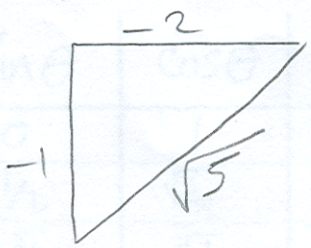
Professor Fred Katiraie MA180 Quiz 5 Spring 2007 "FORM B"

Name Solution (Sections 5.1, 5.2, and 5.3)

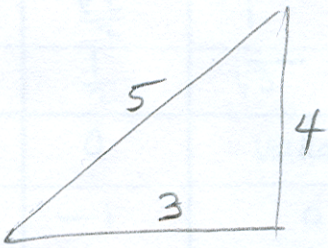
A point on the terminal side of an angle θ is given. Find the exact value of the indicated trigonometric function of θ.

(2pts) 1) (-2, -1) Find csc θ.



1) $-\sqrt{5}$

(2pts) 2) (3,4) Find cos θ.



2) $\frac{3}{5}$

Name the quadrant in which the angle θ lies.

(4pts)

3) $\csc\theta > 0$, $\sec\theta > 0$ — 3) I

4) $\sin\theta > 0$, $\cos\theta < 0$ — 4) II

5) $\cot\theta > 0$, $\sin\theta < 0$ — 5) III

6) $\tan\theta < 0$, $\sin\theta < 0$ — 6) IV

Solve the problem.

(2pts) 7) A pendulum swings though an angle of 40° each second. If the pendulum is 55 inches long, how far does its tip move each second? If necessary, round the answer to two decimal places.

$40^\circ * \frac{\pi \text{ radians}}{180^\circ} = 0.698$

$S = r\theta = (55 \text{ inches})(0.698) = 38.40 \text{ inches}$

7) 38.4 inches

(2pts) 8) If friction is ignored, the time t (in seconds) required for a block to slide down an inclined plane is given by the formula

$t = \sqrt{\frac{2a}{g \sin\theta \cos\theta}} = \sqrt{\frac{2*14}{32 \sin 30^\circ \cos 30^\circ}}$

where a is the length (in feet) of the base and $g \approx 32$ feet per second per second is the acceleration of gravity. How long does it take a block to slide down an inclined plane with base a = 14 when θ = 30°? If necessary, round the answer to the nearest tenth of a second.

8) 1.4 sec

(4pts) 9) A wheel of radius 4.4 feet is moving forward at 13 feet per second. How fast is the wheel rotating? 9) 3 rad/sec

$$v = rw \Rightarrow w = \frac{v}{r} = \frac{13}{4.4} = 2.95$$

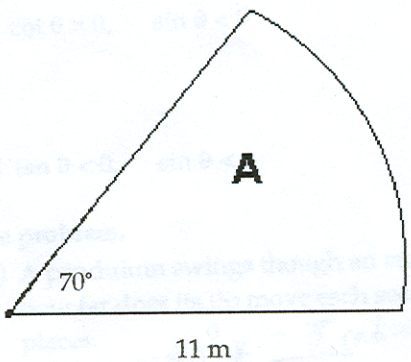
(2pts) 10)

θ	$\sin\theta$	$\cos\theta$	$\tan\theta$
0	0	1	0
30°	$1/2$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	1	0	undefined
180°	0	-1	0
270°	-1	0	undefined
360°	0	1	0

10) _____

Find the area A. Round the answer to three decimal places.

(2pts) 11)



$$70^\circ * \frac{\pi}{180^\circ} = \frac{7\pi}{18}$$

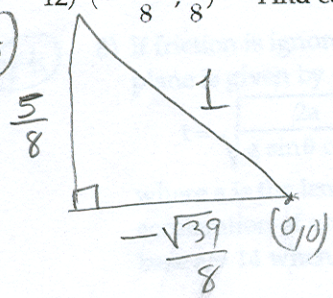
$$A = \frac{1}{2} r^2 \theta = \frac{1}{2}(11)^2\left(\frac{7\pi}{18}\right) = 73.915 \text{ m}^2$$

11) _____

In the problem, t is a real number and P = (x, y) is the point on the unit circle that corresponds to t. Find the exact value of the indicated trigonometric function of t.

12) $\left(-\frac{\sqrt{39}}{8}, \frac{5}{8}\right)$ Find cos t.

(2pts)



$$\cos t = -\frac{\sqrt{39}}{8}$$

12) $\cos t = -\frac{\sqrt{39}}{8}$

Professor Fred Katiraie MA180 Quiz 5 Spring 2007 "FORM A"

Name SOLUTION (Sections 5.1, 5.2, and 5.3)

(2pts) 1)

θ	$\sin\theta$	$\cos\theta$	$\tan\theta$
0	0	1	0
30°	$1/2$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$
45°	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	1	0	undefined
180°	0	-1	0
270°	-1	0	undefined
360°	0	1	0

1) _____

Solve the problem.

(2pts) 2) A pendulum swings though an angle of 30° each second. If the pendulum is 60 inches long, how far does its tip move each second? If necessary, round the answer to two decimal places.

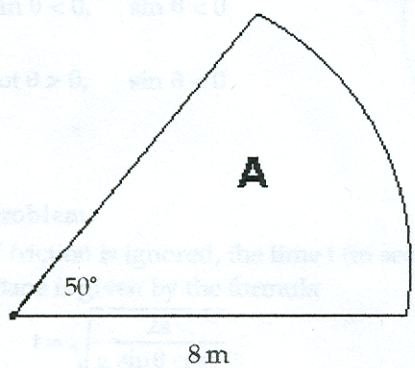
2) _____

$30^\circ * \frac{\pi}{180^\circ} = \frac{\pi}{6}$ Radians

$S = r\theta = (60 \text{ inches})\left(\frac{\pi}{6}\right) = 10\pi = 31.42$ inches

Find the area A. Round the answer to three decimal places.

(2pts) 3)



3) _____

$50^\circ * \frac{\pi}{180^\circ} = \frac{5\pi}{18}$

$A = \frac{1}{2} r^2 \theta$

$= \frac{1}{2}(8\text{m})^2\left(\frac{5\pi}{18}\right) = 27.925 \text{ m}^2$

Solve the problem.

(2pts) 4) A wheel of radius 9.7 feet is moving forward at 19 feet per second. How fast is the wheel rotating?

4) _____

$V = r\omega$

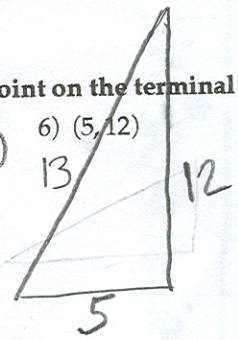
$\omega = \frac{V}{r} = \frac{19 \text{ ft/sec}}{9.7 \text{ ft}} = 1.96 \frac{\text{radians}}{\text{sec}}$

In the problem, t is a real number and P = (x, y) is the point on the unit circle that corresponds to t. Find the exact value of the indicated trigonometric function of t.

(2pts) 5) $\left(-\frac{\sqrt{65}}{9}, \frac{4}{9}\right)$ Find cos t. $\cos t = -\frac{\sqrt{65}}{9}$ 5) $\frac{-\sqrt{65}}{9}$

A point on the terminal side of an angle θ is given. Find the exact value of the indicated trigonometric function of θ.

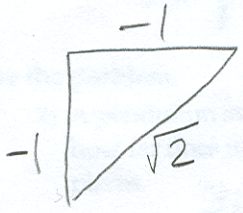
(2pts) 6) (5, 12) Find cos θ. $c^2 = 5^2 + 12^2$ 6) _____



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

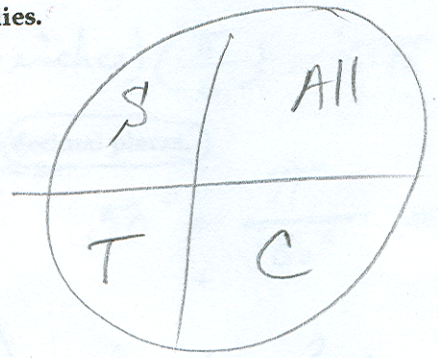
7) (−1, −1) Find csc θ. 7) $\csc\theta = -\sqrt{2}$

(2pts) $\sin\theta = \frac{-1}{\sqrt{2}} = \frac{-\sqrt{2}}{2}$



Name the quadrant in which the angle θ lies.

(4pts)
8) $\sin\theta > 0$, $\cos\theta < 0$ 8) II
9) $\csc\theta > 0$, $\sec\theta > 0$ 9) I
10) $\tan\theta < 0$, $\sin\theta < 0$ 10) IV
11) $\cot\theta > 0$, $\sin\theta < 0$ 11) III



Solve the problem.

12) If friction is ignored, the time t (in seconds) required for a block to slide down an inclined plane is given by the formula 12) 1.1 seconds

(2pts) $$t = \sqrt{\frac{2a}{g \sin\theta \cos\theta}}$$

where a is the length (in feet) of the base and g ≈ 32 feet per second per second is the acceleration of gravity. How long does it take a block to slide down an inclined plane with base a = 9 when θ = 60°? If necessary, round the answer to the nearest tenth of a second.

$t = \sqrt{\frac{2*9}{32*\sin 60^\circ \cos 60^\circ}} = 1.1$ seconds