# Precalculus

## Topic: Exponents and Radicals

**Instructions**

Solve the following problems. Be sure to review the properties of exponents and radicals.

## Practice Problems

1. **Simplify the following expressions:**
   i. $5^3 \cdot 5^2$
   ii. $\frac{2^7}{2^4}$
   iii. $(x^3)^4$
   iv. $\sqrt{81}$
   v. $\sqrt[3]{27}$
   vi. $(-3)^2 - 2^3$
   vii. $\dfrac{5}{\sqrt{2}}$
   viii. $\sqrt{12} + \sqrt{27}$
   ix. $|-9| + 3$

2. **Fill in the blanks:**
   a. $x^0$= _____.
   b. The square root of 49 is _____.

c. $\sqrt[3]{-8}$ is equal to _____ .

3. **Solve for $x$:**
   i. $2^x = 16$
   ii. $\sqrt{x} = 5$
   iii. $x^{\frac{3}{2}} = 8$
   iv. $\sqrt[3]{x} = 4$

4. **Perform the indicated operations:**
   i. $\dfrac{3^3}{3^2}$
   ii. $(2^3 \cdot 3^2)^2$
   iii. $\sqrt{36} - 5$
   iv. $\sqrt{50} \cdot \sqrt{2}$

5. **Rewrite each expression to eliminate negative exponents:**
   i. $\frac{x^{-3}}{y^2}$
   ii. $(2^{-1} \cdot 3^2)^2$
   iii. $\frac{a^{-4}b^{-2}}{c^3}$
   iv. $x^{-5}y^3$

6. **Rationalize the denominator:**
   i. $\frac{5}{\sqrt{3}}$
   ii. $\frac{2}{1+\sqrt{5}}$
   iii. $\frac{\sqrt{7}}{\sqrt{2}}$
   iv. $\frac{4}{\sqrt{6}-1}$

7. **Write each number in scientific notation:**
   i. 0.00045
   ii. 123000
   iii. $7.5 \times 10^3$
   iv. 0.0032

8. **Write each number in decimal notation:**

   i. $4.5 \times 10^{-4}$

   ii. $1.23 \times 10^{5}$

   iii. $7.5 \times 10^{-3}$

   iv. $3.2 \times 10^{2}$

# Multiple Choice Questions

**Choose the correct answer:**

1. Simplify $\sqrt{48}$:

   (a) $4\sqrt{3}$

   (b) $3\sqrt{4}$

   (c) $6\sqrt{2}$

   (d) None of the above

2. Solve $x^2 - 16 = 0$:

   (a) $x = 4$

   (b) $x = \pm 4$

   (c) $x = 0$

   (d) None of the above

3. Which of the following represents the property $a^m \cdot a^n = a^{m+n}$?

   (a) Associative property of addition

   (b) Distributive property

   (c) Exponent addition rule

   (d) Multiplicative inverse property

4. If $2^x = 32$, what is $x$?

   (a) 3

   (b) 4

   (c) 5

   (d) 6

5. The simplified form of $\frac{9}{\sqrt{3}}$ is:

   (a) $3\sqrt{3}$

   (b) 3

   (c) $\frac{3}{\sqrt{3}}$

(d) None of the above

6. What is the cube root of 64?

   (a) 2

   (b) 4

   (c) 8

   (d) None of the above

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