69 §7.3

$$\frac{3\sqrt{100x^2}}{2\sqrt{2x^{-1}}}$$

Quotient of radicals

Somewhere in Ch 7, they say to assume variables are nonnegative. Don't worry about $|x|$ stuff for

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

$$= \left(\frac{3}{2}\right)\frac{\sqrt{100}\sqrt{x^2}}{\sqrt{\frac{2}{x}}}$$

Kind of ugly

$$= \left(\frac{3}{2}\right)\sqrt{\frac{100x^2}{2x^{-1}}}$$

Radical of quotient

$$= \left(\frac{3}{2}\right)\sqrt{50x^{2-(-1)}}$$

$$a^b a^c = a^{b+c}$$

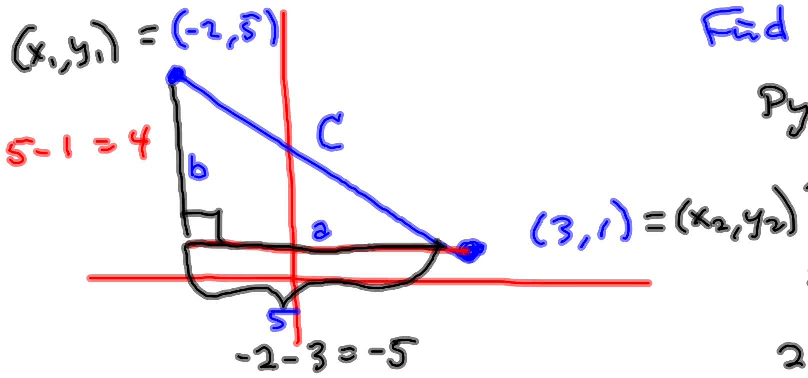
$$= \left(\frac{3}{2}\right)\sqrt{25 \cdot 2x^3} = \left(\frac{3}{2}\right)\sqrt{25}\sqrt{2x^{2+1}}$$

$$= \left(\frac{3}{2}\right)(5)\sqrt{2x^2 \cdot x^1} = \frac{15}{2}\sqrt{x^2 \cdot 2x}$$

$$= \frac{15}{2}\sqrt{x^2}\sqrt{2x} = \frac{15}{2}x\sqrt{2x}$$

$$= \frac{15x\sqrt{2x}}{2}$$

Finish 7-3



Find the distance

Pythagorus says

$$a^2+b^2=c^2$$

$$5^2+4^2=c^2$$

$$25+16=41=c^2$$

$$\pm\sqrt{41}=c$$

Distance is positive

$$c=+\sqrt{41}$$

distance

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

$$= \sqrt{(-2-3)^2+(5-1)^2}$$

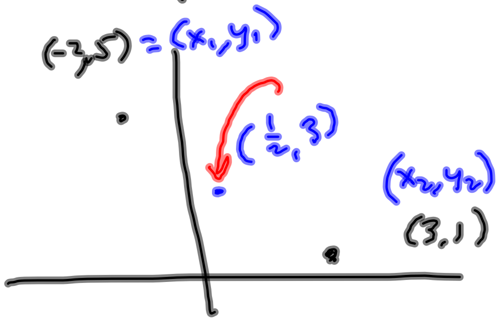
$$= \sqrt{(-5)^2+4^2}$$

$$= \sqrt{25+16}$$

$$= \boxed{\sqrt{41}} \approx 6.403124237 \approx \boxed{6.403}$$ to 3 places

Midpoint of (x_1, y_1) & (x_2, y_2)

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



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

$$= \left(\frac{-2+3}{2}, \frac{5+1}{2}\right)$$

$$= \left(\frac{1}{2}, \frac{6}{2}\right) = \left(\frac{1}{2}, 3\right)$$

§7.4

~~$2x+3x=5x$~~

$$\frac{\sqrt{75}}{9}-\frac{\sqrt{3}}{2}$$

$$=\frac{5\sqrt{3}}{9}-\frac{\sqrt{3}}{2}$$

LCD= 9·2

$$=\frac{5\sqrt{3}}{9}\cdot\frac{2}{2}-\frac{\sqrt{3}}{2}\cdot\frac{9}{9}$$

$$=\frac{10\sqrt{3}-9\sqrt{3}}{2\cdot 9}=\boxed{\frac{\sqrt{3}}{18}}$$

$$\begin{array}{r|l} 3 & 75 \\ 5 & 25 \\ & 5 \end{array}$$

$75=5^2\cdot 3$

$\sqrt{75}=\sqrt{5^2\cdot 3}$

$=5\sqrt{3}$

Nov 12-9:35 AM

$$\sqrt[3]{\frac{5x}{27}} + 4\sqrt[3]{5x}$$

$$\sqrt{\frac{5x}{27}}$$

BAD

$$= \frac{\sqrt[3]{5x}}{\sqrt[3]{27}} + 4\sqrt[3]{5x}$$

$$= \frac{\sqrt[3]{5x}}{3} + \left(4\sqrt[3]{5x}\right)\left(\frac{3}{3}\right)$$

$$= \frac{\sqrt[3]{5x} + 12\sqrt[3]{5x}}{3} = \frac{13\sqrt[3]{5x}}{3}$$

Nov 12-9:40 AM

Multiply

$\sqrt{2}\,(6+\sqrt{10})$

$= 6\sqrt{2} + \sqrt{2}\sqrt{10}$

$= 6\sqrt{2} + 2\sqrt{5}$

$\sqrt{2}\sqrt{10}$

$\sqrt{20} = \sqrt{4\cdot 5}$

$= \sqrt{4}\sqrt{5}$

$= 2\sqrt{5}$

$6\sqrt{2} + \sqrt{20} = 6\sqrt{2} + 2\sqrt{5}$

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

$\sqrt{6} + 7\sqrt{3} - \sqrt{10} - 7\sqrt{5}$

Done.

Nov 12-9:43 AM

Rationalizing Denominators §7.5

$\frac{2}{\sqrt{5}}$ by hand.

$\sqrt{5} \approx 2.236$

$$
\begin{array}{r}
.8944 \\
2.236 \overline{)\,2.00000} \\
1.7888 \\
\hline
.211200 \\
.20124 \\
\hline
.00996 \\
.008944 \\
\hline
.00016
\end{array}
$$

is hard

Really hard.

blah blah blah.

$$\frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5} \approx \frac{2 \cdot 2.236}{5} = \frac{4.472}{5}$$

Long division!

Quick & Easy

$$
\begin{array}{r}
.8944 \\
5 \overline{)\,4.472} \\
4.000 \\
\hline
.472 \\
.450 \\
\hline
.022000 \\
.020000 \\
\hline
.002000
\end{array}
$$

$$\frac{3}{\sqrt{6}} = \frac{3}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{3\sqrt{6}}{6} = \boxed{\frac{\sqrt{6}}{2}}$$

$$\frac{3}{6} = \frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{3}}\cdot 2} = \frac{1}{2}$$

Conjugates:

$$(a-b)(a+b) = a^2 - b^2$$

$\sqrt{2}+3$, $\sqrt{2}-3$

$7+\sqrt{5}$, $7-\sqrt{5}$

$$(7-\sqrt{5})(7+\sqrt{5}) = 7^2 - (\sqrt{5})^2 = 49-5 = 44$$

Nov 12-9:54 AM

$$\frac{3}{2\sqrt{5}+1} = \left(\frac{3}{2\sqrt{5}+1}\right)\left(\frac{2\sqrt{5}-1}{2\sqrt{5}-1}\right)$$

$$= \frac{3(2\sqrt{5}-1)}{(2\sqrt{5})^2 - 1^2} = \boxed{\frac{6\sqrt{5}-3}{19}}$$

$2^2 \cdot 5 - 1^2$

$4 \cdot 5 - 1$

$20 - 1$

Rationalizing Numerators (Same deal)

$$\left(\frac{\sqrt{x+2} - \sqrt{x}}{2}\right)\left(\frac{\sqrt{x+2} + \sqrt{x}}{\sqrt{x+2} + \sqrt{x}}\right)$$

$$= \frac{\left(\sqrt{x+2}\right)^2 - \left(\sqrt{x}\right)^2}{2\left(\sqrt{x+2} + \sqrt{x}\right)} = \frac{x+2-x}{2\left(\sqrt{x+2} + \sqrt{x}\right)}$$

$$= \frac{\cancel{2}^{1}}{\cancel{2}_{1}\left(\sqrt{x+2} + \sqrt{x}\right)} = \frac{1}{\sqrt{x+2} + \sqrt{x}}$$

§7.5 #1-69 every 4^{th} Plus

Rationalize the numerator:

$$\frac{\sqrt{x+h} - \sqrt{x}}{h}$$