

Math 111 – Exam 2 – Fall 2011

No books, notes, or calculators allowed.

Do NOT write on this exam.

- The measure of an angle in radians is $\frac{7\pi}{12}$. Find the measure of the angle in degrees.
A. 84° B. 210° C. $\frac{7}{2160}^\circ$ D. $105\pi^\circ$ E. 105°
- Find the length, s , of the arc of a circle of radius 8 meters subtended (or determined) by the central angle $1/4$ radian.
A. 2π meters B. 1 meter C. 32 meters D. 8 meters E. 64π meters F. 2 meters
- Find the radius of a circle which has a sector of area $5\pi \text{ cm}^2$ determined by a central angle 50° .
A. 12 cm B. 5 cm C. $\sqrt{\frac{\pi}{5}}$ cm D. 6 cm E. $\frac{\pi}{5}$ cm F. 36 cm
- A child wants to go on the Ferris wheel at the state fair, but he is afraid that the ride is moving too fast for him. If the wheel spins at $1\frac{1}{2}$ revolutions per minute, and it has a radius of 60 feet, what is the linear speed of each person as they are rotating around the Ferris wheel (in ft/min)?
A. $90\pi \approx 282.7$ ft/min B. $180\pi \approx 565.5$ ft/min C. 180 ft/min
D. 90 ft/min E. $45/\pi \approx 14.3$ ft/min F. None of these
- Find the exact value of the expression $\left(\sec \frac{\pi}{6}\right) \times \left(\tan \frac{\pi}{4}\right)$.
A. $\frac{1}{2}$ B. 2 C. $\frac{\sqrt{3}}{2}$ D. $\frac{2\sqrt{3}}{3}$ E. $\frac{\sqrt{6}}{3}$ F. None of these
- Find the exact value of $\cot(-420^\circ)$.
A. $-\sqrt{3}$ B. $\sqrt{3}$ C. $\frac{-\sqrt{3}}{3}$ D. $\frac{\sqrt{3}}{3}$ E. $\frac{-\sqrt{2}}{2}$ F. None of these
- What is the domain of the cosecant function?
A. All real numbers
B. All real numbers except odd multiples of $\frac{\pi}{2}$ (90°)
C. All real numbers except integer multiples of $\frac{\pi}{2}$ (90°)
D. All real numbers except integer multiples of π (180°)
E. None of these

8. Use the properties of trigonometric functions to find the exact value of the following expression: $\frac{\sin(70^\circ)}{\cos(-430^\circ)} + \tan(-70^\circ)$.

- (a) 0 (b) 1 (c) $2 \tan(-70^\circ)$ (d) $2 \tan 70^\circ$ (e) $2 \cot(-70^\circ)$ (f) None of these

9. The point $(2, -3)$ is on the terminal side of an angle θ in standard position. Find the exact value of $\sec \theta$.

- (a) $-\frac{2\sqrt{13}}{13}$ (b) $-\frac{3\sqrt{13}}{13}$ (c) $-\frac{\sqrt{13}}{3}$ (d) $\frac{\sqrt{13}}{2}$ (e) $\frac{2\sqrt{13}}{13}$ (f) None of these

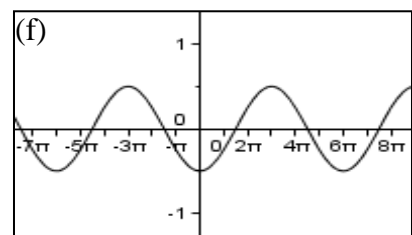
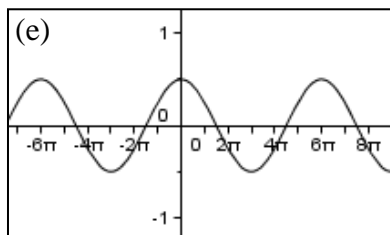
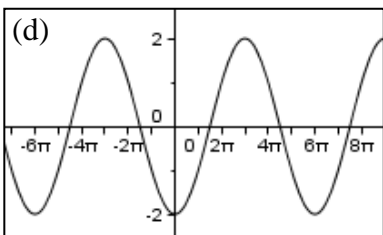
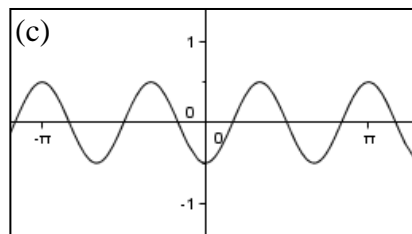
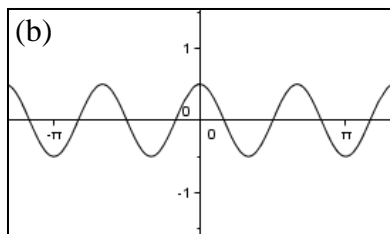
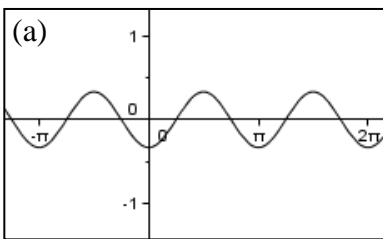
10. Find the exact value of the following trigonometric expression: $\cos^2(-40^\circ) + \sin^2(-320^\circ)$.

- (a) $\cot 40^\circ$ (b) 1 (c) 0 (d) $\cot(-40^\circ)$ (e) -1 (f) None of these

11. If $\cos \theta = -\frac{1}{4}$ and $\cot \theta < 0$, find the exact value of $\tan \theta$.

- (a) $-\frac{4\sqrt{15}}{15}$ (b) -4 (c) $\frac{\sqrt{15}}{4}$ (d) $\frac{4\sqrt{15}}{15}$ (e) $-\sqrt{15}$ (f) $-\frac{\sqrt{15}}{15}$

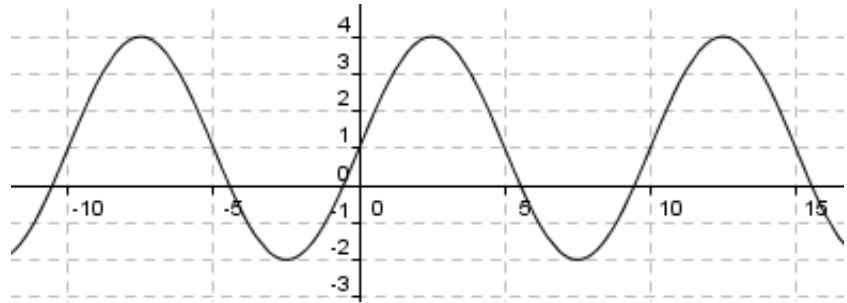
12. Match the function $y = -\frac{1}{2} \cos\left(\frac{1}{3}x\right)$ to the correct graph.



13) Identify the equation of a sine function that has amplitude 5 and period 3.

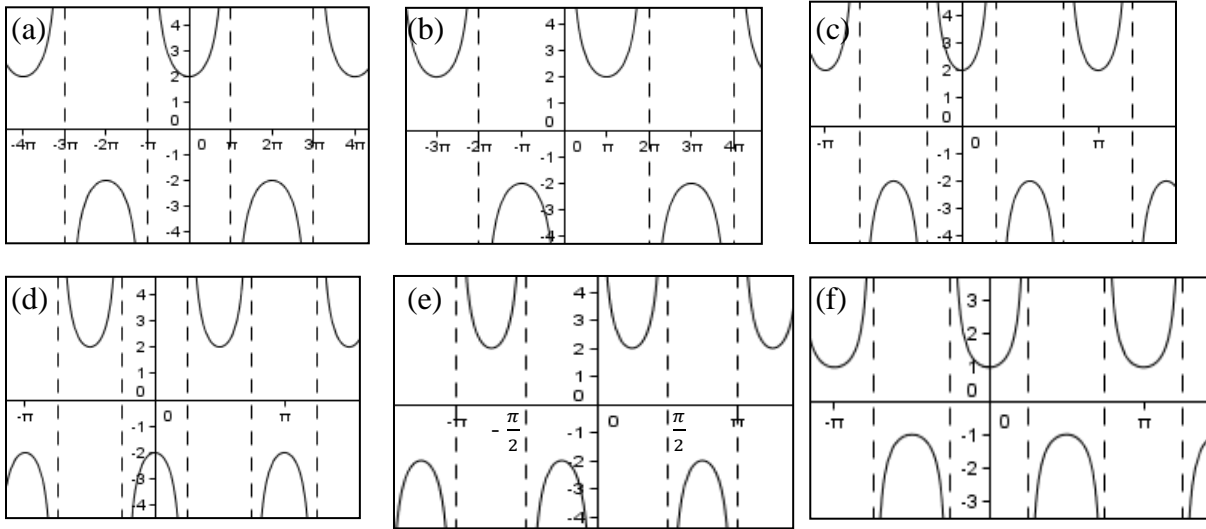
- (a) $y = \frac{1}{5} \sin\left(\frac{2\pi}{3}x\right)$ (b) $y = \frac{1}{5} \sin(3x)$ (c) $y = 5 \sin\left(\frac{2\pi}{3}x\right)$ (d) $y = 5 \sin(3x)$
 (e) $y = \frac{1}{5} \sin\left(\frac{1}{3}x\right)$ (f) $y = \frac{1}{5} \sin\left(\frac{\pi}{3}x\right)$ (g) $y = 5 \sin\left(\frac{1}{3}x\right)$ (h) $y = 5 \sin\left(\frac{\pi}{3}x\right)$

14) Identify the equation for the displayed graph.



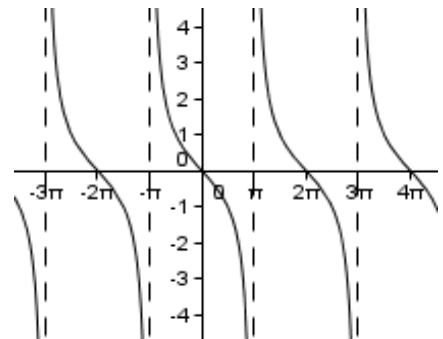
- (a) $y = 3 \sin(10x) - 1$ (b) $y = 4 \sin\left(\frac{\pi}{5}x\right)$ (c) $y = -3 \sin\left(\frac{\pi}{5}x\right) - 1$
 (d) $y = 3 \sin\left(\frac{\pi}{5}x\right) + 1$ (e) $y = 3 \sin(10x) + 1$ (f) None of these

15) Match the function $y = 2\csc(2x)$ to the correct graph.



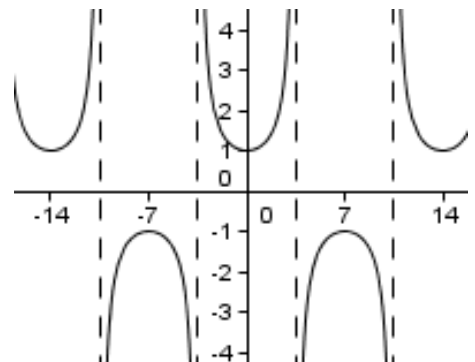
16) Write an equation for the displayed graph.

- (a) $y = \cot(x)$ (b) $y = \cot\left(\frac{1}{2}x\right)$ (c) $y = -\cot(2x)$
 (d) $y = -\tan(x)$ (e) $y = -\tan(2x)$ (f) $y = -\tan\left(\frac{1}{2}x\right)$



17) Write an equation for the displayed graph.

- (a) $y = \sec\left(\frac{\pi}{14}x\right)$ (b) $y = \sec(14x)$ (c) $y = \sec\left(\frac{\pi}{7}x\right)$
 (d) $y = \csc\left(\frac{\pi}{14}x\right)$ (e) $y = \csc(14x)$ (f) $y = \csc\left(\frac{\pi}{7}x\right)$

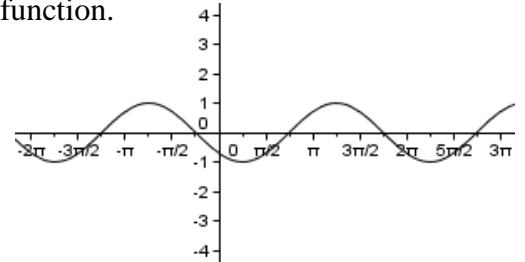


18) Find the phase shift of the function $y = -7 \csc(3x + 2)$

- (a) $-\frac{2}{3}$ (b) $\frac{2}{3}$ (c) $-\frac{3}{2}$ (d) $\frac{3}{2}$ (e) $-\frac{7}{2}$ (f) $\frac{7}{2}$ (g) $-\frac{7}{3}$

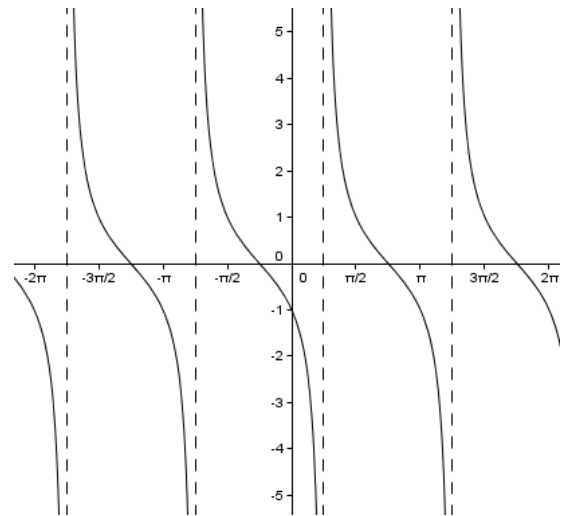
19) Write an equation for the displayed graph in terms of the sine function.

- (a) $y = \cos\left(x + \frac{\pi}{2}\right)$ (b) $y = \cos\left(x + \frac{\pi}{4}\right)$ (c) $y = \sin\left(x + \frac{5\pi}{4}\right)$
 (d) $y = \cos\left(x - \frac{\pi}{2}\right)$ (e) $y = \cos\left(x - \frac{\pi}{4}\right)$ (f) $y = \sin\left(x - \frac{5\pi}{4}\right)$



20) Write an equation for the displayed graph in terms of the cotangent function.

- (a) $y = \cot\left(x - \frac{\pi}{2}\right)$ (b) $y = \cot\left(x - \frac{\pi}{4}\right)$ (c) $y = \cot(x - \pi)$
 (d) $y = \cot\left(x + \frac{\pi}{2}\right)$ (e) $y = \cot\left(x + \frac{\pi}{4}\right)$ (f) $y = \cot(x + \pi)$



Answers:

1. E
2. F
3. D
4. B
5. D
6. C
7. D
8. A
9. D
10. B
11. E
12. F
13. C
14. D
15. E
16. F
17. C
18. A
19. C
20. B