

Swap x and y

$$x = 4 \cdot y + 3$$

$$4 \cdot y = x - 3$$

Correct inverse

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

$$\text{Domain: } \mathbb{R}$$

$$\text{Range: } \mathbb{R}$$

10. Find the inverse of f.

$$f(x) = (x + 8)^2$$

$$D(f): x \leq -8$$

Swap x and y

$$x = (y + 8)^2$$

$$(y + 8)^2 = x$$

$$y + 8 = -\sqrt{x}$$

Correct inverse

$$f^{-1}(x) = -\sqrt{x} - 8$$

$$\text{Domain: } x \geq 0$$

$$\text{Range: } x \leq -8$$

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11. Find the inverse of f.

$$f(x) = 2 \cdot (x + 5)^4$$

$$D(f): x \leq -5$$

Swap x and y

$$x = 2 \cdot (y + 5)^4$$

$$(y + 5)^4 = \frac{x}{2}$$

$$y + 5 = -\sqrt[4]{\frac{x}{2}}$$

Correct inverse

$$f^{-1}(x) = -\sqrt[4]{\frac{x}{2}} - 5$$

$$\text{Domain: } x \geq 0$$

$$\text{Range: } x \leq -5$$

12. Find the inverse of f.

$$f(x) = -2 \cdot x$$

$$D(f): \mathbb{R}$$

Swap x and y

$$x = -2 \cdot y$$

$$-2 \cdot y = x$$

Correct inverse

$$f^{-1}(x) = \frac{x}{-2}$$

$$\text{Domain: } \mathbb{R}$$

$$\text{Range: } \mathbb{R}$$