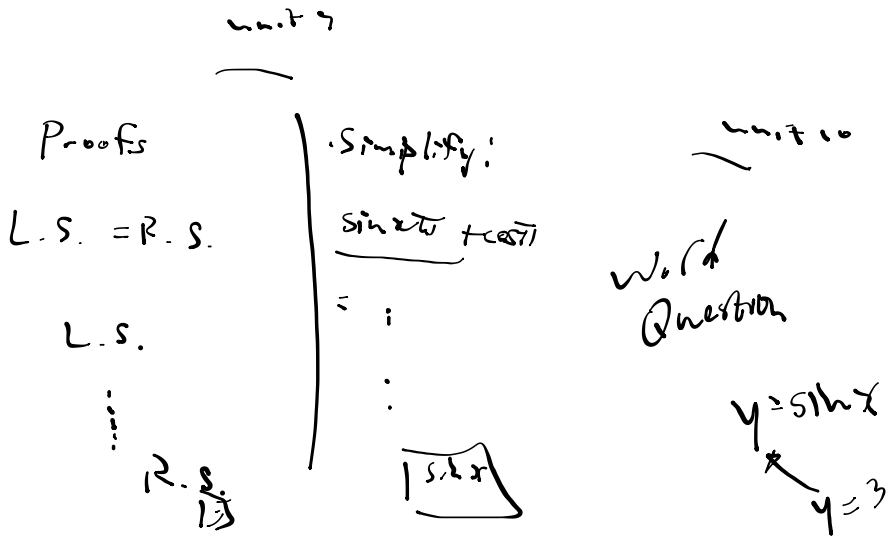

unit 9
Proofs
L.S. = R.S.
L.S.
R.S.
Simplify:
unit 10
W.P.
Question
y = sin x
y = 3

Unit 9: Simplifying and Proving

Using trig identities involving a sum or a difference, or a product of 2 #

- Pick the appropriate trig identity.

use
$\sin(A-B) = \sin A\cos B - \sin B\cos A$

- rewrite
- evaluate
- simplify
- factor
- cancel out only when there's one term on the top and bottom.

add like terms.

Question Simplify the following expression:

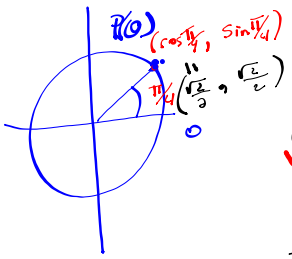
$$\sin\left(\frac{\pi}{2} - \theta\right)$$

$$\sin\frac{\pi}{2}\cos\theta - \sin\theta\cos\frac{\pi}{2}$$

$$1 \qquad\qquad 0$$

$$(1)\cdot\cos\theta - \sin\theta\cdot(0)$$

$$\cos\theta$$



Completely simplify

$\cos(\frac{\pi}{4} - A) - \cos(\frac{\pi}{4} + A)$

$\cos\frac{\pi}{4}\cdot\cos A + \sin\frac{\pi}{4}\sin A - \{\cos\frac{\pi}{4}\cos A - \sin\frac{\pi}{4}\sin A\}$

$\frac{\sqrt{2}}{2}\cdot\cos A + \frac{\sqrt{2}}{2}\sin A - \{\frac{\sqrt{2}}{2}\cdot\cos A - \frac{\sqrt{2}}{2}\sin A\}$

$\frac{\sqrt{2}}{2}\cos A + \frac{\sqrt{2}}{2}\sin A - \frac{\sqrt{2}}{2}\cos A + \frac{\sqrt{2}}{2}\sin A$

$(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2})\sin A$

$\frac{\sqrt{2}+\sqrt{2}}{2}\sin A$

$\frac{2\sqrt{2}}{2}\sin A$

$\sqrt{2}\sin A$

use
$\cos(A - B) = \cos A\cos B + \sin A\sin B$

use
$\cos(A + B) = \cos A\cos B - \sin A\sin B$

Simplify the following expression

$$\frac{\cos(-A)}{\cos(A+2\pi)}$$

den:

$\cos(A+B)$

$= \ldots$

$\cos(A-B)$

$$\frac{\cos(0-A)}{\cos(A+2\pi)}$$

Prove that

$\cos(-A) = \cos A$

L. S.

$\cos(-A)$

$\cos(0-A)$

Prove that

$\cos 2A = 2\cos^2 A - 1$

L.S.

$\cos 2A$

$\cos^2 A - \sin^2 A$

$\cos(2A) = \cos^2 A - \sin^2 A$

$\cos^2 A - (1 - \cos^2 A)$

$\cos^2 A + \cos^2 A - 1$

$2\cos^2 A - 1$

R.S. ∎

trig that has what we have $\sin^2 A$ and we want $\cos^2 A$

use $\sin^2 x + \cos^2 x = 1$

$\sin^2 x = 1 - \cos^2 x$

Prove

$\cos 2t \cos t + \sin 2t \sin t = \cos t$

use
$\cos 2A$
$= \cos^2 A$

use
$\sin 2A$

L.S.

$\cos 2t \cos t + \sin 2t \sin t$

$(\cos^2 t - \sin^2 t)\cos t + (2\sin t \cos t)\sin t$

$\cos^3 t - \sin^2 t \cos t + 2\sin^2 t \cos t$

$\cos^3 t + \sin^2 t \cos t$

factor!

Factor gcf:
Identify gcf: cost
gcf

$\cos t(\cos^2 t + \sin^2 t)$

use
$\sin^2 t + \cos^2 t = 1$

$\cos t(1)$

$\cos t$ R.S. ∎

Prove

$$\frac{\sin 2x}{1+\cos 2x} = \tan x$$

Prove that

$$\frac{\sin 2t}{\sin t} - \frac{\cos 2t}{\cos t} = \sec t$$

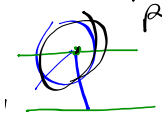
$\cos 2t \cos t + \sin 2t \sin t = \cos t$

$\cos(A-B) = \cos A \cos B + \sin A \sin B$

$\cos(2t - t)$

$\cos t$.

Unit 10: Word Question described by a Sinusoidal Function



- amplitude
  $A = |a|$
- period
  $P = \frac{2\pi}{|b|}$
- central axis
  $y = k$
- h - phase shift
- Frequency $= \frac{1}{\text{Period}}$
  (the # of cycles per second)
  (Hz) (hertz)

- sketch/label/axis
- Translating sentences into parameters (a/b/h/k)
- translating the question into a point on the graph
  (x, y)

$f(x) = f(x+P)$
$= f(x+kP)$
$k \in \mathbb{Z}$

$0 = \sin x$

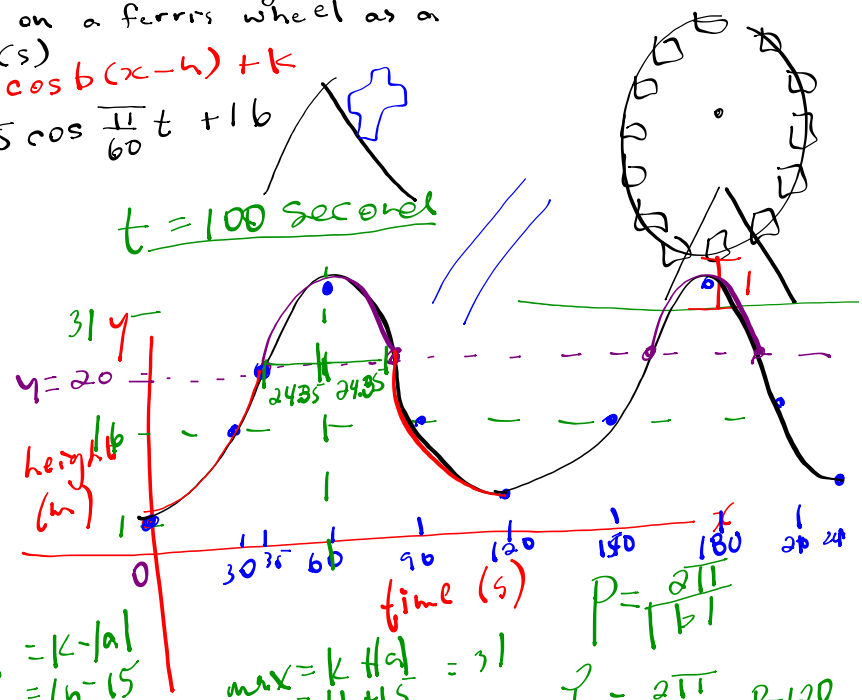
The following formula describes the height (m) of Shannon in her beam on a ferris wheel as a function of time (s)

$f(t) = a\cos b(x-h)+k$

$h(t) = -15\cos\frac{\pi}{60}t + 16$

When you're 20m above ground, you can see the top of mont Royal.

If Shannon goes around twice, how long will they have a romantic view of the mountain?



$a = -15$ $h = 0$

$b = \frac{\pi}{60}$ $k = 16$

$A = 15$ $y = 16$

min $= k - |a| = 16 - 15 = 1$

max $= k + |a| = 16 + 15 = 31$

$P = \frac{2\pi}{|b|}$

$P = \frac{2\pi}{\frac{\pi}{60}}$ $P = 120$

$P = 2\pi \times \frac{60}{\pi}$

starting point $(h, k+a)$

$(0, 1)$

min/k/max/k/min

$\frac{}{2}$ $\frac{}{P}$ $\frac{}{2}$

sub $y = 20$ into equation and find t.

$20 = -15\cos\frac{\pi}{60}t + 16$

$\frac{4}{-15} = \frac{-15\cos\frac{\pi}{60}t}{-15}$

$\cos^{-1}\left(\frac{4}{-15}\right) = \cos^{-1}\cos\frac{\pi}{60}t$

$\frac{1.84}{\pi/60} = \frac{\frac{\pi}{60}\cdot t}{\frac{\pi}{60}}$ $t = 35.15$

Do Ex 1
P. 10-3

1. How high is the wave after 5 sec.
2. When is the wave 2 cm high.

Questions
P 10.4
P 10.6