Unit Review

Trigonometry

#1 If θ is formed from the line thru (5, −12) find:

$\sin\theta = \frac{-12}{13}$

$\cos\theta = \frac{5}{13}$

$\tan\theta = \frac{-12}{5}$

$\sin\theta = \frac{y}{r}$

$\cos\theta = \frac{x}{r}$

$\tan\theta = \frac{y}{x}$

$x = 5$

$y = -12$

need $r = \sqrt{5^2 + (-12)^2}$

$r = 13$

#2 Trig Equations

S	A
T	C

$5\cos\theta + 7 = 3$ (−7 on both sides)

$5x + 7 = 3$

1) solve for cos θ

$5\cos\theta = -4$

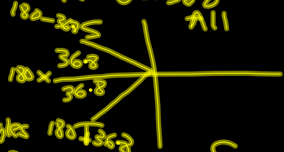
2) Find ref θ (2ndF) ignore neg

$\cos\theta = -\frac{4}{5}$

$\cos^{-1}\left(\frac{4}{5}\right)$

ref $\theta = 36.8$

3) S | A, T | C



4) Name Angles

$\theta = 143.2$

$\theta = 216.8$

Ex #2 $\tan^2\theta - 2\tan\theta - 8 = 0$

1) Solve equation

$x^2 - 2x - 8 = 0$

$(x-4)(x+2) = 0$

$x = 4$ or -2

$(\tan\theta - 4)(\tan\theta + 2) = 0$

$\tan\theta = 4$ or $\tan\theta = -2$

ref $\theta = 75.9$ ✓ ref $\theta = 63.4°$

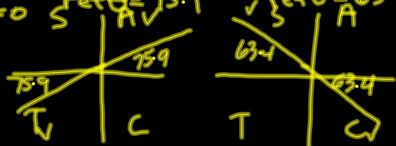
2) Ref θ

$\theta = 75.9$

$\theta = 255.9$

$\theta = 116.6$

$\theta = 296.6$



Topic Three – Ambiguous Triangles

Given $\angle A = 37$

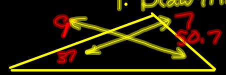
$a = 7$

$b = 9$

Find all possible values of c

Steps

1. Draw triangle



2. Find ∠B

(Law of Sines)

$\frac{7}{\sin 37} = \frac{9}{\sin B}$

2nd sin (.77) = 50.69

Side c_1

$\angle C = 180 - \angle A - \angle B$

$= 180 - 37 - 50.7$

$= 92.3$

$\frac{7}{\sin 37} = \frac{c}{\sin 92.3}$

$c = 11.6$

Side c_2

$\angle c_2 = \angle B - \angle A$

$\angle c_2 = 50.7 - 37$

$\angle c_2 = 13.7$

$\frac{7}{\sin 37} = \frac{c_2}{\sin 13.7}$

$c_2 = 2.7$

Quadratics

(Solving for x in an equation that has x^2.)

#1 Factoring

$x^2 - 3x - 28 = 0$

$(x-7)(x+4) = 0$

$x = +7$ or -4

#2

$x^2 - 8x = 0$

$x(x-8) = 0$

$x = 0$ or 8

Type 2 – Hard factoring

$3x^2 - 4x - 7 = 0$

$(3x-7)(x+1) = 0$

$x = \frac{+7}{3}$ or -1

$5x^2 + 22x + 8 = 0$

$5 \times 8 = 40$

$40 \cdot 1$, $20 \cdot 2$, $10 \cdot 4$, $8 \cdot 5$

$5 \cdot 1$, $8 \cdot 1$

$(5x+2)(1x+4) = 0$

$x = -\frac{2}{5}$ or -4

#3 Quad Formula (Given)

$9x^2 - 5x - 3 = 0$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$a = 9$, $b = -5$, $c = -3$

$x = \frac{+5 \pm \sqrt{(-5)^2-4(9)(-3)}}{2(9)}$

$25 + 108$, $\sqrt{133}$

$x = \frac{5+\sqrt{133}}{18}$ or $\frac{5-\sqrt{133}}{18}$

$x = .91$ or $-.36$

Last Part

if $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

then $b^2 - 4ac$ determines how many solutions.

$b^2-4ac > 0$ 2 answers

$b^2-4ac = 0$ 1 solution

$b^2-4ac < 0$ No real solution

$8x^2 + 5x$

$2x^2 + 8x + 8 = 0$

$b^2 - 4ac$

$64 - 4(a)(8)$

$64 - 64 = 0$

$\therefore$ 1 root

Sum of roots $= \frac{-b}{a}$

Prod of roots $= \frac{c}{a}$

$3x^2+5x-2=0$

if $(x+2)(3x-1)=0$

$x=-2$ or $1/3$ sum roots $-2+\frac{1}{3}=\frac{-5}{3}$

product $-2\cdot\frac{1}{3}=\frac{-2}{3}$

$7x^2-9x-2=0$ sum of roots $\frac{-b}{a}$ $\frac{9}{7}$

product $\frac{c}{a}$ $\frac{-2}{7}$

#3 Suppose you have roots

$\frac{2}{3}$ and $\frac{-4}{5}$ sum $=\frac{2}{3}+\frac{-4}{5}$ $\frac{10-12}{15}$

Find $ax^2+bx+c=0$ multiply $\frac{2}{3}\cdot\frac{-4}{5}=\frac{-8}{15}$

$15x^2+2x-8=0$

sum $=\frac{-2}{15}=\frac{b}{a}=+2$

product $=\frac{-8}{15}=c$