

EXERCISE 5: Answers for this exercise start on page 314.

1

Which expression is equivalent to  $\sqrt{100x^{36}}$ ?

- A)  $10x^6$   
 B)  $50x^6$   
 C)  $10x^{18}$   
 D)  $50x^{18}$

2

If  $(5^3)^{4k} = (5^{\frac{1}{3}})^{24}$ , what is the value of  $k$ ?

- A)  $-6$   
 B)  $\frac{2}{3}$   
 C)  $\frac{3}{4}$   
 D)  $2$

3

Which of the following is equivalent to  $3y^{\frac{1}{2}}$  for all  $y > 0$ ?

- A)  $\sqrt{3y}$   
 B)  $\sqrt{9y}$   
 C)  $\sqrt{\frac{3}{y}}$   
 D)  $\sqrt{\frac{9}{y}}$

4

Which expression is equivalent to  $4^{m+2}$ ?

- A)  $16^m$   
 B)  $16 + 4^m$   
 C)  $8(4^m)$   
 D)  $16(4^m)$

$4^{m+2} = 4^m \times 4^2$

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Which expression is equivalent to  $\sqrt[4]{x^2y^4}$ , where  $x > 0$  and  $y > 0$ ?

- A)  $\sqrt{xy}$   
 B)  $y\sqrt{x}$   
 C)  $\frac{1}{x^2}$   
 D)  $x^2y$

6

Which expression is equivalent to  $p^{\frac{1}{3}} \cdot (\sqrt[3]{p})^2$ , where  $p$  is greater than 0?

- A)  $p^{\frac{2}{3}}$   
 B)  $p^{\frac{2}{9}}$   
 C)  $p^{\frac{7}{3}}$   
 D)  $p$

7

Which expression is equivalent to  $x^{\frac{2a}{b}}$  for all positive values of  $x$ , where  $a$  and  $b$  are positive integers?

- A)  $\sqrt[b]{ax^2}$   
 B)  $\sqrt[b]{x^{2a}}$   
 C)  $\sqrt[b]{x^{a+2}}$   
 D)  $\sqrt[2a]{x^b}$

8

If  $\frac{9^7}{\sqrt[4]{9^{10}}} = 9^{6t}$ , what is the value of  $t$ ?

$\frac{3}{4}$

9

Which expression is equivalent to  $a^{\frac{3}{4}}b^{\frac{1}{2}}$ , where  $a \geq 0$  and  $b \geq 0$ ?

- A)  $\sqrt[4]{a^3b}$   
 B)  $\sqrt[4]{a^3b^2}$   
 C)  $\sqrt{a^3b}$   
 D)  $\sqrt{a^4b^2}$

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Which expression is equivalent to  $h^{\frac{5}{12}}(h^{-\frac{1}{4}})^{\frac{7}{3}}$ , where  $h > 0$ ?

- A)  $\frac{1}{h^6}$   
 B)  $\sqrt{h^5}$   
 C)  $\frac{1}{\sqrt[6]{h}}$   
 D)  $\frac{1}{\sqrt[5]{h^2}}$

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$$\sqrt[8]{41k}(\sqrt[9]{41k})^{12}$$

For what value of  $x$  is the given expression equivalent to  $(41k)^{25x}$ , where  $k > 1$ ?

$$\frac{7}{120}$$

12

The expression  $4^{18x}$  is equivalent to  $k^{3x}$ , where  $k$  is a constant. What is the value of  $k$ ?

$$4^6$$

13

Which expression is equivalent to  $9^{\frac{1}{n}}(4^{\frac{1}{2n}})$ , where  $n$  is a positive integer?

- A)  $24^{\frac{1}{n}}$   
 B)  $12^{\frac{1}{n}}$   
 C)  $\sqrt[n]{18}$   
 D)  $\sqrt[n]{6}$

$$4^{\frac{1}{2n}} = 4^{\frac{1}{2} \cdot \frac{1}{n}} = (4^{\frac{1}{2}})^{\frac{1}{n}} = 2^{\frac{1}{n}}$$

14

$$\frac{10\sqrt[6]{9^3x^{48}}}{\sqrt[4]{6^4x}}$$

The given expression is equivalent to  $ax^b$ , where  $a > 0$ ,  $b > 0$ , and  $x > 1$ . What is the value of  $ab$ ?

$$\frac{155}{4}$$

$$\underline{2^x} = \underline{8^{\frac{3}{2}}} \quad 2^x = (2^3)^{\frac{3}{2}} \quad x = \frac{9}{2}$$

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If  $m$  and  $n$  are both positive numbers, and  $4m$  is equal to the cube root of the square of  $n$ , for what value of  $x$  is  $m^x$  equal to  $n$  when  $m = 2$ ?

$$4m = n^{\frac{2}{3}} \quad m = 2$$

$$m^x = n \quad 4 \cdot m = 4 \cdot 2 = 8$$

$$8 = \sqrt[3]{n^2} \quad 8^3 = n^2 \quad n = 8^{\frac{3}{2}}$$

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If  $2^{x+3} - 2^x = k(2^x)$ , what is the value of  $k$ ?

- A) 3  
 B) 5  
 C) 7  
 D) 8