Exponential Equations and Logarithms

Solve each equation for the unknown variable.

1) $5^{3n} = 125$
2) $3^{r} = 69$
3) $20^{n} = 56$
4) $4^{r+1} = 1$
5) $243^{x} = 81$
6) $6^{-3v-2} = 36$
7) $3^{2n} = 9$
8) $6^{n} = 51$
9) $\frac{216^{2a}}{36^{-a}} = 216$
10) $25 \times 25^{-v} = 625$
11) $3^{2n} = \frac{1}{81}$
12) $(\frac{1}{6})^{n} = 36$
13) $32^{2x} = 8$
14) $5^{3-2x} = 5^{-x}$
15) $2^{-3x} = 2^{x-1}$
16) $2^{2n} = 16$
17) $2^{2x+2} = 2^{3x}$
18) $5^{3n} = 125$
19) $3^{-2k} = 81$
20) $5^{3r} = 5^{-2r}$
21) $4^{-2r} \times 4^{r} = 64$
22) $10^{3x} = 10{,}000$
23) $25 \cdot 125^{-v} = 625$
24) $\frac{125}{25^{-3m}} = 25^{-2m-2}$
25) $2^{-2n} \times 2^{n+1} = 2^{-2n}$
26) $6^{3n} \times 6^{-n} = 6^{-2n}$

Solve each problem. (Round to the nearest whole number)

27) *A substance decays 18% each day. After 12 days, there are 6 milligrams of the substance remaining. How many milligrams were there initially?* _____

28) *A culture of bacteria grows continuously. The culture doubles every 3 hours. If the initial amount of bacteria is 10, how many bacteria will there be in 13 hours?* _____

29) *Bob plans to invest $5,500 at an annual rate of 4.5%. How much will Bob have in the account after five years if the balance is compounded quarterly?* _____

30) *Suppose you plan to invest $4,000 at an annual rate of 5.5%. How much will you have in the account after 10 years if the balance is compounded monthly?* _____

Answers

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1) 1
2) 3.854
3) 1.3437
4) -1
5) $\frac{4}{5}$
6) $-\frac{4}{3}$
7) 1
8) 51
9) $\frac{3}{8}$
10) -1
11) -2
12) -2
13) $\frac{3}{10}$
14) 3
15) $\frac{1}{4}$
16) 2
17) 2
18) 1
19) -2
20) 0
21) -3
22) $\frac{4}{3}$
23) -1
24) $-\frac{7}{10}$
25) -1
26) 0
27) 52
28) 202
29) \$6879.13
30) \$6,
31) 924.31