6.0 Variables.Sept2020

Skills:

Identify square and cube expressions using variables:

$(5)(5) = 5^2$ so $\sqrt{5^2} = 5$

$(x)(x) = x^2$ so $\sqrt{x^2} = x$

$(x^2)(x^2) = x^4$ so $\sqrt{x^4} = x^2$

$\sqrt[3]{5^3} = 5$

$\sqrt[3]{x^3} = x$

Outcome: Express as mixed radicals in simplest form.

Outcome: Determine the restrictions on the variable.

Express as a radical in simplest form.

1. $\sqrt{18x^3}$

$= \sqrt{9x^2}\sqrt{2x}$

$= 3x\sqrt{2x}$

perfect square   leftover

9   2

$\boxed{x^2}$ $\dfrac{x}{x}$

even exp. ... $\sqrt{half} = (\ )^{1/2}$

2. $\sqrt{8x^5}$

$= \sqrt{4x^4}\sqrt{2x}$

$= 2x^2\sqrt{2x}$

square   leftover

4   2

$\boxed{xx}\boxed{xx}\ⓧ$ →

x^4 ... $\sqrt{half} : (\ )^{1/2}$ x

3. $3x\sqrt{49x^7}$

$= 3x\sqrt{49x^6}\sqrt{1x}$

$= 3x(7x^3)\sqrt{x}$

$= 21x^4\sqrt{x}$

square   left

49   1

$\boxed{xx}\boxed{xx}\boxed{xx}$ x

x^6

$\sqrt[3]{half} : (\ )^{1/2}$

4. $\sqrt[3]{24x^7}$

$= \sqrt[3]{8x^6}\sqrt[3]{3x}$

$= 2x^2\sqrt[3]{3x}$

CUBE   LEFT OVER

8   3

$\boxed{xxx}\ \boxed{xxx}$ x

x^6

$\sqrt[3]{third} = (\ )^{1/3}$

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Add and Subtract, Multiply, Divide. Restrictions.

1. $5\sqrt{x} + 2\sqrt{x}$

$= 7\sqrt{x}$

number × number

radical x radical

2. $(2\sqrt{x} + 3)(3\sqrt{x} - 5)$

$= 6\sqrt{x^2} - 10\sqrt{x} + 9\sqrt{x} - 15$

$= 6x - \sqrt{x} - 15$

number÷number $\quad \dfrac{15}{3} =$

3. $\dfrac{15\sqrt{6x^3}}{3\sqrt{2x}} = 5\sqrt{3x^2}$

$= 5\sqrt{x^2}\sqrt{3}$

$= 5x\sqrt{3}$

radical÷radical $\quad \dfrac{6x^3}{2x} = \dfrac{x \cdot x \cdot x}{x}$

4. $\dfrac{6\sqrt{5} - \sqrt{24x^3}}{2\sqrt{x}} = \dfrac{6\sqrt{5} - \sqrt{4x^2}\sqrt{6x}}{2\sqrt{x}}$

$\boxed{x \cdot x} \quad \boxed{x}$

$= \dfrac{6\sqrt{5} - 2x\sqrt{6x}}{2\sqrt{x}} \cdot \dfrac{\sqrt{x}}{\sqrt{x}}$

$= \dfrac{6\sqrt{5x} - 2x\sqrt{6x^2}}{2\sqrt{x^2}}$

$= \dfrac{6\sqrt{5x} - 2x(x)\sqrt{6}}{2(x)}$

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$6^2, 2 \div 2$

$= \dfrac{6\sqrt{5x} - 2x^2\sqrt{6}}{2x}$

$= \dfrac{3\sqrt{5x} - x^2\sqrt{6}}{x}$