Algebra 1 Name Key

WS 6.5B Solving Exponential Equations

Solve each equation.

1) $6^{2x+2} = 6^2$

$2x+2 = 2$

$-2 \quad -2$

$\frac{2x}{2} = \frac{0}{2}$

$x = 0$

2) $4^{-3b-3} = 4^{-2b}$

$-3b-3 = -2b$

$+3b \quad +3b$

$-3 = b$

3) $2^{2k-1} = 16$

$2^{2k-1} = 2^4$

$2k-1 = 4$

$+1 \quad +1$

$\frac{2k}{2} = \frac{5}{2}$

$k = \frac{5}{2}$

4) $3^{2-2x} = 3^{3x-3}$

$2-2x = 3x-3$

$+2x \quad +2x$

$2 = 5x-3$

$+3 \quad +3$

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

$1 = x$

5) $36^{-a} = 6^3$

$(6^2)^{-a} = 6^3$

$\frac{-2a}{-2} = \frac{3}{-2}$

$a = -\frac{3}{2}$

6) $25^{3r+2} = 125$

$(5^2)^{3r+2} = 5^3$

$2(3r+2) = 3$

$6r+4 = 3$

$-4 \quad -4$

$\frac{6r}{6} = \frac{-1}{6}$

$r = -\frac{1}{6}$

7) $125^{3n-3} = 625^{2n}$

$(5^3)^{3n-3} = (5^4)^{2n}$

$3(3n-3) = 4(2n)$

$9n - 9 = 8n$

$-9n \quad -9n$

$\frac{-9}{-1} = \frac{n}{1}$

$\boxed{9 = n}$

8) $25^{-2x} = 625^{x}$

$25^{-2x} = (25^2)^x$

$-2x = 2x$

$+2x \quad +2x$

$\frac{0}{4} = \frac{4x}{4}$

$\boxed{0 = x}$

9) $1000000^{-2m-1} = 100000$

$(10^6)^{-2m-1} = 10^5$

$6(-2m-1) = 5$

$-12m - 6 = 5$

$+6 \quad +6$

$\frac{-12m}{-12} = \frac{11}{-12}$

$\boxed{m = -\frac{11}{12}}$

10) $9^{k} = 27$

$(3^2)^k = 3^3$

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

$\boxed{k = \frac{3}{2}}$

11) $3^{3p} = 3^{-3p-1}$

$3p = -3p - 1$

$+3p \quad +3p$

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

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

12) $2^{3n} = 64$

$2^{-3n} = 2^6$

$\frac{-3n}{-3} = \frac{6}{-3}$

$\boxed{n = -2}$

13) $8^{a-2} = 32^{a-2}$

$(2^3)^{a-2} = (2^5)^{a-2}$

$3(a-2) = 5(a-2)$

$3a - 6 = 5a - 10$

$-5a \quad -5a$

$-2a - 6 = -10$

$+6 \quad +6$

$-2a = -4$

$\boxed{a = 2}$

14) $9^{2m} = 81$

$9^{2m} = 9^2$

$\frac{2m}{2} = \frac{2}{2}$

$\boxed{m = 1}$