This week: Cover radicals

(square roots)

Test FRIDAY

Last two weeks of semester:

Cover ch. 13 (statistics)

Test over ch. near end of semester

Square roots & radicals:

A square root is the number you multiply by itself to get another number.

$6 \cdot 6 = 36$

six is the square root of 36

$9 \cdot 9 = 81$

9 is the square root of 81

$1.72 \times 1.72 = 2.9584$

1.72 is the square root of 2.9584

Radical sign means "find the positive square root" of the number.

$\sqrt{25}$ = find the positive square root of 25

$\boxed{25 = 5 \cdot 5}$

$25 = -5 \cdot -5$

$\sqrt{x}$ = always positive

$-\sqrt{x}$ = always negative

$\pm\sqrt{x}$ = both positive and negative square roots

Square roots of negative #:

NOT A REAL NUMBERS =

we'll ignore them

$$-\sqrt{25} = -5$$

$$\sqrt{-25} = \text{we'll ignore}$$

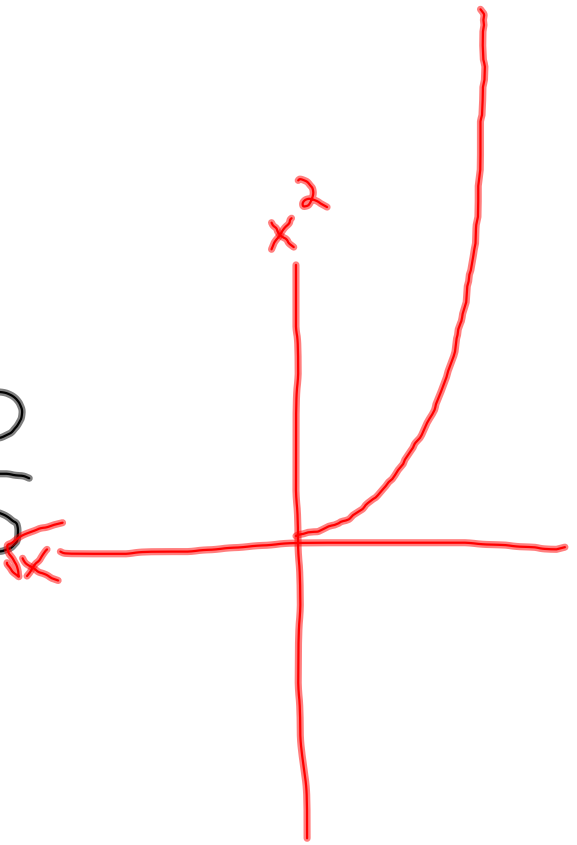
$\sqrt{0} = 0$ (neither − or +)

$\sqrt{x}$ = integer (1, 2, 3 . . .)

= not an integer (decimal)

$\sqrt{x}$	x
1	1
2	4
3	9
4	16
5	25
6	36

$\sqrt{x}$	x
10	100
20	400
50	2,500
100	10,000



$\sqrt{x}$ = if the answer is an integer, then x is a "perfect square"

- 81 is a perfect square because $\sqrt{81} = 9$
- 144 is a perfect square because $\sqrt{144} = 12$
- 146 is <u>not</u> a perfect square — $\sqrt{146}$ is not an integer

For perfect squares

- You can find $\sqrt{x}$ by "progressively estimating":

$\sqrt{121} = ?$ = $\sqrt{900} = 30$

$9^2 = 81$

$12^2 = 144$

$10^2 = 100$

$20^2 = 400$

$25^2 = 625$

$40^2 = 1600$

Evaluate the expression.

$10^2 = 100$
$100^2 = 10000$
$50^2 = 2500$
$30^2 = 900$
$20^2 = 400$

1. $\pm\sqrt{81}$

9, −9

2. $\pm\sqrt{25}$

5, −5

3. $-\sqrt{400}$

−20

4. $\sqrt{625}$

25

5. $\sqrt{4900}$

70

~~$\sqrt{490}$~~

6. $\pm\sqrt{169}$

13, −13

Approximate the square root of a number that's not a perfect square:

$\sqrt{722}$ = between 26 & 27

26.87

$10^2 = 100$

$20^2 = 400$

$30^2 = 900$

$25^2 = 625$

$28^2 = 784$

$27^2 = 729$

$26^2 = 676$

Approximate the square root to the nearest integer.

7. $-\sqrt{29}$

$5^2 = 25$

$6^2 = 36$

between -5 & -6

8. $\sqrt{108}$

$10^2 = 100$

$11^2 = 121$

between 10 & 11

9. $-\sqrt{53}$

$7^2 = 49$

$8^2 = 64$

between -7 & -8

10. $\sqrt{138}$

$11^2 = 121$

$12^2 = 144$

between 11 & 12

11. $-\sqrt{55}$

12. $\sqrt{640}$

$25^2 = 625$

$26^2 = 676$

between 25 & 26

irrational #'s <u>cannot</u> be written as fractions of integers.

$\frac{a}{b}$ (where a & b are integers) = RATIONAL NUMBER

Square roots of whole numbers are either integers ($\sqrt{625} = 25$, $-\sqrt{81} = -9$) <u>OR</u> irrational numbers:

$\sqrt{626}$, $\sqrt{82}$, $-\sqrt{27}$ = irrational numbers

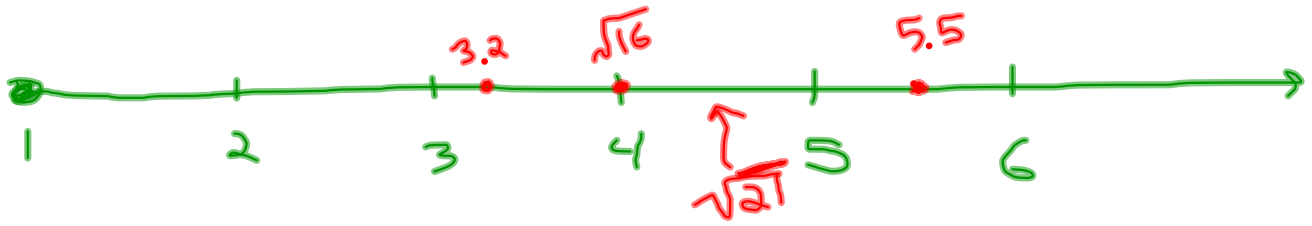
irrational numbers have a never-ending, never-repeating decimal part:

2.3120756152098 3 . . . . .

3.2

$\sqrt{16} = 4$

5.5



$\sqrt{21}$

$4^2 = 16$

$5^2 = 25$

Homework:

p. 113: 3-14 (all)
15-21 (odd)
24-26 (all)
38-41 (all)