

MRS22 – Algebra 2/Trigonometry  
Exam 3 Review Sheet

*Topics:*

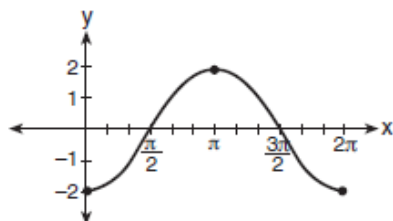
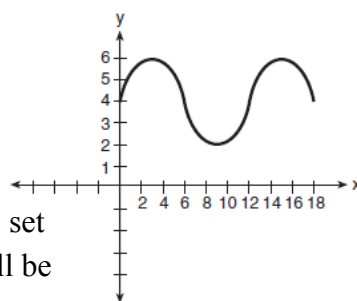
- Solving First-Degree Trigonometric Equations
- Graphing  $y = \sin x$  and  $y = \cos x$
- Graphing  $y = a \sin bx$  and  $y = a \cos bx$  (amplitude, frequency, and period)
- Graphing  $y = a \sin b(x+c) + d$  and  $y = a \cos b(x+c) + d$  (horizontal and vertical translations)
- Graphing  $y = \tan x$
- Graphs of Reciprocal Trigonometric Functions
- Inverse Trigonometric Functions

Be sure to thoroughly prepare for the exam by reviewing (and re-doing) problems in your class notes and homework assignments.

Note that exams are **cumulative**, meaning that some questions on this exam will cover topics that were tested on previous exams.

*Practice Problems:*

1. As  $x$  increases from  $\frac{\pi}{2}$  to  $\frac{3\pi}{2}$ , the value of  $\sin x$ 
  - (1) increases
  - (2) increases then decreases
  - (3) decreases
  - (4) decreases then increases
2. Which value of  $x$  is *not* in the domain of the function defined by  $y = \tan x$ ?
  - (1)  $\pi$
  - (2)  $\frac{2\pi}{3}$
  - (3)  $\frac{\pi}{3}$
  - (4)  $\frac{3\pi}{2}$
3. Between  $-2\pi$  and  $2\pi$ , the graph of  $y = \cos x$  is symmetric with respect to
  - (1) the origin
  - (2) the line  $y = x$
  - (3) the  $y$ -axis
  - (4) the  $x$ -axis
4. What is the amplitude of the function shown in the accompanying graph?
  - (1) 1.5
  - (2) 2
  - (3) 6
  - (4) 12
5. If the graphs of the equations  $y = 2$  and  $y = 2 \sin x$  are drawn on the same set of axes, the number of points of intersection in the interval  $0 \leq x \leq 2\pi$  will be
  - (1) 1
  - (2) 2
  - (3) 0
  - (4) 4
6. The graph of which equation has an amplitude of 2 and a period of  $4\pi$ ?
  - (1)  $y = 2 \sin \frac{1}{2}x$
  - (2)  $y = 2 \sin 4x$
  - (3)  $y = 4 \sin \frac{1}{2}x$
  - (4)  $y = 4 \sin 2x$
7. What is the minimum value of  $y = -3 \sin 5x + 8$ ?
  - (1) 8
  - (2) 5
  - (3) -3
  - (4) -11
8. If  $\theta$  is an angle in standard position and  $P(-3, 4)$  is a point on the terminal side of  $\theta$ , what is the value of  $\sin \theta$ ?
  - (1)  $-\frac{3}{5}$
  - (2)  $\frac{3}{5}$
  - (3)  $-\frac{4}{5}$
  - (4)  $\frac{4}{5}$
9. The accompanying graph shows a trigonometric function. State an equation of this function.



10. The brightness of the star MIRA over time is given by the equation  $y = 2 \sin \frac{\pi}{4}x + 6$ , where  $x$  represents time and  $y$  represents brightness. What is the period of this function, in radian measure?
11. Find the exact value of (a)  $\text{Arcsin}\left(\frac{1}{2}\right) + \text{Arccos}\left(\frac{\sqrt{3}}{2}\right)$  (b)  $\cos\left(\text{Arc tan}\left(-\sqrt{3}\right)\right)$  (c)  $\tan\left(\text{Arc cos}\frac{1}{6}\right)$
12. Which statement regarding the inverse function is true?
  - (1) A domain of  $y = \sin^{-1}x$  is  $[0, 2\pi]$ .
  - (2) The range of  $y = \sin^{-1}x$  is  $[-1, 1]$ .
  - (3) A domain of  $y = \cos^{-1}x$  is  $(-\infty, \infty)$ .
  - (4) The range of  $y = \cos^{-1}x$  is  $[0, \pi]$ .

13. The graph of the equation  $y = \sec x$  has an asymptote at

- (1)  $x = \pi$  (3)  $x = \frac{\pi}{2}$   
 (2)  $x = -\frac{\pi}{4}$  (4)  $x = 0$

14. a) For each equation, state the amplitude, frequency, and period:

i)  $y = -2 \cos \frac{1}{2}x$

ii)  $y = 3 \cos 2x$

amplitude: \_\_\_\_\_

amplitude: \_\_\_\_\_

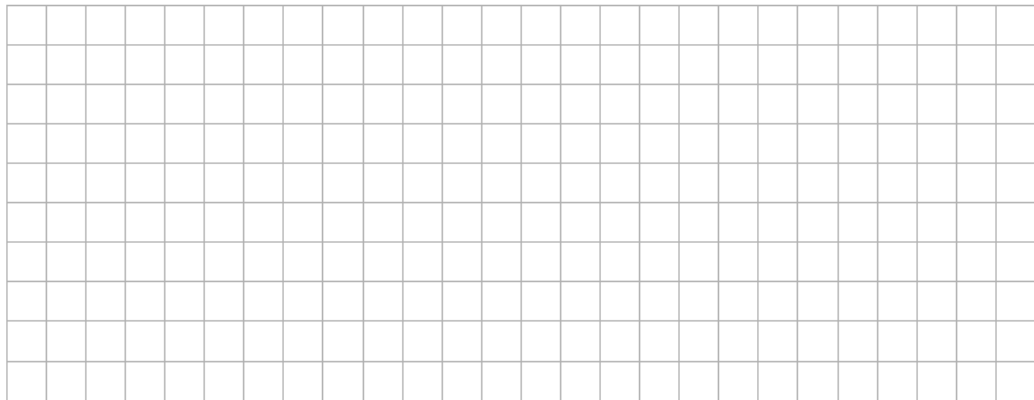
frequency: \_\_\_\_\_

frequency: \_\_\_\_\_

period: \_\_\_\_\_

period: \_\_\_\_\_

b) On the same set of axes, sketch the graphs of  $y = -\sin \frac{1}{2}x$  and  $y = 3 \cos 2x$  in the interval  $-\pi \leq x \leq \pi$ .



c) State the number of values of  $x$  in the interval  $-\pi \leq x \leq \pi$  that satisfy the equation  $-\sin \frac{1}{2}x = 3 \cos 2x$ . \_\_\_\_\_

15. Sketch the graph of  $y = 2 \cos(x + \frac{\pi}{2}) - 1$  on the interval  $-2\pi \leq x \leq 2\pi$ .



In 16 – 18, solve for  $x$  to the nearest degree if  $0^\circ \leq x < 360^\circ$ .

16.  $3 \cos x - \sqrt{3} = \cos x$

17.  $2 - (5 \sec x + 10) = \sec x$

18. a.  $\cot x = \frac{1}{5}$       b.  $\csc x = \frac{1}{5}$       c.  $\sec x = \frac{1}{5}$   
 d.  $\tan x = \frac{1}{5}$       e.  $\csc x = 5$       f.  $\sec x = 5$

19. If  $\csc \theta = -\frac{5}{4}$  and  $\tan \theta > 0$ , then  $\cos \theta$  equals

- (1)  $-\frac{4}{5}$       (2)  $-\frac{3}{5}$       (3)  $\frac{3}{5}$       (4)  $\frac{4}{5}$

20. If  $\cos A = -\frac{\sqrt{7}}{3}$  and angle  $A$  does *not* terminate in Quadrant II, find the exact values of the remaining five trigonometric functions.

21. If  $\theta$  is a positive acute angle and  $\sin \theta = a$ , which expression represents  $\cos \theta$  in terms of  $a$ ?

- (1)  $\sqrt{a}$       (2)  $\frac{1}{\sqrt{a}}$       (3)  $\sqrt{1-a^2}$       (4)  $\frac{1}{\sqrt{1-a^2}}$