§7.1 Radical

$1^2=1$	$1^3=1$
$2^2=4$	$2^3=8$
$3^2=9$	$3^3=27$
$4^2=16$	$4^3=64$
$5^2=25$	$5^3=125$
$6^2=36$	$6^3=216$
$7^2=49$	$7^3=343$
$8^2=64$	$8^3=512$
$9^2=81$	$9^3=729$
$10^2=100$	$10^3=1000$
$11^2=121$	
$12^2=144$	
$13^2=169$	
$14^2=196$	
$15^2=225$	
$16^2=256$	
$17^2=289$	

$\sqrt{100} = 10$ b/c $10^2=100$

$\sqrt{256} = 16$ ∵ $16^2=256$

$f(x) = \sqrt{x}$

$f(100) = 10$

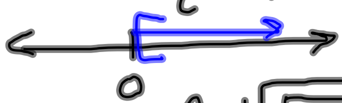
$f(-100) = \sqrt{-100}$ ain't real.

we keep $\sqrt{x}$ real

by keeping x nonnegative

∴ ∴ $x \geq 0$

Domain $= \{x \mid x \geq 0\}$

$=$  $= [0, \infty)$

In general $\sqrt{\boxed{}}$ has

domain $\{x \mid \boxed{} \geq 0\}$

$f(x) = \sqrt{3x-2}$

Domain $= \{x \mid 3x-2 \geq 0\}$

Need $3x - 2 \geq 0$

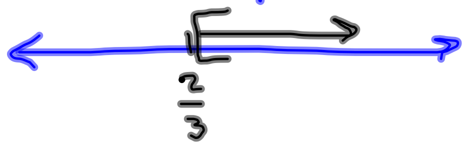
$\quad +2 = +2$

$3x \geq 2$

$\frac{3x}{3} \geq \frac{2}{3}$

$x \geq \frac{2}{3}$

$D = \{x \mid x \geq \frac{2}{3}\}$

$=$ 

$= [\frac{2}{3}, \infty)$

$\sqrt{.04} = .2$

$$\begin{array}{r} .2 \\ \times\ .2 \\ \hline .04 \end{array}$$

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    4724.484544
3500e^(.03*10)
    4724.505827
√(.04)
             .2
.04^(1/2)
             .2
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$\sqrt[3]{8} = 2$, b/c $2^3 = 2\cdot 2\cdot 2 = 8$

$\sqrt[3]{-8} = -2$, b/c $(-2)(-2)(-2) = -8$

Domain of $\sqrt[3]{x}$ is all real numbers. $(-\infty, \infty)$

This is because 3 is odd. Same works for

$\sqrt[5]{x}$, $\sqrt[7]{x}$, $\sqrt[11]{x}$, $\sqrt[9]{x}$, ...

$\sqrt{x} = \sqrt[2]{x}$ Domain of $\sqrt{x}, \sqrt[4]{x}, \sqrt[6]{x}, \ldots$

is $[0, \infty)$

$\sqrt[3]{x^3} = x$, $\sqrt[5]{x^5} = x$ b/c $x^5 = x^5$

$\sqrt[5]{x^{10}} = x^2$, b/c $(x^2)^5 = x^{2\cdot 5} = x^{10}$

If n is odd,

$\sqrt[n]{x^n} = x$

$\sqrt[3]{(-3)^3} = -3$

$\sqrt[3]{(24)^3} = 24$

If n is EVEN.

$\sqrt{3^2} = 3$

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

$\sqrt[4]{3^4} = 3$

$\sqrt[4]{(-3)^4} = 3$

$(-3)^4 = (-3)(-3)(-3)(-3)$

$= 3^4$ (the negatives cancel)

$\sqrt[4]{x^4} = |x|$ $\sqrt[5]{x^5} = x$

#s 29-42 It says "... variables represent nonnegative real numbers..."

Then $|x| = x$ (No $|x|$ in answers)

#s 43-54 "... variables represent real numbers..."

Then there'll be some $|x|$'s floating around in answers.

Circle the real numbers

$\sqrt{-15}$, $\boxed{\sqrt[3]{-15}}$, $\sqrt[5]{-15}$, $\sqrt[6]{-15}$

$\sqrt[6]{64} = 2$ b/c $2^6 = 64$

64^(1/6) = 2

64^1/6 = $\frac{64}{6}$ if you forget parentheses.

why is

$\sqrt{25} = 5$ and not $\sqrt{25} = -5$?

isn't $(-5)^2 = 25$?

$\sqrt{x}$ is the principal (nonnegative) square root of x.

-5 is a square root of x, too, just not the principal square root of 5.

$\sqrt{\text{RADICAND}}$

$\sqrt[4]{x^{12}} = x^3$

$(x^3)^4 = x^{3 \cdot 4} = x^{12}$ ✓

7.1 #s 1, 5, 9, 13, 17, 21, 25, 29, 31, 35, 39, 43, 45, 47, 53, 54, 55, 59, 63, 69, 73, 77-80

#s 43-54

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

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

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

$\sqrt{x^2+8x+16} = \sqrt{(x+4)^2} = |x+4|$

$(x+4)(x+4)$

$= x^2+4x+4x+16$

$= x^2+8x+16$

$\sqrt{16y^6}$

$= \sqrt{4^2(y^3)^2} = \sqrt{(4y^3)^2} = 4y^3$

No absolute value because the instructions say "Assume variables represent positive real numbers." If they didn't say that, we would need $4|y^3|$ or $4|y|^3$

$\sqrt[5]{-32x^{20}} = -2x^4$ HINT: Divide 20 by 5

$(-2x^4)^5 = (-2)^5(x^4)^5 = -32x^{20}$ ✓

$(ab)^c = a^c b^c$

Collect @ end of class, Monday.

Nov 5-11:53 AM