

Answer on Question #57031 – Math – Algebra

Question

1. Which of the following pairs are equivalent statements?

A: $\log_b N = p$ and $b^p = N$

B: $N^{1/b} = p$ and $b^p = N$

C: $\log N b = p$ and $b^p = N$

D: $\log_p N = b$ and $b^p = N$

Answer:

A: $\log_b N = p$ and $b^p = N$

Question

2. Which of the following statements are true?

A. The graph of $f(x) = \frac{1}{2} 3\sqrt{x}$ looks like the graph of $f(x) = 3\sqrt{x}$, but will shrink it horizontally by a factor of $\frac{1}{2}$

B. $f(x) = \frac{1}{2} \sqrt{x}$ has the same domain and range as $f(x) = 3\sqrt{x}$

C. The graph of $f(x) = \frac{1}{2} 3\sqrt{x}$ looks like the graph of $f(x) = 3\sqrt{x}$, but will shrink vertically by a factor of $\frac{1}{2}$

D. The graph of $f(x) = \frac{1}{2} \sqrt{x}$ does not look like the graph of $f(x) = 3\sqrt{x}$ because the roots are different.

Solution

B: $f(x) = \frac{1}{2} \sqrt{x}$ has the same domain and range as $f(x) = 3\sqrt{x}$, because the domain, the range of both functions is $[0, +\infty)$.

C: The graph of $f(x) = \frac{1}{2} 3\sqrt{x}$ looks like the graph of $f(x) = 3\sqrt{x}$, but will shrink vertically by a factor of $\frac{1}{2}$

Question

3. Simplify the expression shown below: $(a^2 b^5 c^3)^4 (a^3 b^3)^3 (a^2 c)^2$

A: $a^{21} b^{24} c^{10}$

B: $a^{13} b^{19} c^{13}$

C: $a^{21} b^{29} c^{14}$

D: $6(a^8 b^{12} c^4)$

Solution

To simplify

$$(a^2 \times b^5 \times c^3)^4 \times (a^3 \times b^3)^3 \times (a^2 \times c)^2,$$

consider

$$(a^2 \times b^5 \times c^3)^4 = a^{2 \times 4} \times b^{5 \times 4} \times c^{3 \times 4} = a^8 \times b^{20} \times c^{12}$$

$$(a^3 \times b^3)^3 = a^{3 \times 3} \times b^{3 \times 3} = a^9 \times b^9$$

$$(a^2 \times c)^2 = a^{2 \times 2} \times c^{1 \times 2} = a^4 \times c^2$$

Then

$$\begin{aligned} (a^2 \times b^5 \times c^3)^4 \times (a^3 \times b^3)^3 \times (a^2 \times c)^2 \\ = a^8 \times b^{20} \times c^{12} \times a^9 \times b^9 \times a^4 \times c^2 \\ = a^{8+9+4} \times b^{20+9} \times c^{12+2} = a^{21} \times b^{29} \times c^{14} \end{aligned}$$

Answer:

C: $a^{21} b^{29} c^{14}$