

## SOLUTIONS $\Rightarrow$ EXERCISE 7

1.  $\{(-1, 5), (0, 12), (1, 18)\}$

Inverse:  $\{(5, -1), (12, 0), (18, 1)\}$

2.  $\{(2, 9), (4, 16), (6, 16), (15, 19)\}$

Inverse:  $\{(9, 2), (16, 4), (16, 6), (19, 15)\}$

$$3. \quad y = x + 4$$

Inverse:  $x = y + 4$

Solve for  $y$ :

$$x - 4 = y \quad \underline{\underline{\text{or}}} \quad y = x - 4$$

$$4. \quad y = 7x + 15$$

Inverse:  $x = 7y + 15$

Solve for  $y$ :  $\frac{x-15}{7} = \frac{7y}{7}$

$$\frac{x-15}{7} = y$$

$$5. y = \frac{2}{5}x + 7$$

$$\text{Inverse: } x = \frac{2}{5}y + 7$$

$$\text{Solve for } y: x - 7 = \frac{2}{5}y$$

$$\frac{5}{2}(x - 7) = y$$

$$\frac{5x - 35}{2} = y \quad \underline{\text{OR}} \quad \frac{5x - 35}{2} = y$$

6. Inverse Functions

7. NOT Inverse Function

8. Inverse Functions.

9. Inverse Functions.

10.

Exponential Form

$$125 = 5^3$$

$$8 = 2^3$$

$$\left(\frac{1}{49}\right) = 7^{-2}$$

$$12^{-1} = \left(\frac{1}{12}\right)$$

$$16^{\frac{1}{2}} = 4$$

$$45^0 = 1$$

$$64^{\frac{1}{3}} = \frac{1}{4}$$

Logarithmic Form

$$3 = \log_5 125$$

$$3 = \log_2 8$$

$$-2 = \log_7 \left(\frac{1}{49}\right)$$

$$-1 = \log_{12} \left(\frac{1}{12}\right)$$

$$\left(\frac{1}{2}\right) = \log_{16} 4$$

$$0 = \log_{45} 1$$

$$\left(-\frac{1}{3}\right) = \log_{64} \frac{1}{4}$$

11.  $\Rightarrow \log 1000$  "SAME AS"  $\log_{10} 1000$

$$\log_{10} 1000$$

$$x = \log_{10} 1000$$

$$10^x = 1000$$

$$10^x = 10^3$$

$$x = 3$$

$$12. \log_3 27$$

$$\begin{aligned} x &= \log_3 27 \\ 3^x &= 27 \\ 3^x &= 3^3 \\ x &= 3 \end{aligned}$$

$$13. \log_5 625$$

$$\begin{aligned} x &= \log_5 625 \\ 5^x &= 625 \\ 5^x &= 5^4 \\ x &= 4 \end{aligned}$$

$$14. \log_{121} 1$$

$$\begin{aligned} x &= \log_{121} 1 \\ 121^x &= 1 \\ 121^x &= 121^0 \\ x &= 0 \end{aligned}$$

$$15. \log_5 \left( \frac{1}{25} \right)$$

$$x = \log_5 \left( \frac{1}{25} \right)$$

$$5^x = \frac{1}{25}$$

$$5^x = \frac{1}{5^2}$$

$$5^x = 5^{-2}$$

$$x = -2$$

$$16. \log_5 5$$

$$x = \log_5 5$$

$$5^x = 5$$

$$5^x = 5^1$$

$$x = 1$$

$$17. \log_2 \left( \frac{1}{8} \right)$$

$$x = \log_2 \left( \frac{1}{8} \right)$$

$$2^x = \frac{1}{8}$$

$$2^x = \frac{1}{2^3}$$

$$2^x = 2^{-3}$$

$$x = -3$$



$$18. \log_{\frac{1}{5}}(125)$$

$$x = \log_{\frac{1}{5}}(125)$$

$$\frac{1}{5}^x = 125$$

$$(5^{-1})^x = (5^3)$$

$$5^{-1x} = 5^3$$

$$\frac{-1x}{-1} = \frac{3}{-1}$$

$$x = -3$$

$$19. \log_{\frac{1}{3}}\left(\frac{1}{81}\right)$$

$$x = \log_{\frac{1}{3}}\left(\frac{1}{81}\right)$$

$$\frac{1}{3}^x = \frac{1}{81}$$

$$\frac{1}{3}^x = \frac{1}{3^4}$$

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

$$3^{-1x} = 3^{-4}$$

$$\frac{-1x}{-1} = \frac{-4}{-1}$$

$$x = 4$$

$$20. \log_3 x = 4 \quad \leftarrow \text{Logarithmic Form}$$

$$3^4 = x \quad \leftarrow \text{Exponential Form}$$

$$81 = x$$

$$21. \log_5 x = -2$$

$$5^{-2} = x$$

$$\frac{1}{5^2} = x$$

$$\frac{1}{25} = x$$

$$22. \log_x 81 = \frac{4}{3}$$

$$x^{\frac{4}{3}} = 81$$

$$\left(x^{\frac{4}{3}}\right)^{\frac{3}{4}} = 81^{\frac{3}{4}}$$

$$x = 81^{\frac{3}{4}}$$

$$x = \left(\sqrt[4]{81}\right)^3$$

$$x = (3)^3$$

$$x = 27$$

$$23. \log_x 36 = \frac{2}{5}$$

$$x^{\frac{2}{5}} = 36$$

$$\left(x^{\frac{2}{5}}\right)^{\frac{5}{2}} = 36^{\frac{5}{2}}$$

$$x = 36^{\frac{5}{2}}$$

$$x = \left(\sqrt{36}\right)^5$$

$$x = (6)^5$$

$$x = 7776$$

$$24. \log_x \left(\frac{81}{16}\right) = \frac{4}{5}$$

$$x^{\frac{4}{5}} = \frac{81}{16}$$

$$\left(x^{\frac{4}{5}}\right)^{\frac{5}{4}} = \left(\frac{81}{16}\right)^{\frac{5}{4}}$$

$$x = \left(\frac{81}{16}\right)^{\frac{5}{4}}$$

$$x = \left(\sqrt[4]{\frac{81}{16}}\right)^5$$

$$x = \left(\frac{3}{2}\right)^5$$

$$x = \frac{243}{32}$$

$$25. \log_x \left( \frac{1}{25} \right) = -2$$

$$x^{-2} = \frac{1}{25}$$

$$(x^{-2})^{-1/2} = \left( \frac{1}{25} \right)^{-1/2}$$

$$x = \left( \frac{1}{25} \right)^{-1/2}$$

$$x = (25)^{1/2}$$

$$x = (\sqrt{25})^1$$

$$x = (5)^1$$

$$x = 5$$

$$26. \log_x \left( \frac{32}{243} \right) = \frac{5}{2}$$

$$x^{5/2} = \frac{32}{243}$$

$$\left( x^{5/2} \right)^{2/5} = \left( \frac{32}{243} \right)^{2/5}$$

$$x = \left( \frac{32}{243} \right)^{2/5}$$

$$x = \left( \sqrt[5]{\frac{32}{243}} \right)^2$$

$$x = \left( \frac{2}{3} \right)^2$$

$$x = \frac{4}{9}$$