

Student: \_\_\_\_\_  
Date: \_\_\_\_\_

Instructor: Joe Betters

Course: Pre-Calculus Pre AP (Master Course)

Assignment: 6.5 Classwork Day 1

1. Find the average rate of change of  $f$  from 0 to  $\frac{\pi}{6}$ .

$$f(x) = \tan x$$

The average rate of change is \_\_\_\_\_.  
(Simplify your answer, including any radicals. Type an exact answer, using  $\pi$  as needed.)

2. Find  $(f \circ g)(x)$  and  $(g \circ f)(x)$  and graph each of these functions.

$$f(x) = -5x$$

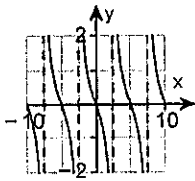
$$g(x) = \tan x$$

Find  $(f \circ g)(x)$ .

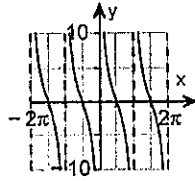
$$(f \circ g)(x) = \underline{\hspace{2cm}}$$

Choose the correct graph of  $(f \circ g)(x)$  below.

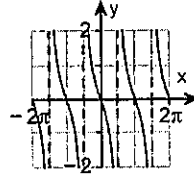
A.



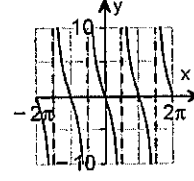
B.



C.



D.

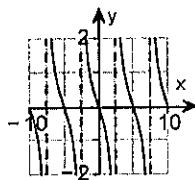


Find  $(g \circ f)(x)$ .

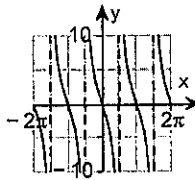
$$(g \circ f)(x) = \underline{\hspace{2cm}}$$

Choose the correct graph of  $(g \circ f)(x)$  below.

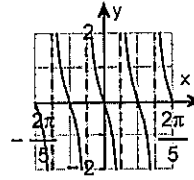
A.



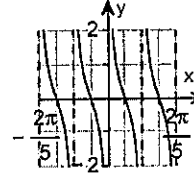
B.



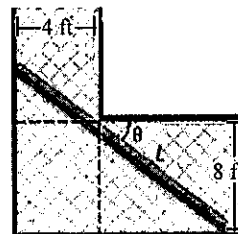
C.



D.



3. Two hallways, one of width 4 feet, the other of width 8 feet, meet at a right angle. See the illustration. Complete parts (a.) through (d.).



(a.) Which equation below gives the length  $L$  of the line segment shown as a function of the angle  $\theta$ ?

- A.  $L(\theta) = 4 \sin \theta + 8 \cos \theta$   
 B.  $L(\theta) = 4 \cos \theta + 8 \sin \theta$   
 C.  $L(\theta) = 4 \sec \theta + 8 \csc \theta$   
 D.  $L(\theta) = 4 \csc \theta + 8 \sec \theta$

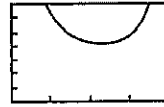
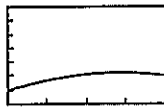
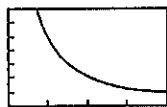
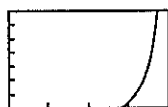
(b.) Graph  $L = L(\theta)$ ,  $0 < \theta < \frac{\pi}{2}$ .

A.

B.

C.

D.



(All graphs are  $\left[0, \frac{\pi}{2}\right]$  by  $[0, 28]$ .)

(c.) For what values of  $\theta$  is  $L$  the least?

$$\theta_{\min} = \underline{\hspace{2cm}}$$

(Type your answer in radians. Round to the nearest hundredth as needed.)

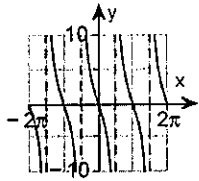
(d.) What is the length of the longest ladder that can be carried around the corner?

The longest ladder that can be carried around the corner is                      feet  
(Round down to the nearest hundredth of a foot.)

1.  $\frac{2\sqrt{3}}{\pi}$

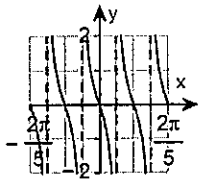
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2.  $-5 \tan x$



D.

$\tan(-5x)$



C.

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3. C.  $L(\theta) = 4 \sec \theta + 8 \csc \theta$



D.

0.90

16.64

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## 6.5 classwork day 1

① Average rate of change  $\frac{f(b) - f(a)}{b - a}$   
from 0 to  $\pi/6$

$$f(x) = \tan x$$

$$\frac{\tan \pi/6 - \tan 0}{\pi/6 - 0}$$

$$\frac{\frac{\sqrt{3}}{3} - 0}{\pi/6} = \boxed{\frac{2\sqrt{3}}{\pi}}$$

②  $f(x) = -5x$   
 $g(x) = \tan x$

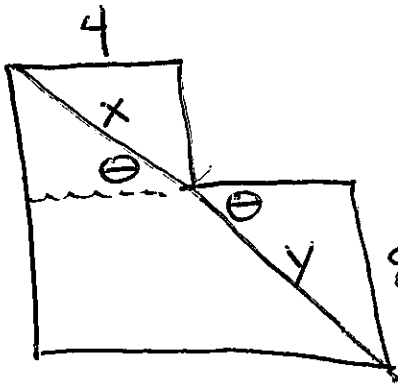
$$(f \circ g)(x) = -5(\tan x) \quad \text{Graph D}$$

$$(g \circ f)(x) = \tan(-5x) \quad \text{Graph C}$$

\*use calculator for graphs

# 6.5 classwork day 1 continued

③



$$\cos \theta = \frac{4}{x}$$

$$x = \frac{4}{\cos \theta}$$

$$\sin \theta = \frac{8}{y}$$

$$y = \frac{8}{\sin \theta}$$

$$L = x + y$$

$$L = \frac{4}{\cos \theta} + \frac{8}{\sin \theta}$$

$$L = 4 \sec \theta + 8 \csc \theta$$

Graph D

minimum  
use calculator =  $\boxed{.9}$  x-value

maximum  
use calculator =  $\boxed{16.64}$  y-value