

Chapter

5

Chapter 5

PRACTICE TEST

Assignment

Complete pgs. 306 - 307
Questions 1-6,7,8,13,14,15

Solutions

SOLUTIONS \Rightarrow Ch.5-Practice Test

1. What is the entire radical form of $-3(\sqrt[3]{2})$?

$$\begin{aligned} \hookrightarrow & -3(\sqrt[3]{2}) && \text{Option} \Rightarrow \text{"B"} \\ & = \sqrt[3]{(-3)^3(2)} \\ & = \sqrt[3]{(-27)(2)} \\ & = \sqrt[3]{-54} \end{aligned}$$

2. What is the condition on the variable in $2\sqrt{-7n}$ for the radicand to be a real number?

$$\begin{aligned} \hookrightarrow & 2\sqrt{-7n}, \quad \frac{-7n}{-7} \geq \frac{0}{-7} && \text{Option} \Rightarrow \text{"D"} \\ & n \leq 0 \end{aligned}$$

3. What is the simplest form of the sum $-2x\sqrt{6x} + 5x\sqrt{6x}$, $x \geq 0$?

$$\begin{aligned} \hookrightarrow & -2x\sqrt{6x} + 5x\sqrt{6x} && \text{Option} \Rightarrow \text{"C"} \\ & = 3x\sqrt{6x} \end{aligned}$$

4. What is the product of $\sqrt{540}$ and $\sqrt{6y}$, $y \geq 0$, in simplest form?

$$\begin{aligned} \hookrightarrow & \sqrt{540} \times \sqrt{6y} && \text{Option} \Rightarrow \text{"D"} \\ & = \sqrt{3240y} \\ & = \sqrt{(2)(2)(2)(3)(3)(3)(3)(5)y} \\ & = (2)(3)(3)\sqrt{(2)(5)y} \\ & = 18\sqrt{10y} \end{aligned}$$

Solutions

5. Determine any root of the equation, $x+7 = \sqrt{23-x}$, where $x \leq 23$.

$$\begin{aligned} \hookrightarrow (x+7)^2 &= (\sqrt{23-x})^2 && \text{Option} \Rightarrow \text{"B"} \\ x^2 + 14x + 49 &= 23 - x \\ x^2 + 14x + x + 49 - 23 &= 0 \\ x^2 + 15x + 26 &= 0 \\ (x+2)(x+13) &= 0 \\ x+2=0 \text{ or } x+13=0 & \\ x=-2 & \qquad x=-13 \\ & \qquad \qquad \downarrow \\ & \qquad \qquad \text{Extraneous} \end{aligned}$$

6. Suppose $\frac{5\sqrt{3}}{7\sqrt{2}}$ is written in simplest form as $a\sqrt{b}$, where a is a real number and b is an integer. What is the value of b ?

$$\begin{aligned} \hookrightarrow \frac{5\sqrt{3}}{7\sqrt{2}} & \qquad \qquad \text{Option} \Rightarrow \text{"C"} \\ = \frac{5\sqrt{3}}{7\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} & \\ = \frac{5\sqrt{6}}{7 \cdot 2} & \\ = \frac{5\sqrt{6}}{14} & \\ = \frac{5\sqrt{6}}{14} & \end{aligned}$$

Solutions

7. Order the following numbers from least to greatest:

$$\begin{aligned}
 & 3\sqrt{11}, \quad 5\sqrt{6}, \quad 9\sqrt{2}, \quad \sqrt{160} \\
 & \downarrow \quad \quad \downarrow \quad \quad \downarrow \quad \quad \downarrow \\
 & = \sqrt{(3)^2(11)} = \sqrt{(5)^2(6)} = \sqrt{(9)^2(2)} \quad \sqrt{160} \\
 & = \sqrt{(9)(11)} = \sqrt{(25)(6)} = \sqrt{(81)(2)} \\
 & = \sqrt{99} \quad = \sqrt{150} \quad = \sqrt{162}
 \end{aligned}$$

In order from least to greatest:

$$3\sqrt{11}, \quad 5\sqrt{6}, \quad \sqrt{160}, \quad 9\sqrt{2}$$

8. Express as a radical in simplest form.

$$\begin{aligned}
 & \frac{(2\sqrt{5n})(3\sqrt{8n})}{1-12\sqrt{2}}, \quad n \geq 0 \\
 & = \frac{6\sqrt{40n^2}}{1-12\sqrt{2}} \\
 & = \frac{6\sqrt{(2)(2)(2)(5)(n)(n)}}{1-12\sqrt{2}} \\
 & = \frac{6(2)(n)\sqrt{10}}{1-12\sqrt{2}} \\
 & = \frac{12n\sqrt{10}}{1-12\sqrt{2}} \cdot \frac{(1+12\sqrt{2})}{(1+12\sqrt{2})} \\
 & = \frac{12n\sqrt{10} + 144n\sqrt{20}}{1 - 144(2)} \\
 & = \frac{12n\sqrt{10} + 144n\sqrt{(2)(2)(5)}}{1 - 288} \\
 & = \frac{12n\sqrt{10} + 288n\sqrt{5}}{-287} \\
 & = \frac{-12n\sqrt{10} - 288n\sqrt{5}}{287}
 \end{aligned}$$

Solutions

13. You wish to rationalize the denominator in each expression. By what number will you multiply each expression? Justify your answer.

a) $\frac{4}{\sqrt{6}}$, you would multiply by $\sqrt{6}$.

b) $\frac{22}{\sqrt{y-3}}$, you would multiply by $\sqrt{y-3}$

c) $\frac{2}{\sqrt[3]{7}}$, you would multiply by $(\sqrt[3]{7})^2$
 \downarrow
 $\sqrt[3]{49}$

14. For diamonds of comparable quality, the cost, C , in dollars, is related to the mass, m , in carats, by the formula

$$m = \sqrt{\frac{C}{700}}, C \geq 0. \text{ What is the cost of a 3-carat diamond?}$$

$$3 = \sqrt{\frac{C}{700}}$$

$$(3)^2 = \left(\sqrt{\frac{C}{700}}\right)^2$$

$$9 = \frac{C}{700}$$

$$9(700) = C$$

$$\$6300 = C$$

Solutions

15. Teya tries to rationalize the denominator in the expression $\frac{5\sqrt{2} + \sqrt{3}}{4\sqrt{2} - \sqrt{3}}$. Is Teya correct?

If not, identify and explain any errors she made.

Teya's Solution

$$\begin{aligned} \frac{5\sqrt{2} + \sqrt{3}}{4\sqrt{2} - \sqrt{3}} &= \left(\frac{5\sqrt{2} + \sqrt{3}}{4\sqrt{2} - \sqrt{3}} \right) \left(\frac{4\sqrt{2} + \sqrt{3}}{4\sqrt{2} + \sqrt{3}} \right) \\ &= \frac{20\sqrt{4} + 5\sqrt{6} + 4\sqrt{6} + \sqrt{9}}{32 - 3} \\ &= \frac{40 + 9\sqrt{6} + 3}{32 - 3} \\ &= \frac{43 + 9\sqrt{6}}{29} \end{aligned}$$

* Teya's Solution is correct!