

Name _____

ZID _____

Directions:

1. **ALL WORK** should be organized to be readable and must be of sufficient depth to justify your answer by any method requested.
2. Correct answers with incorrect work or insufficient justification may receive no credit.
3. Give exact answers and **NOT** numeric approximations unless explicitly requested otherwise.
4. No Scratch paper outside of the Exam is permitted.
5. Only a basic **non-text capable, non-graphing** calculator is permitted.
6. **Graphing calculators, cell phones (turned off) and pdas shall be stowed out of sight. IF VISIBLE YOU WILL BE DEEMED TO BE CHEATING AND WILL RECEIVE A ZERO SCORE FOR THE EXAM!!!**

Problems: Check that your exam contains exactly 20 problems. Each problem is worth 5 points.

[1] The population of a midwestern city follows the exponential law. If the population decreased from 1,000,000 to 800,000 from 1995 to 1998, what will the population be in 2001?

[2] Simplify $\left(\frac{\cot(2\theta) - 1}{\cot(2\theta) + 1}\right) \left(\frac{1 + \tan(2\theta)}{1 - \tan(2\theta)}\right)$

[3] Simplify $(\tan x) \left(\frac{1}{\sin x} - \sin x\right)$

[4] Which of the following are NOT identities?

(I) $\cos^2 t - \sin^2 t = 1 + 2 \sin^2 t$

(II) $\tan \beta \sin \beta = \sec \beta + \cos \beta$

(III) $\csc \theta \cos \theta \tan \theta = 1$

[5] Suppose that $\triangle ABC$ is a right triangle with $\angle C = \frac{\pi}{2}$. If $AC = 6$ and $BC = 8$ then:

$\sin A =$

$\cos A =$

$\tan A =$

[6] (a) Change to radians: $450^\circ =$

(b) Change to degrees: $\frac{2\pi}{3} =$

[7] Two angles of a triangle are $\frac{\pi}{3}$ and $\frac{2\pi}{5}$. What is the third angle?

[8] Find the arc length determined by a central angle of 45° in a circle of radius 3 inches.

[9] If $\sin t = -.456$ and $\cos x = .345$ then

(a) $\sin(-t) =$

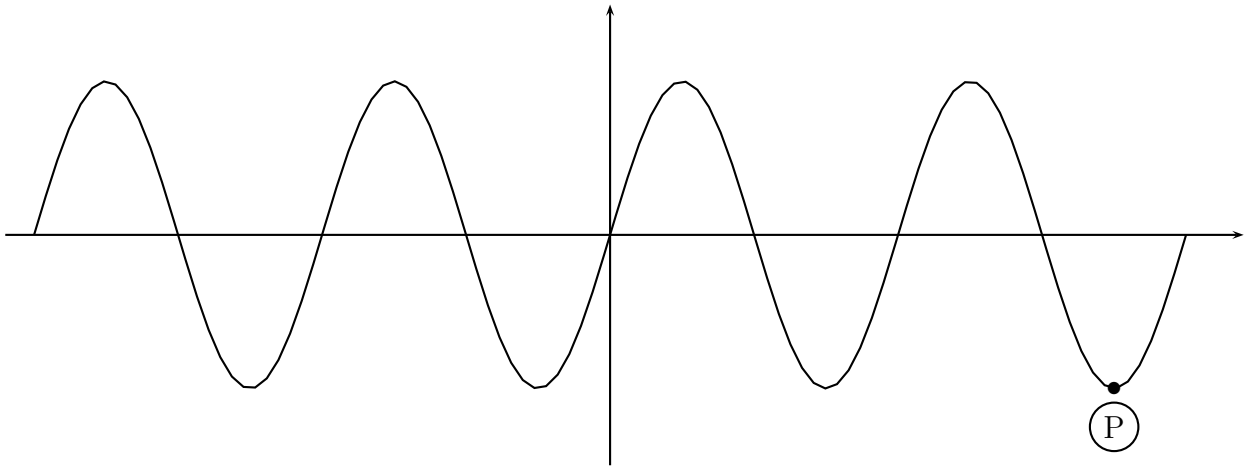
(b) $\cos(-x) =$

[10] Evaluate $\sin\left(\frac{13\pi}{4}\right)$

[11] Evaluate $\tan\left(\frac{183\pi}{4}\right)$

[12] If $\sin(\theta) = \frac{1}{4}$ and θ is in the second quadrant then $\cos(\theta) =$

[13] In the following graph of $y = \sin(x)$ give the coordinates of the point P :

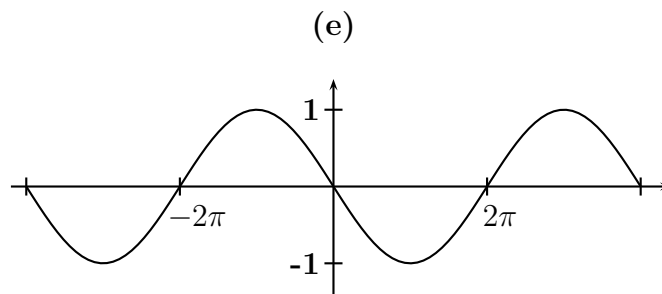
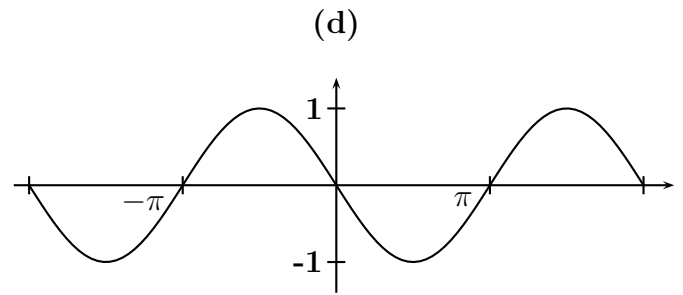
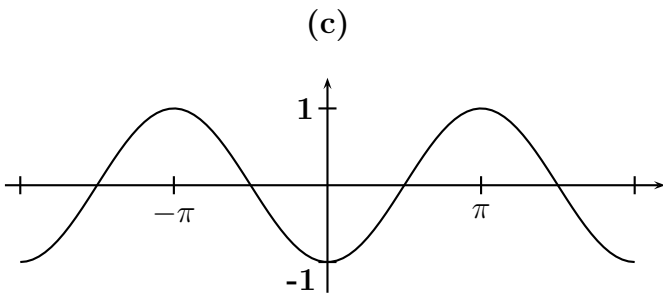
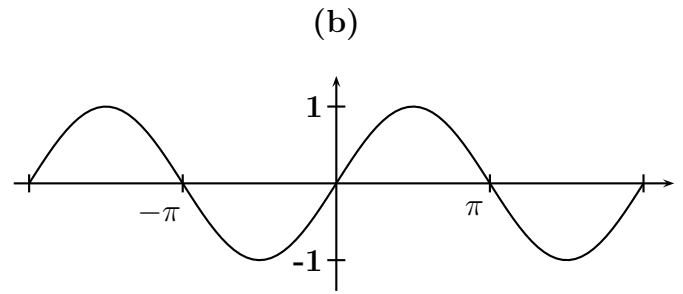
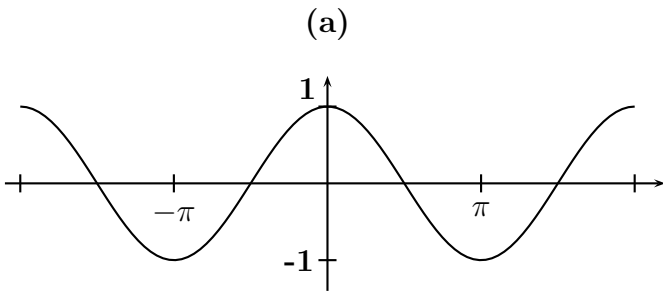


[14] Simplify $\frac{\sin^2 \beta}{1 - \cos \beta} + \frac{\sin^2 \beta}{1 + \cos \beta}$

[15] When an analog clock reads 5:00, what is the smaller angle, in radians, between the hour hand and the minute hand?

[16] Evaluate $\cos\left(\frac{\pi}{2}\right) + 2\sin\left(\frac{\pi}{4}\right) + 3\cos\left(\frac{\pi}{3}\right) + 4\sin\left(\frac{\pi}{6}\right)$

[17] Which is the graph of $y = \cos x$?



[18] A wheel of radius 3 feet is rotating at 100 rpm (revolutions per minute). What is the angular speed in radians per minute?

[19] A wheel of radius 3 feet is rotating at 100 rpm (revolutions per minute). What is the linear speed in feet per minute of a point on the circumference of the wheel?

[20] In the following graph of $y = \cos(x)$ give the coordinates of the point Q :

