Pre-Calc AB

Lesson 26

9/15/15

Agenda: 9/15/15

HW leader: Period 2 $\boxed{\text{Kyle S.}}$ Period 8 $\boxed{\text{Ethan L.}}$

Lesson 26

- Logarithms / Functions
- Log equations

★ Test 3 Tomorrow

- Lessons 1-22
- 50% on 21-22 - Functions

★ Quiz corrections Due today

★ Time spent on HW

- Should be 45-60 minutes each day
- I want you to record the time you spend on each HW at the top of each HW at the top by your name

★ Test 3 tomorrow (1-22)

Graphing, transformations, prove similar, function def.

Logarithms:

For any positive number N and b, $b \neq 1$ there is a real number L such that:

$$N = b^L$$

We define the logarithm for b of N to be L:

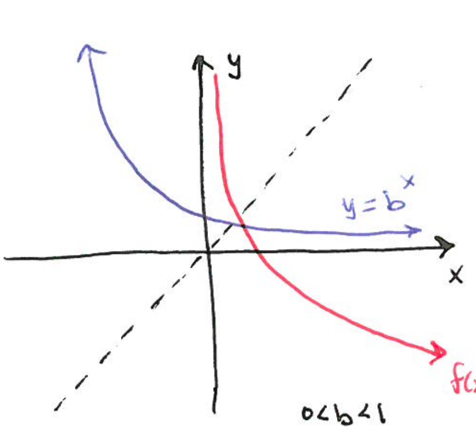
$$\boxed{\log_b N = L \qquad \text{if and only if} \qquad N = b^L}$$

Ex. Write the exponential form of $\log_x\left(\frac{1}{3}\right) = 2$

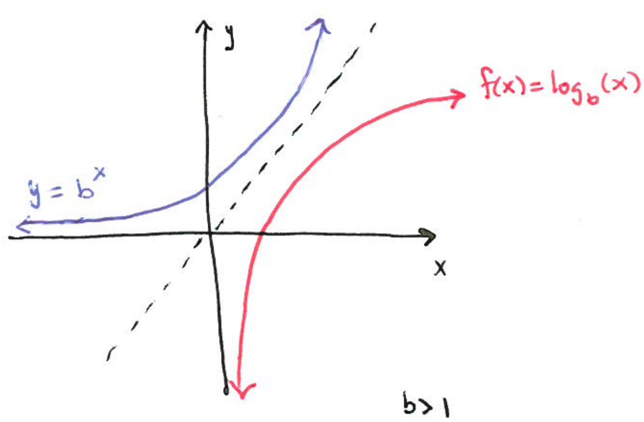
$$\boxed{x^2 = \frac{1}{3}}$$

Ex. Write the logarithmic form of $16 = 14^y$ $\quad \boxed{\log_{14}(16) = y}$

Definition - The logarithm function for b, $b > 0$, $b \neq$ is $f(x) = \log_b(x)$.



$0 < b < 1$



$b > 1$

Pre-Calc AB

Lesson 26

9/15/15

<u>logarithmic Equations</u>: Solve by rewriting in exponential form

Ex: Solve for P, $\log_{2/3} P = -3$

$$P = \left(\frac{2}{3}\right)^{-3} = \left(\frac{3}{2}\right)^{3} = \boxed{\frac{27}{8}}$$

Ex. Solve for y, $\log_y y+2 = 2$

$$y + 2 = y^2 \Rightarrow y^2 - y - 2 = 0 \Rightarrow y = -1, 2 \quad \boxed{y = 2}$$

Ex. Solve for n, $\log_4\left(\frac{1}{64}\right) = n$

$$\frac{1}{64} = 4^n \Rightarrow 4^{-3} = 4^n \Rightarrow \boxed{n = -3}$$

Pre-Calc AB

Lesson 27

9/17/18

Agenda: 9/17/18

	Period 2	Period 8
HW leader:	Brian S.	Alanna L.

lesson: 27

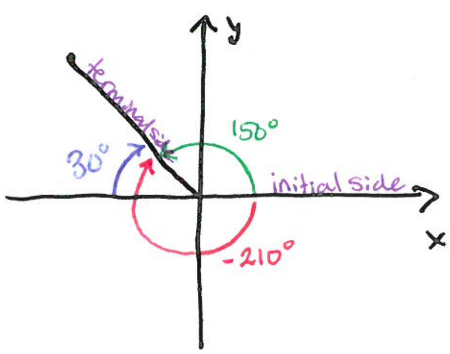
related Angles

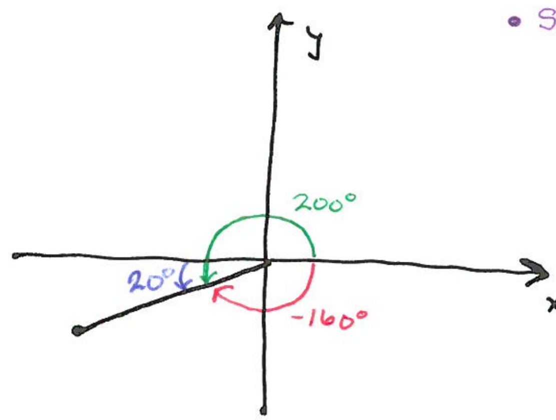
Signs of Trig functions

☆ Test 3 back after lesson

Definition – the related angle is always a positive acute angle between the vector and x-axis.

• Standard position





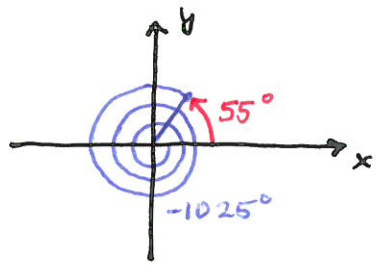
$30°$ is the related angle to both $150°$ and $-210°$

$20°$ is the related angle to both $200°$ and $-160°$

Ex. What is the related angle to $-1025°$? [Me]

$1025° = 2(360°) + 305°$

So the related angle is $360° - 305° = \boxed{55°}$



Signs of Trig Functions:

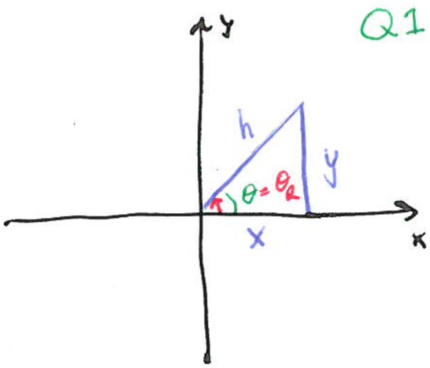
Let θ be any angle and θ_R be its related angle then the trig function of θ is the same as the trig function of θ_R up to a sign.

Pre-Calc AB

Lesson 27

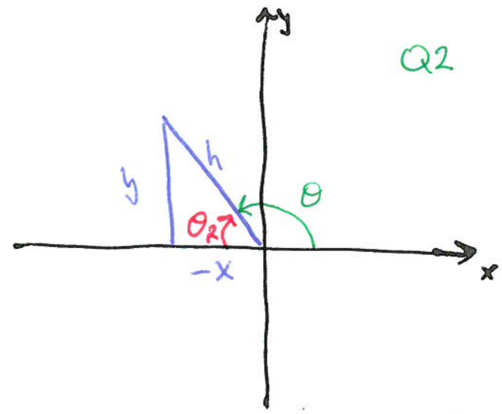
9/17/18

★ Hypothenuse is always positive.



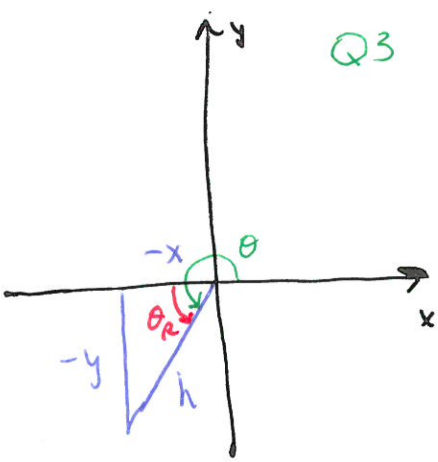
All Positive

ALL



Sine is positive, Cosine, tangent negative

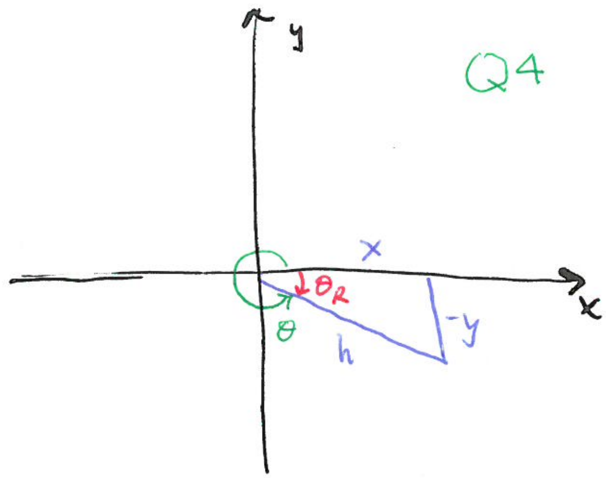
STUDENTS



Tangent Positive

Sine, Cosine Negative

TAKE

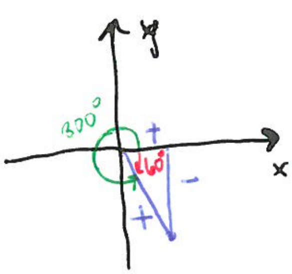


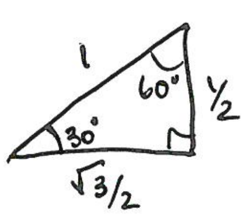
Cosine Positive

Sine, tangent Negative

CALCULUS

Ex 27.3 Evaluate $\frac{5}{3}\cos(300°)$





Reference Triangle

$$\frac{5}{3}\cos(300°) = \frac{5}{3}\left(+\cos(60°)\right)$$

$$= +\frac{5}{3}\left(\frac{1}{2}\right) = \boxed{\frac{5}{6}}$$

Pre-Calc AB

Lesson 28

9/18/15

Agenda: 9/18/15

Period 2

HW leader: Andrew P.

Lesson 28

Factorials

Abstract rate problems

Your Turn: HW #2

reality	T	R	$G-20$
goal	T_2	$R+5$	G

Find T_2 in terms of T and R

$$T_2 = \frac{G}{R+5} = \boxed{\frac{TR+20}{R+5}} \text{ hrs.}$$

Then do #1

Factorials: $n! = n\cdot(n-1)\cdot(n-2)\cdot\ldots\cdot 3\cdot 2\cdot 1$

Ex. 28.3 Evaluate without a calculator $\frac{14!}{6!\,11!}$

$$\frac{14!}{6!\,11!} = \frac{14\cdot 13\cdot 12\cdot \cancel{11!}}{6!\cdot\cancel{11!}} = \frac{14\cdot 13\cdot \cancel{12}}{\cancel{6}\cdot 5\cdot 4\cdot 3\cdot\cancel{2}\cdot 1} = \boxed{\frac{91}{30}}$$

Abstract Rate Problems:

★ Keep track of units!

Ex. 28.5 The train traveled m miles at p miles per hour and still arrived 1 hour late. How fast should the train have traveled to arrive on time?

	rate	time	distance
late	p	T	m
on time	R	$T-1$	m

$$\text{Time} = \frac{\text{distance}}{\text{rate}}$$

$$T = \frac{m \text{ miles}}{p \ \frac{\text{miles}}{\text{hr}}} = \frac{m}{p} \text{ hr}$$

Find R: $$R = \frac{m}{T-1} = \frac{m}{\left(\frac{m}{p}-1\right)} = \frac{m}{\frac{m-p}{p}} = \boxed{\frac{mp}{m-p} \ \frac{\text{mi}}{\text{hr}}}$$

Pre-Calc AB

Lesson 29

9/21/15

Agenda: 9/21/15

	Period 2	Period 8
HW leader:	David M.	Clare S.

Lesson 29

Unit Circle

Quadrantal Angles

- Handout WS 7
- Unit circle Handout

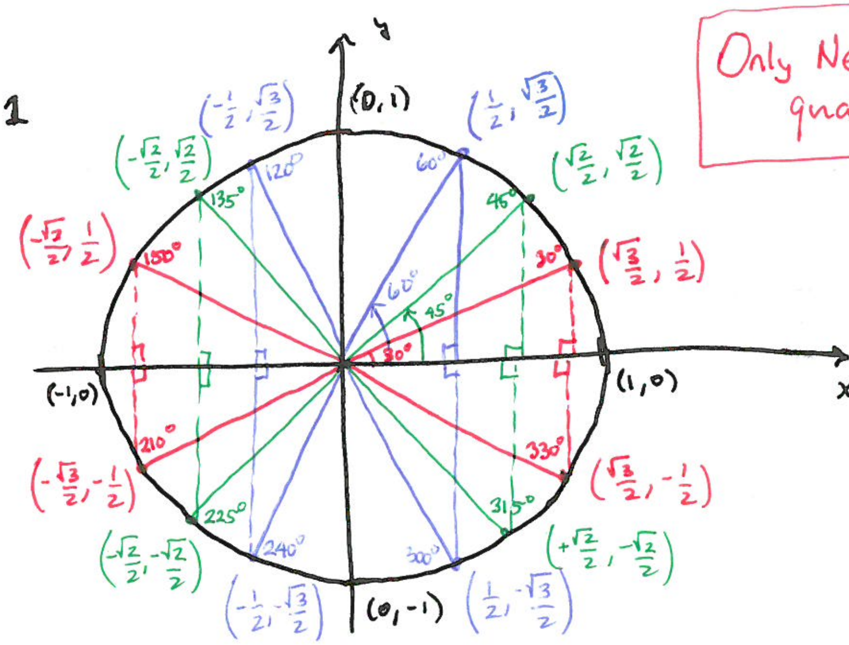
★ Quiz 4 on Wednesday

★ Make-up / retake Test 3 on Tuesday 3-4 or 4-5

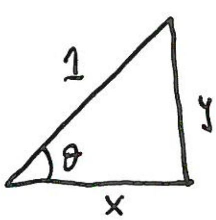
★ retakers must turn in Corrections to their test 3 before.

Unit Circle

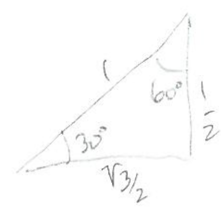
i.e. radius = 1



Only Need to Know quadrant I



$$\boxed{\cos\theta = x \quad \text{and} \quad \sin\theta = y}$$



- Need the related angle
- Unit circle in Q I
- All Students Take Calculus

Quadrantal Angles : 0°, 90°, 180°, 270°, 360°...

Defined to be the limit approached by the trig functions as the angle gets closer and closer to these values.

$\sin 0° = 0$	$\sin 90° = 1$	$\sin 180° = 0$	$\sin 270° = -1$
$\cos 0° = 1$	$\cos 90° = 0$	$\cos 180° = -1$	$\cos 270° = 0$

Ex : Evaluate without a calculator

$2\sin 30° \cos 30° - \sin 60° + \cos 90°$

$= 2\left(\frac{1}{2}\right)\left(\frac{\sqrt{3}}{2}\right) - \frac{\sqrt{3}}{2} + 0$

$= \boxed{0}$

Pre-Calc AB

Lesson 30

9/22/15

Agenda: 9/22/15

HW leader:

Period 2: $\boxed{\text{Hannah L.}}$

Period 8: $\boxed{\text{Brooke M.}}$

Lesson 30

Vector Addition

Over lapping Triangles

Quiz 4 tomorrow

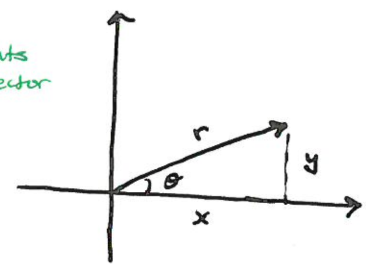
★ Make up/retake done by today 3-4 or 4-5

- A vector has a direction and a magnitude

$$v = r\angle\theta^\circ \quad \text{or} \quad v = x\hat{i} + y\hat{j}$$

[polar coords] [rect. coords]

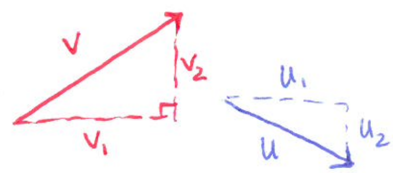
called components of the vector

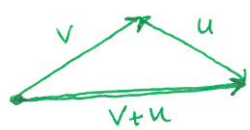


Vector Addition: Defined component wise

$$v = v_1\hat{i} + v_2\hat{j} \qquad u = u_1\hat{i} + u_2\hat{j}$$

$$v + u = (v_1 + u_1)\hat{i} + (v_2 + u_2)\hat{j}$$





★ Vectors can only be added in polar form if they are in the same direction or the exact opposite.

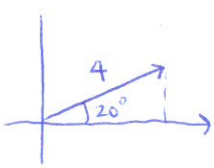
★ v+u called the resultant

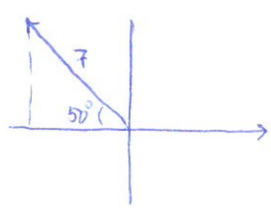
★ -(v+u) called the equilibrant

Ex 30.1 Find the resultant of $4\angle 20^\circ + 7\angle 230^\circ$

$$v = 4\angle 20^\circ = 4\cos 20^\circ\hat{i} + 4\sin 20^\circ\hat{j}$$

$$u = 7\angle{-230^\circ} = -7\cos 50^\circ\hat{i} + 7\sin 50^\circ\hat{j}$$





$$u + v = (4\cos 20^\circ - 7\cos 50^\circ)\hat{i} + (4\sin 20^\circ + 7\sin 50^\circ)\hat{j} \approx \boxed{-0.74\hat{i} + 6.73\hat{j}}$$

Polar form: $r = \sqrt{0.74^2 + 6.73^2} \approx 6.77 \qquad \theta = \tan^{-1}\left(\frac{6.73}{0.74}\right) \approx 83.73^\circ$

$$\boxed{u + v \approx 6.77\angle 83.74^\circ}$$

Pre-Calc AB **lesson 30** 9/22/15

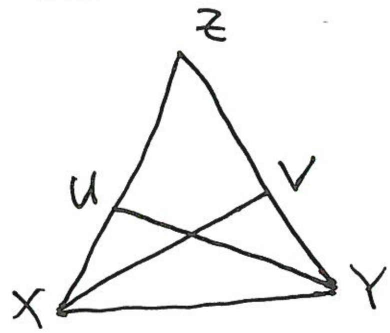
Overlapping Triangles: Separate the Triangles

Ex. 30.6 Given: 1. $\overline{XZ} \cong \overline{YZ}$

2. $\overline{XV} \perp \overline{YZ}$

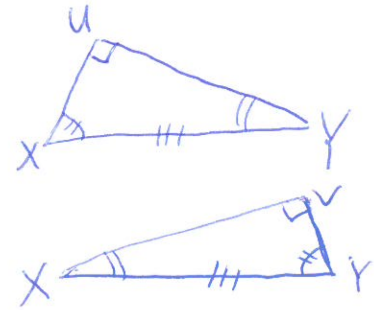
3. $\overline{YU} \perp \overline{XZ}$

Prove: $\overline{XV} \cong \overline{YU}$

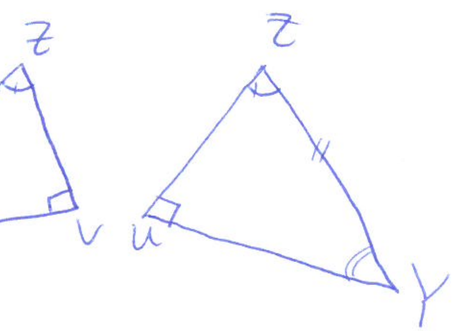


Proof:

Statement	Reason
4. $\angle YUX \cong 90^\circ$	By 3.
5. $\angle XVY \cong 90^\circ$	By 2.
6. $\angle YUX \cong \angle XVY$	By 4 and 5
7. $\angle Z \cong \angle Z$	Reflective Prop.
8. $\angle ZXV \cong \angle ZYU$	AA → AAA
9. $\triangle XZV \cong \triangle YUZ$	AAAS
10. $\overline{XV} \cong \overline{YU}$	CPCTC ∎

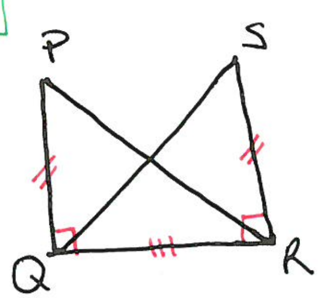


OR



Your Turn

#8 on HW



Given $\angle PQR$ and $\angle SRQ$ are right angles

$\overline{PQ} \cong \overline{SR}$

Prove: $\triangle PQR \cong \triangle SRQ$ By SAS

#6 on HW resultant of $7\angle{-200^\circ} + 5\angle{276^\circ}$

resultant $= (-7\cos 20^\circ + 5\cos 84^\circ)\hat{i} + (7\sin 20^\circ - 5\sin 84^\circ)\hat{j}$