4/22 Rationalize the Denominator

* not allowed to have radicals (square roots, cube roots, etc.) in the denominator when a fraction is in <u>simplest radical form</u>.

To rationalize the denominator, multiply by an appropriate 1.

<u>Equivalent fractions</u>

$(\sqrt{3})^2$

$$\frac{2}{\sqrt{3}} * \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{\sqrt{9}} = \frac{2\sqrt{3}}{3}$$

multiply by 1

$$\frac{2}{5} * \boxed{\frac{2}{2}} = \frac{4}{10}$$

$$\frac{7}{\sqrt{6}} * \frac{\sqrt{6}}{\sqrt{6}} = \frac{7\sqrt{6}}{\sqrt{36}} = \boxed{\frac{7\sqrt{6}}{6}}$$

Simplest radical form

$$\frac{14}{\sqrt{2}} * \frac{\sqrt{2}}{\sqrt{2}} = \frac{14\sqrt{2}}{\sqrt{4}} = \frac{14\sqrt{2}}{2} = \boxed{7\sqrt{2}}$$

$$\frac{\sqrt{3}}{\sqrt{5a}} * \frac{\sqrt{5a}}{\sqrt{5a}} = \frac{\sqrt{15a}}{\sqrt{25a^2}} = \boxed{\frac{\sqrt{15a}}{5a}}$$

$$\sqrt{\frac{2}{3x}} = \underbrace{\frac{\sqrt{2}}{\sqrt{3x}} * \frac{\sqrt{3x}}{\sqrt{3x}}}_{\sqrt{9x^2}} = \boxed{\frac{\sqrt{6x}}{3x}}$$

$$\sqrt{\frac{80x^3}{5y}} = \sqrt{\frac{16x^3}{y}} = \frac{\sqrt{16}\sqrt{x^2}\sqrt{x}}{\sqrt{y}} = \underbrace{\frac{4x\sqrt{x}}{\sqrt{y}} * \frac{\sqrt{y}}{\sqrt{y}}}_{\sqrt{y^2}} = \boxed{\frac{4x\sqrt{xy}}{y}}$$

$$\sqrt{\frac{5}{80}} = \sqrt{\frac{1}{16}} = \frac{\sqrt{1}}{\sqrt{16}} = \frac{1}{4}$$

$$\frac{\sqrt{8}}{2\sqrt{3x}} * \frac{\sqrt{3x}}{\sqrt{3x}} = \frac{\sqrt{24x}}{2\sqrt{9x^2}} = \frac{\sqrt{4}\sqrt{6x}}{2 \cdot 3x} = \frac{\cancel{2}\sqrt{6x}}{\cancel{6}x} = \boxed{\frac{\sqrt{6x}}{3x}}$$

$$\frac{\sqrt{8}}{2\sqrt{3x}} = \frac{\sqrt{4}\sqrt{2}}{2\sqrt{3x}} = \underbrace{\frac{\cancel{2}\sqrt{2}}{\cancel{2}\sqrt{3x}} * \frac{\sqrt{3x}}{\sqrt{3x}}}_{3\sqrt{9x^2}} = \boxed{\frac{\sqrt{6x}}{3x}}$$

$$\sqrt{\frac{98}{x^7}} = \frac{\sqrt{98}}{\sqrt{x^7}} = \frac{\sqrt{49}\sqrt{2}}{\sqrt{x^6}\sqrt{x}} = \frac{7\sqrt{2}}{x^3\sqrt{x}} * \frac{\sqrt{x}}{\sqrt{x}} = \frac{7\sqrt{2x}}{x^3\sqrt{x^2}} = \frac{7\sqrt{2x}}{x^3 \cdot x} = \boxed{\frac{7\sqrt{2x}}{x^4}}$$