

## Unit 9.7 Inverse Functions EXAMPLE

State if the given functions are inverses.

$$1) \begin{aligned} g(x) &= -(x-3)^3 \\ f(x) &= \sqrt[3]{x+1} \end{aligned}$$

$$2) \begin{aligned} h(x) &= -\frac{1}{x+2} - 3 \\ f(x) &= -\frac{1}{x+3} - 2 \end{aligned}$$

$$3) \begin{aligned} g(x) &= \frac{2}{x-1} \\ f(x) &= -\frac{1}{-x-3} + 2 \end{aligned}$$

$$4) \begin{aligned} g(x) &= -(x-2)^5 \\ f(x) &= \frac{-4 - \sqrt[3]{4x}}{2} \end{aligned}$$

$$5) \begin{aligned} g(x) &= \sqrt[5]{x+3} + 1 \\ f(x) &= -2(x-1)^5 \end{aligned}$$

$$6) \begin{aligned} f(x) &= 3x - 1 \\ g(x) &= \frac{x+1}{3} \end{aligned}$$

$$7) \begin{aligned} f(x) &= \frac{x-5}{9} \\ g(x) &= \frac{1}{4}x + \frac{1}{4} \end{aligned}$$

$$8) \begin{aligned} g(x) &= \frac{-15-x}{5} \\ f(x) &= 3x - 3 \end{aligned}$$

$$9) \begin{aligned} h(x) &= \sqrt[5]{x+2} + 1 \\ f(x) &= (x-1)^5 - 2 \end{aligned}$$

$$10) \begin{aligned} f(x) &= \sqrt[5]{\frac{x+2}{2}} \\ g(x) &= 2x^5 - 2 \end{aligned}$$

**Find the inverse of each function.**

$$11) f(x) = -\frac{2}{x+1} - 1$$

$$12) g(x) = \sqrt[3]{x+1} + 1$$

$$13) f(x) = \frac{2}{-x-2} - 2$$

$$14) f(x) = \sqrt[5]{x+1}$$

$$15) f(x) = -\frac{3}{8}x - \frac{3}{2}$$

$$16) f(x) = \sqrt[3]{x+3}$$

$$17) h(x) = -3 - x^3$$

$$18) g(x) = \frac{4}{x+1} - 1$$

$$19) g(x) = -\frac{2}{x} + 2$$

$$20) g(x) = \frac{4}{x+3} - 1$$

$$21) g(x) = \sqrt[3]{x+1}$$

$$22) f(x) = \frac{4}{-x-3}$$

$$23) g(x) = 3 + \frac{1}{5}x$$

$$24) f(x) = \frac{-10+2x}{5}$$

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State if the given functions are inverses.

$$1) \begin{aligned} g(x) &= -(x-3)^3 \\ f(x) &= \sqrt[3]{x+1} \end{aligned}$$

No

$$2) \begin{aligned} h(x) &= -\frac{1}{x+2} - 3 \\ f(x) &= -\frac{1}{x+3} - 2 \end{aligned}$$

$$f(x) = -\frac{1}{x+3} - 2$$

Yes

$$3) \begin{aligned} g(x) &= \frac{2}{x-1} \\ f(x) &= -\frac{1}{-x-3} + 2 \end{aligned}$$

No

$$4) \begin{aligned} g(x) &= -(x-2)^5 \\ f(x) &= \frac{-4 - \sqrt[3]{4x}}{2} \end{aligned}$$

No

$$5) \begin{aligned} g(x) &= \sqrt[5]{x+3} + 1 \\ f(x) &= -2(x-1)^5 \end{aligned}$$

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**Find the inverse of each function.**

$$11) f(x) = -\frac{2}{x+1} - 1$$

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

$$13) f(x) = \frac{2}{-x-2} - 2$$

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

$$15) f(x) = -\frac{3}{8}x - \frac{3}{2}$$

$$f^{-1}(x) = -4 - \frac{8}{3}x$$

$$17) h(x) = -3 - x^3$$

$$h^{-1}(x) = \sqrt[3]{-x-3}$$

$$19) g(x) = -\frac{2}{x} + 2$$

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

$$21) g(x) = \sqrt[3]{x} + 1$$

$$g^{-1}(x) = (x-1)^3$$

$$23) g(x) = 3 + \frac{1}{5}x$$

$$g^{-1}(x) = 5x - 15$$

$$12) g(x) = \sqrt[3]{x+1} + 1$$

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$$f^{-1}(x) = \frac{5x+10}{2}$$