Solutions

SOLUTIONS ⇒ Ch.5 - Practice Test

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

↳ $-3(\sqrt[3]{2})$ Option ⇒ "B"
$= \sqrt[3]{(-3)^3(2)}$
$= \sqrt[3]{(-27)(2)}$
$= \sqrt[3]{-54}$

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

↳ $2\sqrt{-7n}$, $\frac{-7n}{-7} \geq \frac{0}{-7}$ Option ⇒ "D"
$n \leq 0$

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

↳ $-2x\sqrt{6x} + 5x\sqrt{6x}$ Option ⇒ "C"
$= 3x\sqrt{6x}$

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

↳ $\sqrt{540} \times \sqrt{6y}$ Option ⇒ "D"
$= \sqrt{3240y}$
$= \sqrt{(2)(2)(2)(3)(3)(3)(3)(5)y}$
$= (2)(3)(3)\sqrt{(2)(5)y}$
$= 18\sqrt{10y}$

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

↳ $(x+7)^2 = (\sqrt{23-x})^2$ Option => "B"

$x^2+14x+49 = 23-x$

$x^2+14x+x+49-23=0$

$x^2+15x+26=0$

$(x+2)(x+13)=0$

$x+2=0$ or $x+13=0$

$x=-2$ $\quad$ $x=-13$ ↓ Extraneous

6. Suppose $\frac{5}{7}\sqrt{\frac{3}{2}}$ 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?

↳ $\frac{5}{7}\sqrt{\frac{3}{2}}$ Option => "C"

$= \frac{5}{7} \frac{\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$= \frac{5}{7} \frac{\sqrt{6}}{2}$

$= \frac{5\sqrt{6}}{14}$

$= \frac{5}{14}\sqrt{6}$

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7. Order the following numbers from least to greatest:

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

$$= \sqrt{(3)^2(11)} \quad = \sqrt{(5)^2(6)} \quad = \sqrt{(9)^2(2)} \quad \sqrt{160}$$
$$= \sqrt{(9)(11)} \quad = \sqrt{(25)(6)} \quad = \sqrt{(81)(2)}$$
$$= \sqrt{99} \quad = \sqrt{150} \quad = \sqrt{162}$$

In order from least to greatest:
$3\sqrt{11}$, $5\sqrt{6}$, $\sqrt{160}$, $9\sqrt{2}$

8. Express as a radical in simplest form.

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

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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

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

$$3 = \sqrt{\frac{C}{700}}$$
$$(3)^2 = \left(\sqrt{\frac{C}{700}}\right)^2$$
$$9 = \frac{C}{700}$$
$$9(700) = C$$
$$\$6300 = C$$

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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

$$\frac{5\sqrt{2}+\sqrt{3}}{4\sqrt{2}-\sqrt{3}} = \left(\frac{5\sqrt{2}+\sqrt{3}}{4\sqrt{2}-\sqrt{3}}\right)\left(\frac{4\sqrt{2}+\sqrt{3}}{4\sqrt{2}+\sqrt{3}}\right)$$

$$= \frac{20\sqrt{4}+5\sqrt{6}+4\sqrt{6}+\sqrt{9}}{32-3}$$

$$= \frac{40+9\sqrt{6}+3}{32-3}$$

$$= \frac{43+9\sqrt{6}}{29}$$

* Teya's Solution is correct!