§7.1 #s 1–25 odds & 43, 44 are good practice.

Moving on to §8.1 from there

§8.1 #s 1–41 odds for practice

#s 15, 16, 19, 20, 21, 22, 25, 26 involve

$\sqrt{-1} = i$ is the definition of i.

It's the imaginary unit.

$i^2 = -1$

↳ Today, some practice with $\sqrt{\ }$

That's §7.1

Homework sheet will be prepared & posted this afternoon.

Due Wed. or Friday.

§7.1 #8, 14, 22, 40

§7.7 #6, 12,

§8.1 # 4, 10, 16, 22

There will be some added that aren't in your book.

principle
principal

§7.1 Begin.

$(-3)^2 = 9$ There are two square roots of

$3^2 = 9$ 9.

$\sqrt{9}$ is the principal square root; the positive one.

$\sqrt{9} = 3$

$\sqrt{3 \cdot 3} = 3\sqrt{1} = 3$

3 | 27
3 | 9
3

Simplifying radicals

$\sqrt{27} = \sqrt{3 \cdot 3 \cdot 3} = 3\sqrt{3}$

$\sqrt{108} = \sqrt{2 \cdot 2 \cdot 3 \cdot 3 \cdot 3} = 2 \cdot 3\sqrt{3}$

$= 6\sqrt{3}$

2 | 108
2 | 54
3 | 27
3 | 9
3

Simplify $\frac{8+\sqrt{24}}{4}$

BAD:

$$= \frac{8+2\sqrt{6}}{4} = \frac{2+2\sqrt{6}}{1} = 2+2\sqrt{6}$$

What's wrong?

We cancel factors with factors

I need to factor out from BOTH terms in the numerator:

$$\frac{8+2\sqrt{6}}{4} = \frac{4+\sqrt{6}}{2}$$

is correct (I cancelled with Every term upstairs)

But Bad (dangerous) style.

BEST Practice:

$$\frac{8+2\sqrt{6}}{4} = \frac{2(4+\sqrt{6})}{4}$$

$$= \frac{4+\sqrt{6}}{2}$$

This is an 8.2 skill .. 8.1 ..

Now, it's 2 times Everything upstairs.

Now 2 is seen as a FACTOR of the numerator.

We can cancel factors!

$2 \mid 24$
$2 \mid 12$
$2 \mid 6$
3

$\sqrt{24} = \sqrt{2 \cdot 2 \cdot 2 \cdot 3}$
$= 2\sqrt{2 \cdot 3}$
$= 2\sqrt{6}$

Primes

2, 3, 5, 7, 11, 13, 17

Mar 30-9:26 AM

$\sqrt{(-3)^2} = \sqrt{9} = 3$

So it came out positive, even though it was a -3 that was squared.

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

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

$|-3| = 3$ $\quad$ $|-5| = 5$

$|3| = 3$ $\quad$ $|5| = 5$

$\sqrt{(-3)^2} = |-3| = 3$

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

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

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

$x^2 = 16$

$\sqrt{x^2} = \sqrt{16}$ → THE Big idea.

$|x| = 4$

$x = 4$ OR $x = -4$

$x^2 - 16 = 0$

$(x-4)(x+4) = 0$

$x = 4$ OR $x = -4$

Books teach the so-called "Square Root Principle"

$x^2 = 16 \Rightarrow$

$x = \pm\sqrt{16}$

$x = \pm 4$

$$(x-7)^2 = 72$$

$$\sqrt{(x-7)^2} = \sqrt{72}$$

$$|x-7| = 6\sqrt{2}$$

$$x-7 = 6\sqrt{2} \quad \text{OR} \quad x-7 = -6\sqrt{2}$$

$$x = 7+6\sqrt{2} \quad \text{OR} \quad x = 7-6\sqrt{2}$$

2	72
2	36
2	18
3	9
	3

$$\sqrt{72} = \sqrt{2\cdot2\cdot3\cdot3}$$

$$= 2\cdot3\sqrt{2}$$

$$= 6\sqrt{2}$$

S'8.1 has quite a few like this. I'd like you to work the odd problems I mentioned.

$(x-7)^2 = 72$

$x-7 = \pm\sqrt{72} = \pm 6\sqrt{2}$

$x = 7 \pm 6\sqrt{2}$

Minimum effort. Beginning Student should reinforce

Use the 1st way the 1st few or several reps.

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

$\sqrt{x^2} = |x|$, because the $\pm$ does NOT appear by magic OR rote memory.

Added Probs

$(x+5)^2 = 72$

$(2x-3)^2 = 150$

$(x+5)^2 = -72$

$(2x-3)^2 = -150$

} Answers are not real!

By Wednesday, turn in these 4 probs plus the assigned ones

$\sqrt{-300} = i\sqrt{300} =$

$= i \cdot 10 \cdot \sqrt{3}$

$= 10i\sqrt{3}$

$2 \mid 300$
$2 \mid 150$
$3 \mid 75$
$5 \mid 25$
5