Mona?

7.4.57 Rationalize the denominator. Assume that all expressions under radicals represent positive numbers.

$$\sqrt{\frac{441ab^4}{1372a^5b}} = \frac{\sqrt{441ab^4}}{\sqrt{1372a^4ab}} = \frac{\sqrt{4\cdot 49ab^4}}{\sqrt{4\cdot 343a^4b}}$$

$$\sqrt{\frac{441ab^4}{1372a^5b}} = \square$$

$$= \frac{\sqrt{9\cdot 49\,ab^4}}{\sqrt{4\cdot 343a^2\cdot a^2ab}}$$

$7\cdot 7 = 49$ $\quad 49\cdot 7 = 343$

fast way

$$\frac{\sqrt{441ab^4}}{\sqrt{1372a^5b}}$$

$$= \frac{\sqrt{49\cdot 9\,ab^4}}{\sqrt{49\cdot 4\cdot 7\,a^4ab}}$$

$$= \frac{\sqrt{7^2\cdot 3^2\,ab^4}}{\sqrt{7^2\cdot 2^2\cdot 7\,a^4ab}}$$

$$= \frac{7\cdot 3\cdot b^2\sqrt{a}}{7\cdot 2\cdot a^2\sqrt{7ab}}\cdot\frac{\sqrt{7ab}}{\sqrt{7ab}}$$

$$= \frac{3b^2\sqrt{7a^2b}}{2a^2\cdot 7ab} = \frac{3ab^2\sqrt{7b}}{14a^3b}$$

$$\boxed{= \frac{3b\sqrt{7b}}{14a^2}}$$

$4\cdot 49\cdot 7$

49
28
1372

$$= \frac{3b^2\sqrt{49a}}{2a^2\sqrt{343ab}}\cdot\frac{\sqrt{343ba}}{\sqrt{343ba}} = \frac{3b^2\sqrt{49a\cdot 343ba}}{2a^2\cdot 343ba}$$

$$= \frac{3b\sqrt{16807\,ab}}{2a^2\cdot 343a} = \frac{3b\sqrt{7^2a^2\cdot 343b}}{2a^2\cdot 343a}$$

$$= \frac{21ab\sqrt{343b}}{2a^2\cdot 49\cdot 7a} = \frac{3\cdot 7ab\sqrt{49\cdot 7b}}{7^3\cdot a\cdot 2a^2}$$

$$= \frac{3\cdot 7ab\cdot 7\sqrt{7b}}{7^3a\cdot 2a^2}$$

$$= \frac{3b\sqrt{7b}}{7\cdot 2a^2}$$

$$\boxed{= \frac{3b\sqrt{7b}}{14a^2}}$$

8
49
$\cdot 9$
441

$$2\overline{)1372} = 686 \qquad 2\overline{)686} = 343 \qquad 9\overline{)441} = 49$$