

Exponential Equations Not Requiring Logarithms

Solve each equation.

1) $5^{3n} = 125$

2) $2^{2n} = 16$

3) $5^{3r} = 5^{-2r}$

4) $3^{-2k} = 81$

5) $2^{-3x} = 2^{x-1}$

6) $6^{3m} = 36$

7) $10^{3x} = 10000$

8) $4^{r+1} = 1$

9) $\left(\frac{1}{8}\right)^{3x} \cdot 64^{2x+1} = 4$

10) $32^{2x} = 8$

11) $6^{-3v-2} = 36$

12) $243^x = 81$

$$13) 2^{-2n} \cdot 2^{n+1} = 2^{-2n}$$

$$14) \left(\frac{1}{16}\right)^{2a} \cdot 16^{-2a-3} = 64^{2a}$$

$$15) 3^{2n} = 9$$

$$16) \left(\frac{1}{6}\right)^n = 36$$

$$17) \frac{216^{2a}}{36^{-a}} = 216$$

$$18) 36^{3n-2} \cdot \frac{1}{216} = 36^{3n-2}$$

$$19) \frac{16}{\left(\frac{1}{16}\right)^x} = \left(\frac{1}{4}\right)^{2-2x}$$

$$20) 25 \cdot 125^{-v} = 625$$

$$21) 27^{3x} \cdot \left(\frac{1}{9}\right)^{-x} = 243^{-x-3}$$

$$22) \left(\frac{1}{6}\right)^{3a} \cdot 36^{-3a} = \frac{1}{36}$$

$$23) 125^{3n} \cdot 625^{-n} = 625^{-2n-1}$$

$$24) \frac{125}{25^{-3m}} = 25^{-2m-2}$$

Exponential Equations Not Requiring Logarithms

Solve each equation.

1) $5^{3n} = 125$

 $\left\{1\right\}$

2) $2^{2n} = 16$

 $\left\{2\right\}$

3) $5^{3r} = 5^{-2r}$

 $\left\{0\right\}$

4) $3^{-2k} = 81$

 $\left\{-2\right\}$

5) $2^{-3x} = 2^{x-1}$

 $\left\{\frac{1}{4}\right\}$

6) $6^{3m} = 36$

 $\left\{\frac{2}{3}\right\}$

7) $10^{3x} = 10000$

 $\left\{\frac{4}{3}\right\}$

8) $4^{r+1} = 1$

 $\left\{-1\right\}$

9) $\left(\frac{1}{8}\right)^{3x} \cdot 64^{2x+1} = 4$

 $\left\{-\frac{4}{3}\right\}$

10) $32^{2x} = 8$

 $\left\{\frac{3}{10}\right\}$

11) $6^{-3v-2} = 36$

 $\left\{-\frac{4}{3}\right\}$

12) $243^x = 81$

 $\left\{\frac{4}{5}\right\}$

13) $2^{-2n} \cdot 2^{n+1} = 2^{-2n}$

$\{-1\}$

14) $\left(\frac{1}{16}\right)^{2a} \cdot 16^{-2a-3} = 64^{2a}$

$\left\{-\frac{3}{7}\right\}$

15) $3^{2n} = 9$

$\{1\}$

16) $\left(\frac{1}{6}\right)^n = 36$

$\{-2\}$

17) $\frac{216^{2a}}{36^{-a}} = 216$

$\left\{\frac{3}{8}\right\}$

18) $36^{3n-2} \cdot \frac{1}{216} = 36^{3n-2}$

No solution.

19) $\frac{16}{\left(\frac{1}{16}\right)^x} = \left(\frac{1}{4}\right)^{2-2x}$

No solution.

20) $25 \cdot 125^{-v} = 625$

$\left\{-\frac{2}{3}\right\}$

21) $27^{3x} \cdot \left(\frac{1}{9}\right)^{-x} = 243^{-x-3}$

$\left\{-\frac{15}{16}\right\}$

22) $\left(\frac{1}{6}\right)^{3a} \cdot 36^{-3a} = \frac{1}{36}$

$\left\{\frac{2}{9}\right\}$

23) $125^{3n} \cdot 625^{-n} = 625^{-2n-1}$

$\left\{-\frac{4}{13}\right\}$

24) $\frac{125}{25^{-3m}} = 25^{-2m-2}$

$\left\{-\frac{7}{10}\right\}$