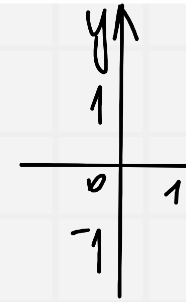
MATH 1060Q Precalculus:

Final Exam Review Session

Scan the QR code to acces the review slides.

Agenda



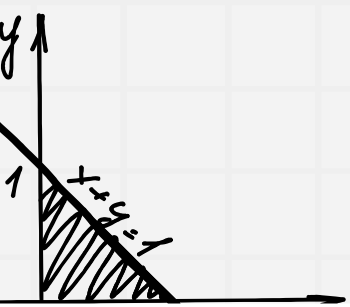
01
Introduction
Who am I? What's on the exam?

02
Review
Work through some practice problems together.

03
Questions
Are there any other topics you would like to discuss?

04
Note Sheet
Definitions, formulas, and topics to include on your note sheet.

05
Conclusion
Thank you for attending the review session and good luck on the exam!



$1/\sqrt{2}$

MATH 1060Q Final Exam

Topics since Exam II include...

Section 4.3	Solving triangles with Soh Cah Toa, using trigonometric identities
Section 4.4	Evaluating trigonometric functions of any angle, using reference angles to evaluate trigonometric functions
Section 4.5	Sketching sine and cosine functions, describing transformations of sine and cosine, finding amplitude, period, phase shift, and vertical shift
Section 4.6	Recognizing graphs of secant, cosecant, tangent, and cotangent, solving trigonometric equations
Section 4.7	Definition, domain, and range of inverse trigonometric functions, evaluating inverse trigonometric functions, compositions of inverse trigonometric functions
Section 4.8	Solving triangles, angle of elevation
Section 5.1	Simplifying trigonometric equations
Section 5.3	Solving trigonometric functions

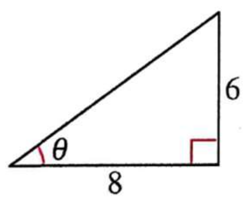
$= \int^{1} dx \int^{1-x} x^2$

V: $z=$
$X=$

Section 4.3

Find the exact values of the six trigonometric functions of the angle θ shown in the figure.

5.



Use trigonometric identities to transform the left side of the equation into the right side $(0 < \theta < 2\pi)$.

49. $\tan\alpha\cos\alpha = \sin\alpha$

$y=\sin x$

$y=\cos x$

x

V: z =
x =

Section 4.4

Find the exact values of the six trigonometric functions of θ with the given constraint.

	Function Value	Constraint
23.	$\tan\theta = -\frac{15}{8}$	$\sin\theta > 0$

Evaluate the sin, cosine, and tangent of the angle without using a calculator.

61. $\frac{5\pi}{4}$

$y = \sin x$

$y = \cos x$

V: z=
X=

Section 4.5

g is related to a parent function $f(x) = \sin(x)$ or $f(x) = \cos(x)$.

$$g(x) = \cos(x - \pi) + 2$$

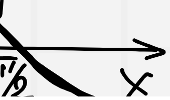
(a) Describe the sequence of transformations from f to g.

(b) Sketch the graph of g.

(c) Use function notation to write g in terms of f.

y=sin x

y=cos x



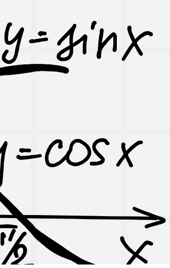
V: z =
X =

Section 4.6

Use a graph to solve the equation on the interval $[-2\pi, 2\pi]$.

49. $\tan x = 1$

51. $\cot x = -\dfrac{\sqrt{3}}{3}$



V: $z=$
$x=$

Section 4.7

Evaluate the expression without using a calculator.

11. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

Use the properties of inverse trigonometric functions to evaluate the expression.

49. $\cos[\arccos(-0.1)]$

$y=\sin x$

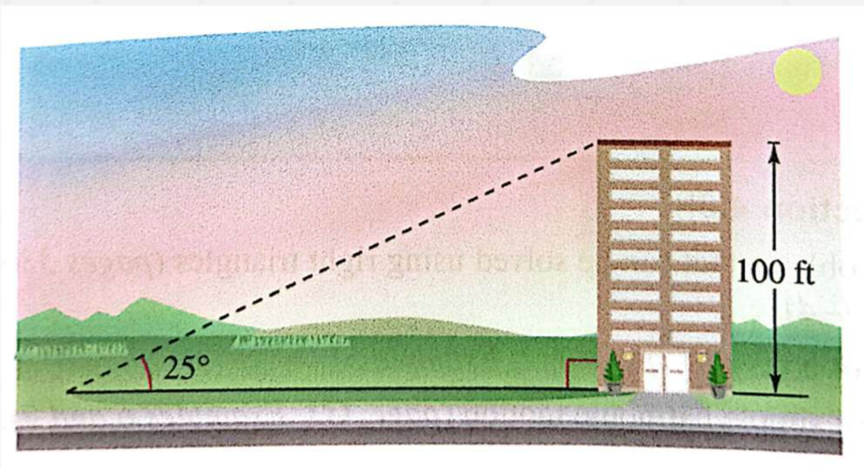
$y=\cos x$

x

V: z =
x =

Section 4.8

The sun is $25°$ above the horizon. Find the length of a shadow cast by a building that is 100 feet tall (see figure).



y = sin x

y = cos x

x

V: $z=$
$X=$

Section 5.1

Factor the expression and use the fundamental identities to simplify. There is more than one correct form of each answer.

21. $\tan^2 x - \tan^2 x \sin^2 x$

23. $\dfrac{\sec^2 x - 1}{\sec x - 1}$

$y=\sin x$

$y=\cos x$

V: $z =$
$x =$

Section 5.3

Solve the equation.

13. $\cos x + 1 = -\cos x$

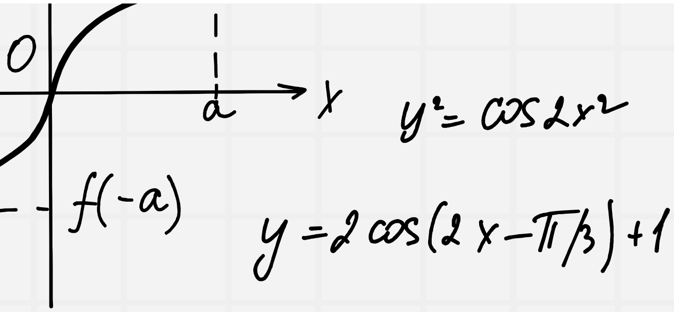
21. $\tan 3x(\tan x - 1) = 0$

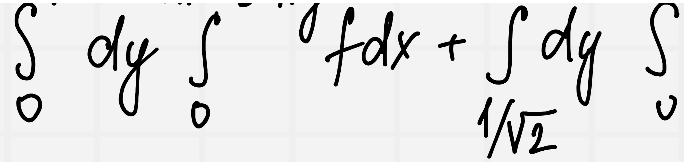
$y = \sin x$

$y = \cos x$

Questions

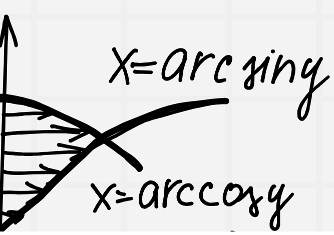
Is there a topic you would like to discuss more? Do you want to review a problem again? Are there any ideas that are confusing?

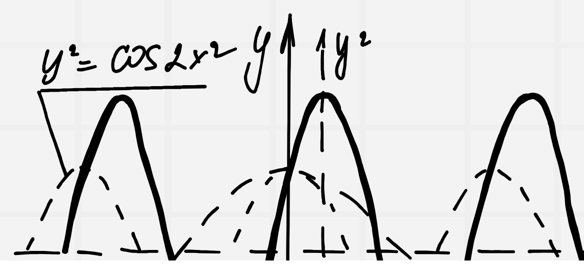


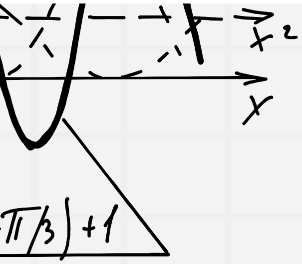


Note Sheet

Hello! If you are looking for information to write on your note sheet, here a few topics that might be worth including.







Trig Identities

Reciprocal

$sin\theta = \frac{1}{csc\theta}$	$cos\theta = \frac{1}{sec\theta}$	$tan\theta = \frac{1}{cot\theta}$
$csc\theta = \frac{1}{sin\theta}$	$sec\theta = \frac{1}{sin\theta}$	$cot\theta = \frac{1}{tan\theta}$

Even/Odd

$\sin(-\theta) = -\sin\theta$	$\cos(-\theta) = cos\theta$	$\tan(-\theta) = -tan\theta$
$\csc(-\theta) = -csc\theta$	$\sec(-\theta) = sec\theta$	$\cot(-\theta) = -\cot\theta$

Pythagorean

$sin^2\theta + cos^2\theta = 1$
$1 + tan^2\theta = sec^2\theta$
$1 + cot^2\theta = csc^2\theta$

Quotient

$tan\theta = \frac{sin\theta}{cos\theta}$	$cot\theta = \frac{cos\theta}{sin\theta}$

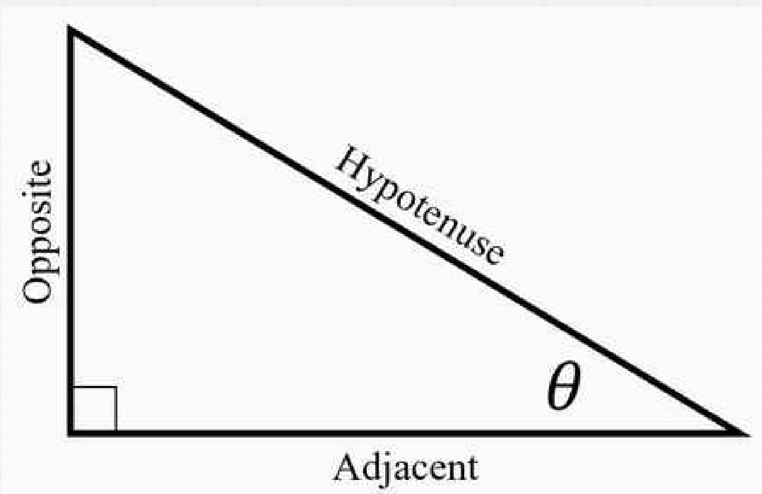
Cofunction

$\sin\left(\frac{\pi}{2} - \theta\right) = cos\theta$	$cos\left(\frac{\pi}{2} - \theta\right) = sin\theta$
$\csc\left(\frac{\pi}{2} - \theta\right) = sec\theta$	$sec\left(\frac{\pi}{2} - \theta\right) = csc\theta$
$\tan\left(\frac{\pi}{2} - \theta\right) = cot\theta$	$\cot\left(\frac{\pi}{2} - \theta\right) = tan\theta$

$x = 2y^2 + 3, x =$
$z = 1 + \sqrt{9x^2 + 4y}$

V: z=
x=

Right Triangle Trigonometry



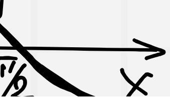
$$\sin\theta = \frac{opp}{hyp} \qquad \csc\theta = \frac{hyp}{opp}$$

$$\cos\theta = \frac{adj}{hyp} \qquad \sec\theta = \frac{hyp}{adj}$$

$$\tan\theta = \frac{opp}{adj} \qquad \cot\theta = \frac{adj}{opp}$$

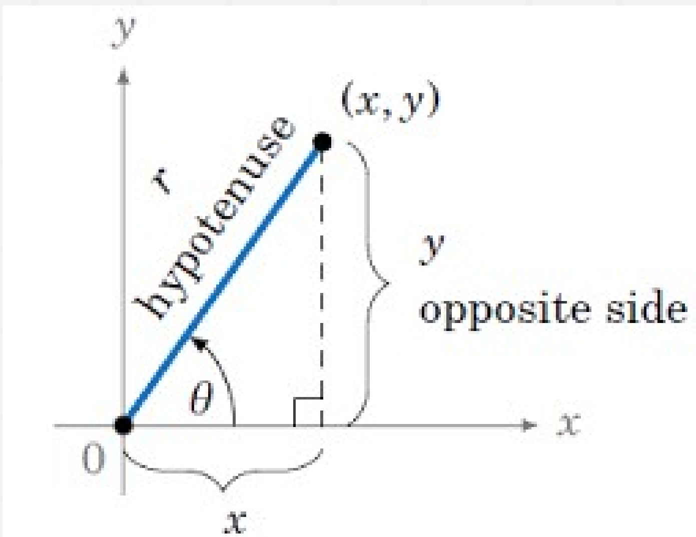
$y = \sin x$

$y = \cos x$



V: z=
X=

Trig Functions of Any Angle



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

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

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

y = sin x

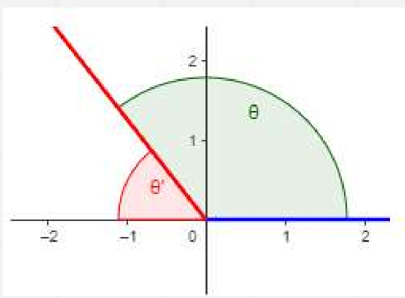
y = cos x

x

Reference Angle

Let θ be an angle in standard position. Its reference angle is the acute angle θ' formed by the terminal side of θ and the horizontal axis.

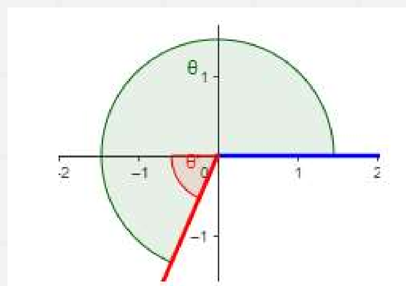
Quadrant II



$\theta' = \pi - \theta$ (rad)

$\theta' = 180° - \theta$ (deg)

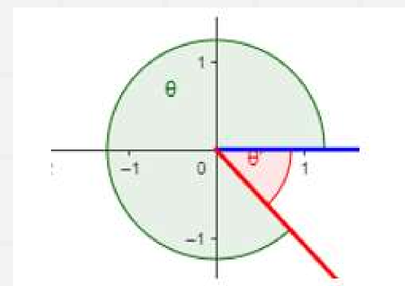
Quadrant III



$\theta' = \theta - \pi$ (rad)

$\theta' = \theta - 180°$ (deg)

Quadrant IV

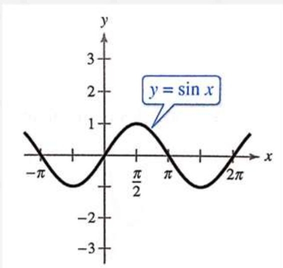


$\theta' = 2\pi - \theta$ (rad)

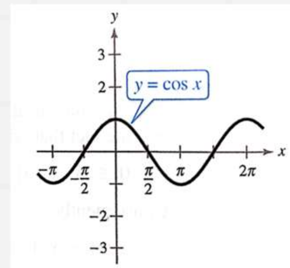
$\theta' = 360° - \theta$ (deg)

V: z=
x=

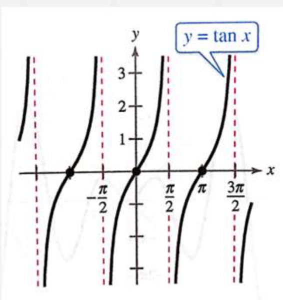
Trig Function Graphs



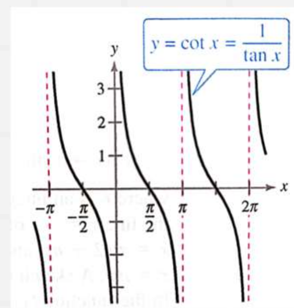
Domain: $(-\infty, \infty)$
Range: $[-1, 1]$
Period: 2π



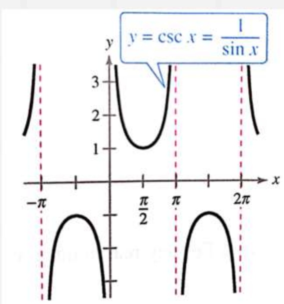
Domain: $(-\infty, \infty)$
Range: $[-1, 1]$
Period: 2π



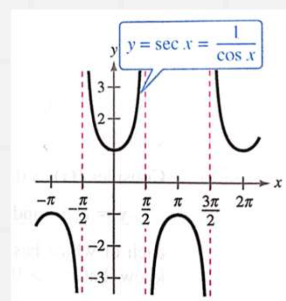
Domain: all $x \neq \frac{\pi}{2} + n\pi$
Range: $(-\infty, \infty)$
Period: π



Domain: all $x \neq n\pi$
Range: $(-\infty, \infty)$
Period: π



Domain: all $x \neq n\pi$
Range: $(-\infty, -1] \cup [1, \infty)$
Period: 2π



Domain: all $x \neq \frac{\pi}{2} + n\pi$
Range: $(-\infty, -1] \cup [1, \infty)$
Period: 2π

y=sinx
y=cosx
x

Amplitude

The <u>amplitude</u> of $y = asinx$ and $y = acosx$ represents half the distance between the maximum and minimum values of the function and is given by

$$Amplitude = |a|$$

Ex. $y = \frac{1}{2}cosx$

Maximum	Intercept	Minimum	Intercept	Maximum
$(0, \frac{1}{2})$	$(\frac{\pi}{2}, 0)$	$(\pi, -\frac{1}{2})$	$(\frac{3\pi}{2}, 0)$	$(2\pi. \frac{1}{2})$

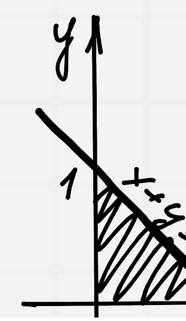
Period

Let *b* be a positive real number. The <u>period</u> of $y = asinbx$ and $y = acosbx$ is given by

$$Period = \frac{2\pi}{b}$$

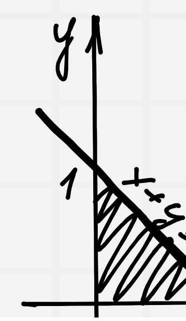
Ex. $y = sin\frac{1}{2}x$

Intercept	Maximum	Intercept	Minimum	Intercept
$(0, 0)$	$(\pi, 1)$	$(2\pi, 0)$	$(3\pi, -1)$	$(4\pi. 0)$



Inverse Trig Functions

Function	*Domain*	*Range*
$y = arcsinx$ if and only if $siny = x$	$-1 \leq x \leq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
$y = arccosx$ if and only if $cosy = x$	$-1 \leq x \leq 1$	$0 \leq y \leq \pi$
$y = arctanx$ if and only if $tany = x$	$-\infty < x < \infty$	$-\frac{\pi}{2} < y < \frac{\pi}{2}$



Inverse Trig Properties

If $-1 \le x \le 1$ and $-\frac{\pi}{2} \le y \le \frac{\pi}{2}$, then $\sin(arcsinx) = x$ and $\arcsin(siny) = y$.
If $-1 \le x \le 1$ and $0 \le y \le \pi$, then $\cos(\arccos x) = x$ and $\arccos(cosy) = y$.
If *x* is a real number and $-\frac{\pi}{2} < y < \frac{\pi}{2}$, then $\tan(arctanx) = x$ and $\arctan(tany) = y$.

Thanks!

Do you have any questions?

katherine.guarco@uconn.edu
860 486 1961
qcenter.uconn.edu