7.4

$\sqrt{4x}\sqrt{12x^2y} = \sqrt{2\cdot2\cdot2\cdot2\cdot3\cdot x\cdot x\cdot x\cdot y}$

$2\cdot2 \quad 2\cdot2\cdot3$

$4x\sqrt{3xy}$

$\sqrt{4x} \quad \sqrt{12x^2y}$

$2\sqrt{x} \quad 2x\sqrt{3y}$

$4x\sqrt{3xy}$

$(2\sqrt{5}+4\sqrt{5})(3\sqrt{3}-6\sqrt{7})$

$6\sqrt{9}-12\sqrt{6}+12\sqrt{15}-24\sqrt{10}$

$6(3)$

$18-12\sqrt{6}+12\sqrt{15}-24\sqrt{10}$

$2x+3y-5x+8y$

$-3x+11y$

$2\sqrt{2}+3\sqrt{5}+5\sqrt{2}+8\sqrt{5}$

$-3\sqrt{2}+1\sqrt{5}$

$\sqrt[n]{x^m} = x^{m/n} \qquad \sqrt{x} = x^{1/2}$

$\sqrt{24x^2y}+\sqrt{40x^3y^2}-12\sqrt{xy}$

$2x\sqrt{6y}+2xy\sqrt{10x}-12\sqrt{xy}$

$2\overline{)40}$
$2\overline{)20}$
$2\overline{)10}$
5

$\sqrt[3]{160x^5y^7z^{12}}$ (xxx)xx

$(2xy^2z^4)\sqrt[3]{2\cdot2\cdot5x^2y}$

20

2|160
2|80
2|40
2|20
2|10
5

Section 7.5 Division of Radicals (Rationalization)

$\frac{3}{\sqrt{2}}$ 1.41... $\sqrt{3}$

$\frac{3}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{\sqrt{4}} = \frac{3\sqrt{2}}{2}$

$\frac{6}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}$ $\frac{6\sqrt{3}}{3}$

$\frac{5}{\sqrt{2}}\cdot\frac{\sqrt{8}}{\sqrt{8}}$ $\frac{5\cdot\sqrt{8}}{\sqrt{16}}$

$\frac{5}{\sqrt[3]{2}}\cdot\frac{\sqrt[3]{4}}{\sqrt[3]{4}}$ $\frac{5\sqrt[3]{4}}{\sqrt[3]{8}} = \frac{5\sqrt[3]{4}}{2}$

2|1000
2|500
2|250
5|125
5|25
5

$\frac{8}{\sqrt[3]{20}}\cdot\frac{\sqrt[3]{20\cdot20}}{\sqrt[3]{20\cdot20}}$ $\frac{8}{\sqrt[3]{20}}\cdot\frac{\text{need}}{\text{need}}$

$2\cdot2\cdot5$ $2\cdot5\cdot5$

2|20
2|10
5

have	need
$2\cdot2$	2
5	$5\cdot5$

$\sqrt[3]{2\cdot5\cdot5}$ / $\sqrt[3]{50}$

$\frac{8}{\sqrt[3]{20}}\cdot\frac{\sqrt[3]{50}}{\sqrt[3]{50}} = \frac{8\sqrt[3]{50}}{\sqrt[3]{1000}} = \frac{\overset{4}{\cancel{8}}\sqrt[3]{50}}{\cancel{10}_5}$

$\frac{4\sqrt[3]{50}}{5}$

have	need
2·2	2
5	5·5

$18x^2y$ $\quad$ $12xy^2$

have	need
2	2·2
3·3	3
x·x	x
y	y y

$2 \mid 18$
$3 \mid 9$
3

$\sqrt[3]{18x^2y}$

$$\frac{12}{\sqrt[3]{18x^2y}} \cdot \frac{\sqrt[3]{12xy^2}}{\sqrt[3]{12xy^2}} = \frac{12\sqrt[3]{12xy^2}}{36xy} = \frac{2\sqrt[3]{12xy^2}}{xy}$$

we · need = together

$$\sqrt[3]{2\cdot3\cdot3\cdot x\cdot x\cdot y} \cdot \sqrt[3]{2\cdot2\cdot3\cdot x\cdot y\cdot y}$$

$$\sqrt[3]{2\cdot2\cdot2\cdot3\cdot3\cdot3\cdot x\cdot x\cdot x\cdot y\cdot y\cdot y}$$

original (have) · need/need = together

$$\frac{6}{\sqrt[4]{24x^2y2^3}} \cdot \frac{\sqrt[4]{54x^2y^3z}}{\sqrt[4]{54x^2y^3z}} = \frac{6\sqrt[4]{54x^2y^3z}}{6xyz}$$

$$\begin{array}{r|l} 2 & 4 \\ 2 & 12 \\ 2 & 6 \\ & 3 \end{array}$$

have	need
2·2·2	2
3	3·3·3
x x	x x
4	4 4 4
2 2 2	2

conjugate of $(\sqrt{2}+5)$ 15 $(\sqrt{2}-5)$

$$\frac{3}{\sqrt{2}+5} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{\sqrt{4}+5\sqrt{2}} \quad \frac{3\sqrt{2}}{2+5\sqrt{2}}$$

conjugate $(x+3)(x-3)$ $x^2+3x-3x-9$

$$\frac{3}{\sqrt{2}+5} \cdot \frac{\sqrt{2}-5}{\sqrt{2}-5} = \frac{3\sqrt{2}-15}{\sqrt{4}-5\sqrt{2}+5\sqrt{2}-25} = \frac{3\sqrt{2}-15}{2-25} = \frac{3\sqrt{2}-15}{-23}$$

$$\frac{3\sqrt{2}}{-23} + \frac{-15}{-23} \qquad \frac{15}{23} - \frac{3}{23}\sqrt{2}$$

$$\frac{4}{1-\sqrt{2}} \cdot \frac{1+\sqrt{2}}{1+\sqrt{2}} = \frac{4+4\sqrt{2}}{1-\sqrt{2}+\sqrt{2}-\sqrt{4}} = \frac{4+4\sqrt{2}}{-1}$$

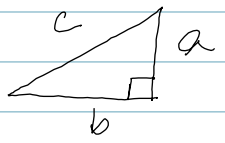
$$1-2$$

$$-1$$

$$-4-4\sqrt{2}$$

$$\frac{4}{-1} + \frac{4\sqrt{2}}{-1}$$

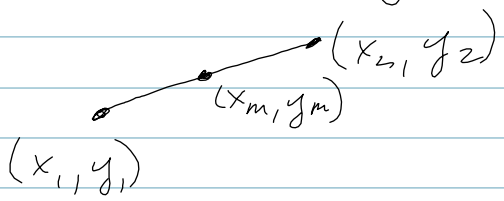
Pythagorean theorem (#) $a^2+b^2=c^2$



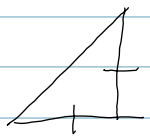
$a=2$ $c=9$ b?

$$2^2+b^2=9^2$$
$$4+b^2=81$$
$$b^2=77$$
$$b=\sqrt{77}$$

midpoint → point (x,y)



$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

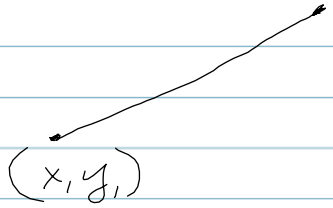


$(3,4)$
$(7,12)$

$$\left(\frac{3+7}{2}, \frac{4+12}{2}\right) \left(\frac{10}{2}, \frac{16}{2}\right)$$

$(5,8)$

distance formula (#)



$(2,6)$
$(3,12)$

$$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

$$d=\sqrt{(2-3)^2+(6-12)^2}$$
$$=\sqrt{(-1)^2+(-6)^2}$$
$$=\sqrt{(1+36)}$$
$$=\sqrt{37}$$