Geometry Weds. 12-5-12 Class Notes

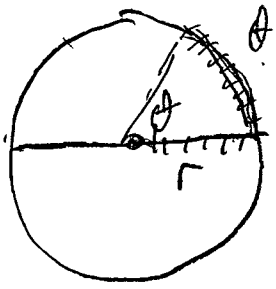
12 inches = 1 ft

$\frac{12 \text{ in}}{1 \text{ ft}}$ or $\frac{1 \text{ ft}}{12 \text{ in}}$

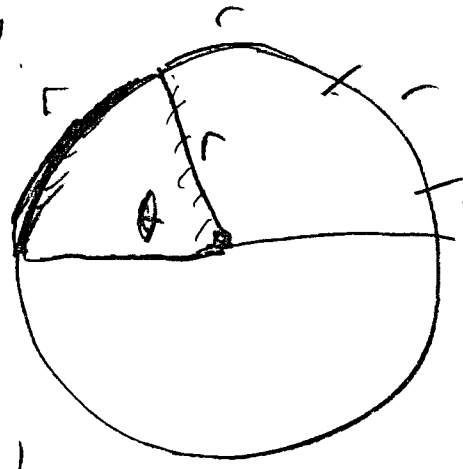
$\frac{5}{6} = \frac{10}{12}$ ft $\cdot \frac{12 \text{ in}}{1 \text{ ft}}$

$70 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = \frac{35}{6} = 5\frac{5}{6}$ ft

$= 5$ ft 10 in.



$\theta = 1$ radian
$= 1$ rad



~ 3.14 rad in $180°$

180 deg = π rad

$\frac{180 \text{ deg}}{\pi \text{ rad}}$ or $\frac{\pi \text{ rad}}{180 \text{ deg}}$

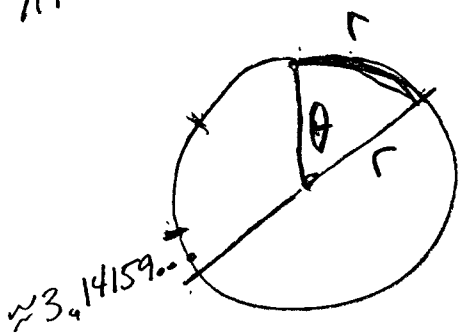
(Ex) $\frac{\cancel{34}^{17}\ \text{in}}{\cancel{12}^{6}\ \text{in}} \cdot \frac{1\ \text{ft}}{} = \frac{17}{6}\ \text{ft}$

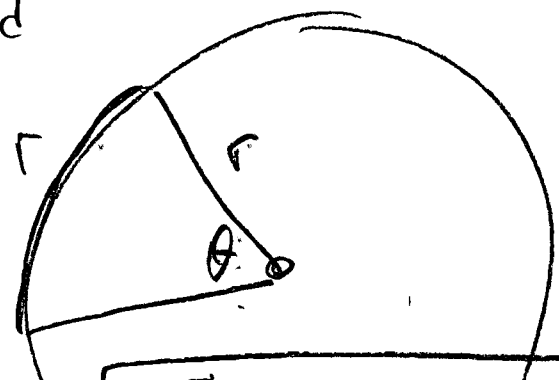
$= 2\frac{5}{6}\ \text{ft}$

(Ex) $3\ \text{ft} \cdot \frac{12\ \text{in}}{1\ \text{ft}} = \boxed{36\ \text{in}}$

$\pi\ \text{rad} = 180^\circ$

$\theta = 1\ \text{rad}$





$\frac{\pi\ \text{rad}}{180\ \text{deg}}$ or $\frac{180\ \text{deg}}{\pi\ \text{rad}}$

$30\ \text{deg} \cdot \frac{\pi\ \text{rad}}{\cancel{180}^{6}\ \text{deg}}$

$\boxed{30^\circ = \frac{\pi}{6}\ \text{rad}} = .52\ \text{rad}$

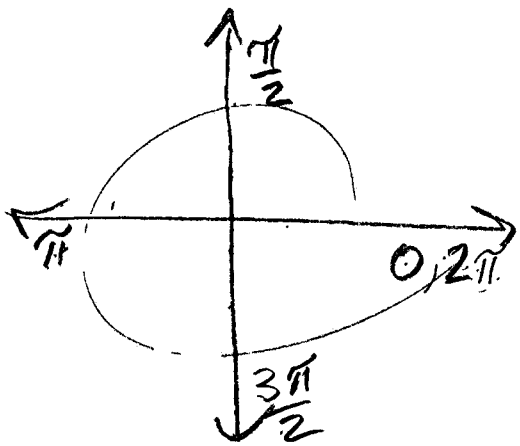
(Ex) $30\,\text{deg} \cdot \frac{\pi\ \text{rad}}{180\,\text{deg}} = \boxed{\frac{\pi}{6}\ \text{rad}}$

(Ex) $45\,\text{deg} \cdot \frac{\pi\ \text{rad}}{180\,\text{deg}} = \boxed{\frac{\pi}{4}\ \text{rad}}$

(Ex) $1\ \text{rad} \cdot \frac{180\,\text{deg}}{\pi\ \text{rad}} = \boxed{\frac{180}{\pi}\,\text{deg}}$ EXACT

$\approx 57.29577951\ldots$

(Ex) $\frac{\pi}{2}\ \text{rad} \cdot \frac{180\,\text{deg}}{\pi\ \text{rad}} = \frac{180}{2}\,\text{deg} = \boxed{90\,\text{deg}}$



$C = 2\pi r$

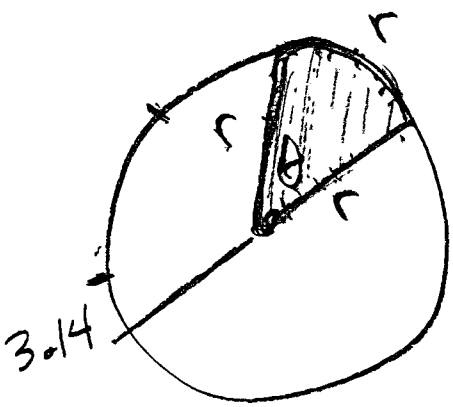
$\frac{2\pi\ \text{rad}}{360^\circ} = \frac{\pi\ \text{rad}}{180\,\text{deg}}$

More than one way to measure:

(Ex) $\frac{12\text{in}}{1\text{ft}} = \frac{1\text{ft}}{1\text{ft}}$ or $\frac{12\text{in}}{12\text{in}} = \frac{1\text{ft}}{12\text{in}}$

$32\text{in} \cdot \frac{1\text{ft}}{12\text{in}} = \frac{8}{3}\text{ft}$ or $2\frac{2}{3}\text{ft}$

$60\text{ft} \cdot \frac{12\text{in}}{1\text{ft}} = 720\text{in}$



$\theta = 1$ radian

π radian $= 180$ deg.

$\frac{\pi\text{ rad}}{180\text{ deg}}$ or $\frac{180\text{ deg}}{\pi\text{ rad}}$

(Ex) $30\text{deg} \cdot \frac{\pi\text{ rad}}{180\text{deg}} = \frac{\pi}{6}\text{ rad}$

(Ex) $90\text{ deg} \cdot \frac{\pi\text{ rad}}{180\text{deg}} = \frac{\pi}{2}\text{ rad}$

(Ex) $740\text{ deg} \cdot \frac{\pi\text{ rad}}{180\text{deg}} = \frac{37\pi}{9}\text{ rad}$

(Ex) $\frac{3\pi}{2}\text{ rad} \cdot \frac{180}{\pi\text{ rad}} = 270^\circ$

A Very, Very Important Pattern Involving ax^2+bx+c

$$(x+3)(x+3)$$

$$x^2+3x+3x+9=0$$

$$x^2+6x+9$$

$$(x+3)^2=(x+3)(x+3)=0$$

$$x=\{-3,-3\}$$

$$x=\{-3\}$$

PST $(a+b)^2=a^2+2ab+b^2$

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

(Ex) $(x+4)^2=x^2+8x+16=0$

$a=1$, $b=8$, $c=16$

b^2-4ac

$(8)^2-4(1)(16)=0=d$

DISCRIMINANT $=0$

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

$x=\{-4\}$

ONE real rational solution

Perf. Sq. Quadratic

$1x^2+6x+9=0$ $\quad ax^2+bx+c$

$(x+3)(x+3)=0$

$(a+b)(a+b)$

$a^2+ab+ba+b^2$

$a^2+2ab+b^2$

$x=\{-3\}$

Double root

* discriminant $=0$

$a=1$ $\quad b^2-4ac$

$b=6$ $\quad (6)^2-4(1)(9)$

$c=9$ $\quad 36-36=0=d$ ✓

$4x^2+20x+25=0$

$(2x+5)(2x+5)=0$

$x=\left\{-\frac{5}{2}\right\}$

(Ex) $4x^2 + 20x + 25 = 0$

Fits perfect square Pattern

$(2x + 5)(2x+5) = 0$

$x = \left\{-\frac{5}{2}\right\}$

$(3x-2)(3x-2)$

START HERE →

$9x^2 - 6x - 6x + 4 = 0$

$9x^2 - 12x + 4 = 0$

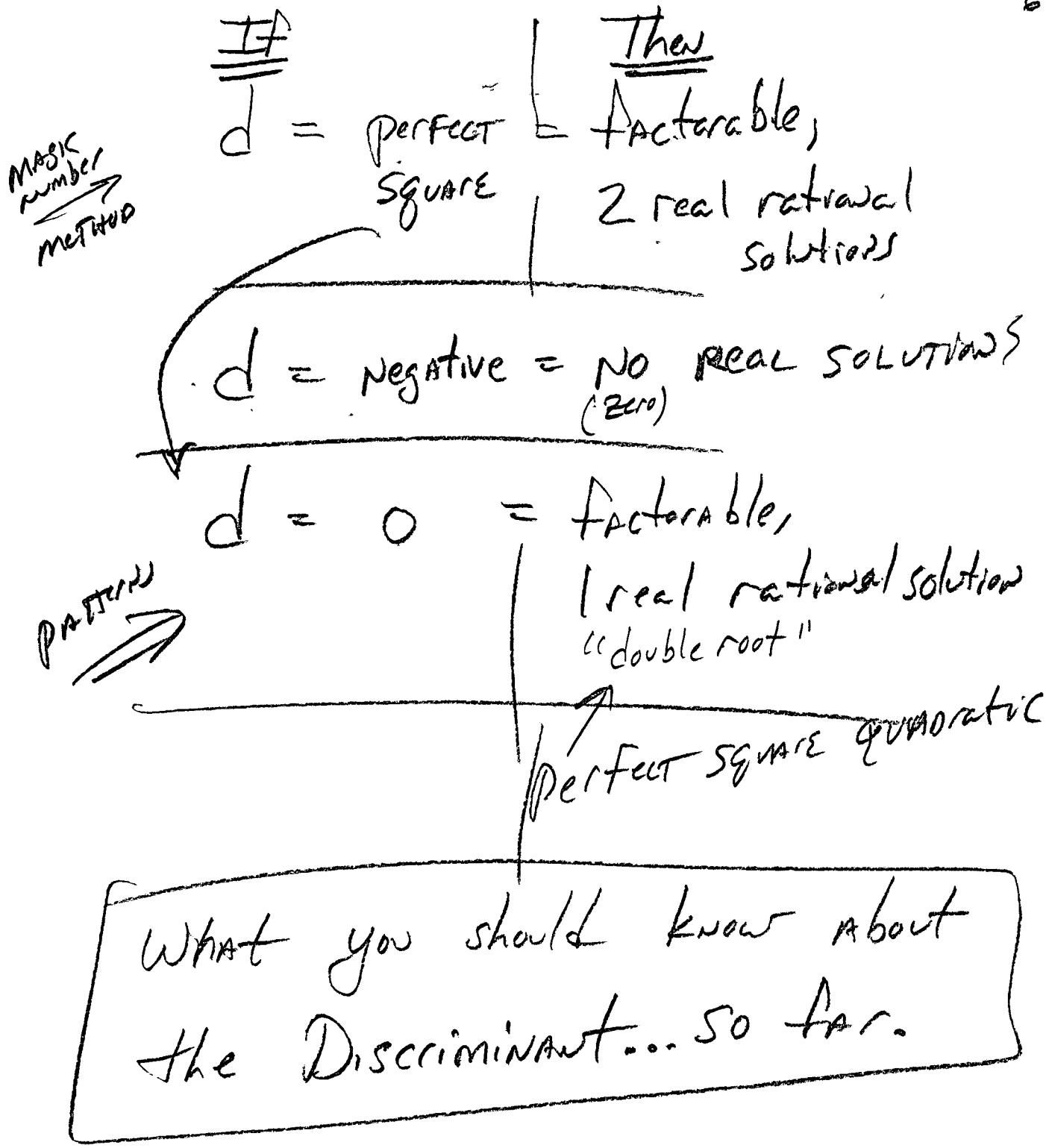
$(3x - 2)(3x-2) = 0$

$x = \left\{\frac{2}{3}\right\}$

PS PATTERN

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

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



What you should know about the Discriminant... so far.

Homework WS

(10) $x = -x^2 + 2$

$x^2 + x - 2 = 0 \quad ax^2 + bx + c = 0$

sum $= b = 1$

prod $= ac = -2$

$-1 \quad +2$

$(x-1)(x+2) = 0$

$x = \{1, -2\}$

---

(14) $1 - 7x = -10x^2$

$10x^2 - 7x + 1 = 0$

sum $= b = -7$

prod $= ac = 10$

$-2x \quad -5x$

$(10x^2 - 2x) + (-5x + 1) = 0$

$2x(5x-1) + -1(5x-1) = 0$

$(5x-1)(2x-1) = 0 \quad x = \{\frac{1}{5}, \frac{1}{2}\}$

Homework ws (10)

$x = -x^2 + 2$

Std. Form
$ax^2 + bx + c = 0$

$x^2 + x = 2$

$x^2 + x - 2 = 0$

sum = b = 1

prod = ac = -2

-1 +2

Since a = +1, use shortcut

$(x-1)(x+2) = 0$

$x = \{1, -2\}$

or $x = \{-2, 1\}$

(22) $12 + 19N = -5N^2$

$5N^2 + 19N + 12 = 0$

sum = b = 19 — 6, 10; 5, 12; 4, 15

prob = ac = 60

+4 +15

$(5N^2 + 4N) + (15N + 12) = 0$

$N(5N+4) + 3(5N+4) = 0$

$(5N+4)(N+3) = 0$

$N = \{-3, -\frac{4}{5}\}$

? ?

✓

$4x^2 + 10x + 25 = 0$

sum $\Rightarrow b = 10$

prod $\Rightarrow ac \Rightarrow 100$

$a = 4$

$b = 10$

$c = 25$

1, 100	
2, 50	
4, 25	
5, 20	
10, 10	

$b^2 - 4ac$

$(10)^2 - 4(4)(25)$

$100 - 400 = -300 = d$

* No Real Solution.

---

* ? Magic Numbers do not exist

d is Negative!