

## Exponential Equations

Solve each equation.

$$1) 2^{-2r} = 2^{2r-3} \quad r = \frac{3}{4}$$

$$2) 6^{-3n-3} = 6^{3n} \quad n = -\frac{1}{2}$$

$$3) 6^{-2r} = 1 \quad r = 0$$

$$4) 4^{-2n} = 4^2 \quad n = -1$$

$$5) 5^{b-3} = 25$$

$$5^{b-3} = 5^2 \quad b = 5$$

$$b-3 = 2$$

$$\begin{array}{r} +3 \\ +3 \end{array}$$

$$6) 3^{x-1} = 3^{2x+3} \quad x = -4$$

$$7) 2^{-2n+1} = 8$$

$$2^{-2n+1} = 2^3 \quad n = -1$$

$$-2n+1 = 3$$

$$\begin{array}{r} -2n = 2 \\ \frac{-2n}{-2} = \frac{2}{-2} \end{array} \quad \boxed{n = -1}$$

$$9) 36^{-m-1} = \frac{1}{6} \quad m = -\frac{1}{2}$$

$$8) \left(\frac{1}{8}\right)^{2x-2} = 32^{-x} \quad x = 6$$

$$\left(\frac{1}{2^3}\right)^{2x-2} = (2^5)^{-x}$$

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

$$\begin{array}{r} -6/x + 6 = -5x \\ +6/x \quad \quad +6x \end{array}$$

$$\boxed{6 = x}$$

$$10) 25^x = 625 \quad x = 2$$

$$11) 216^{1-3p} = 36 \quad p = \frac{1}{9}$$

$$12) 9^{-p} = 81 \quad p = -2$$

$13) 625^{3p} = 25$

$p = \frac{1}{6}$

$14) 25^{2p} = 5^4$

$p = 1$

$15) 8^{-3n} = 4^{3n-2}$

$(2^3)^{-3n} = (2^2)^{3n-2}$

$n = \frac{4}{15}$

$-9n = 6n - 4$

$\frac{-15n = -4}{-15} \quad \frac{-4}{-15}$

$17) 4^{-r} = \frac{1}{8}$

$r = \frac{3}{2}$

$n = \frac{4}{15}$

$18) 6^{2-x} = 36$

$x = 0$

$(2^2)^{-r} = \frac{1}{2^3}$

$\frac{-2r = -3}{-2} \quad \frac{-3}{-2}$

$(2^2)^{-r} = 2^{-3}$

$19) 4^{-2k-2} = 16^k$

$k = -\frac{1}{2}$

$20) 243^{-3n} = 27$

$n = -\frac{1}{5}$

$21) 2^{1-b} = 64$

$b = -5$

$22) 4^{1-2x} = 64$

$x = -1$

$23) 4^{2v} = 64$

$v = \frac{3}{2}$

$24) 3^{3x} = 3^{-3x}$

$x = 0$