

Eastern Oregon University
Concurrent Enrollment/Credit by Proficiency Program

Math 112, Spring, 2016

Exam 2

name/school:

Key

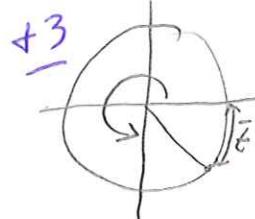
Show any relevant work. For each problem, circle your answer

1. (12 points) For each value of t given below, find the reference number \bar{t} and the coordinates of the terminal point determined by t .

6 a. $t = 7\pi/4$

$$\bar{t} = \frac{\pi}{4} \boxed{+3}$$

$$P = \left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right) \boxed{+3}$$

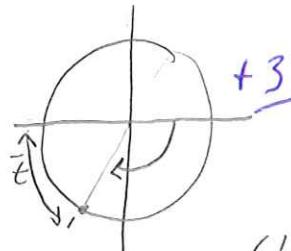


diagrams
not required,
but may earn
partial credit
if correct

6 b. $t = -2\pi/3$

$$\bar{t} = \frac{\pi}{3} \boxed{+3}$$

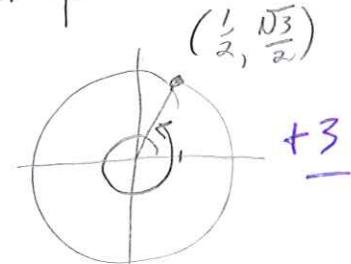
$$P = \left(-\frac{1}{2}, -\frac{\sqrt{3}}{2} \right) \boxed{+3}$$



2. (12 points) Find the exact value of each of the following.

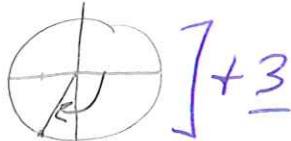
6 a. $\sec(7\pi/3)$

$$= \sec\left(\frac{\pi}{3}\right) = \frac{1}{\cos\frac{\pi}{3}} = \frac{1}{\frac{1}{2}} = 2 \boxed{+2}$$



6 b. $\tan(-2\pi/3)$

$$= \frac{\sin\frac{-2\pi}{3}}{\cos\frac{-2\pi}{3}} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \sqrt{3} \boxed{+2}$$

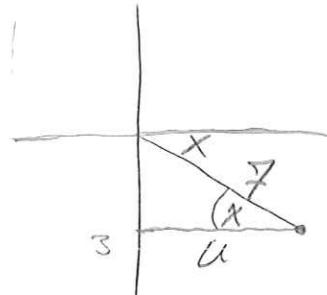


3. (12 points) Suppose $\sin x = -\frac{3}{7}$ and $\cos x > 0$. Find:

6 a. $\sin(-x)$

$$= -\sin x = -\left(-\frac{3}{7}\right) = \frac{3}{7} \boxed{-2}$$

$$\begin{aligned} u^2 + 3^2 &= 7^2 \\ u^2 &= 49 - 9 \\ u &= \sqrt{40} \end{aligned}$$



6 b. $\cos(-x) = \cos x = \frac{\sqrt{40}}{7}$

$$\boxed{+2}$$

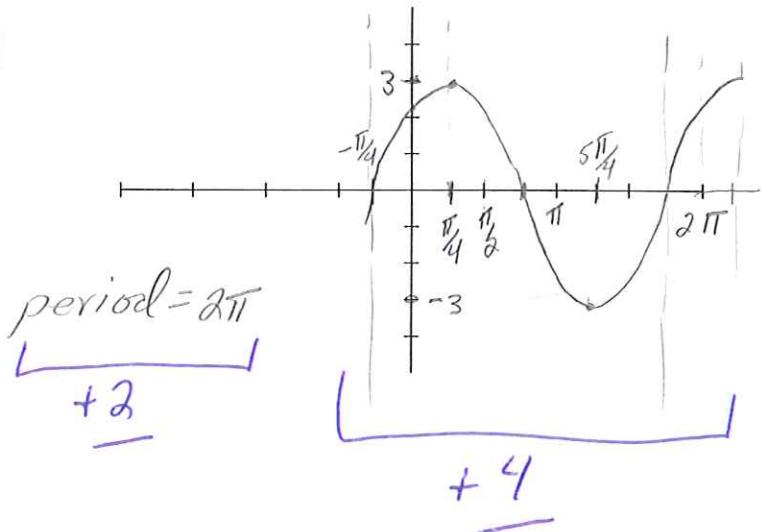
4. (16 points) For each of the following functions, sketch one period of the graph carefully, and label the grid sufficiently to indicate the period and either amplitude or asymptotes.

8 a. $f(x) = 3 \cos(x - \pi/4)$

shift graph
of $\cos x$ to right by $\frac{\pi}{4}$
amplitude = 3

$$f\left(\frac{3\pi}{4}\right) = 3 \cos\left(\frac{\pi}{2}\right) = 0$$

$$f(0) = 3 \cos(-\frac{\pi}{4}) = 3\left(\frac{\sqrt{2}}{2}\right)$$

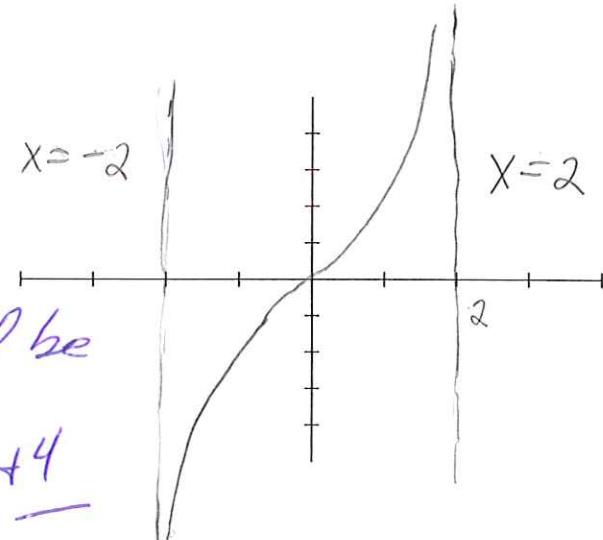


8 b. $f(x) = \tan\left(\frac{\pi}{4}x\right)$

$$\text{period} = \frac{\pi}{\pi/4} = 4$$

asymptotes should be
labeled.

+ 4



5. (10 points) a. For what values of x is $\sin^{-1}(\sin x) = x$?

5 For $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$

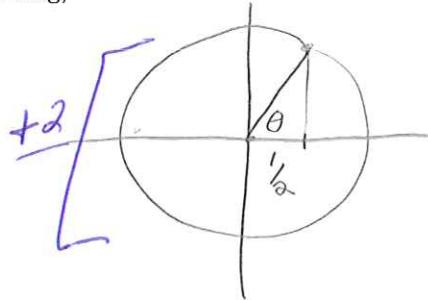
- 5 b. For what values of x is $\tan(\tan^{-1} x) = x$?

For all x in \mathbb{R} .

6. (16 points) Find exact values of each of the following,

4 a. $\cos^{-1}(1/2)$

$$= \frac{\pi}{3} \boxed{+4}$$

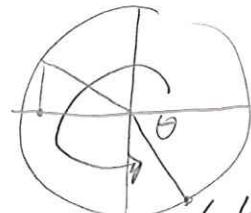


sketch not required,
but can earn partial credit

6 b. $\cos^{-1}(\sin(5\pi/3))$

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

$$= \frac{5\pi}{6} \boxed{+3}$$



$$\boxed{+3}$$

6 c. $\tan(\tan^{-1}(5\pi/3))$

$$= \frac{5\pi}{3} \boxed{+6}$$

based on # 5b

7. (12 points) If $\cos t = 2/5$ and $\tan t > 0$, find the values of the trigonometric functions below.

a. $\sin t$

$$\frac{\sqrt{21}}{5}$$

+3

b. $\csc t$

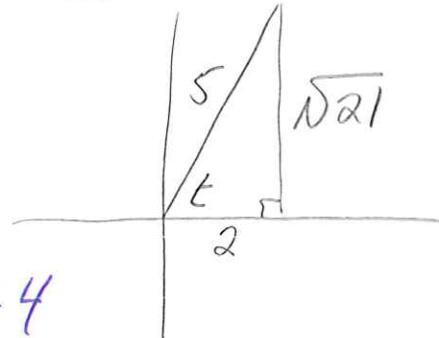
$$\frac{5}{\sqrt{21}}$$

+2

c. $\tan t$

$$\frac{\sqrt{21}}{2} \boxed{+3}$$

$$\begin{aligned} y^2 + 2^2 &= 5^2 \\ y^2 &= 21 \\ y &= \sqrt{21} \end{aligned} \boxed{+4}$$



8. (10 points) A mass is suspended from a spring. The spring is compressed a distance of 6 cm and then released. It is observed that the mass returns to the compressed position after $\frac{1}{2}$ s. Find a function that models the displacement of the mass. Assume a frictionless environment.

$$\text{period} = \frac{1}{2} \text{ s} = \frac{2\pi}{\omega} , \omega = 4\pi \quad \boxed{+ 3}$$

$$\text{displacement} = 6 \text{ cm} = a \quad \boxed{+ 3}$$

$$y = a \cos \omega t = 6 \cdot \cos 4\pi t$$

+ 4