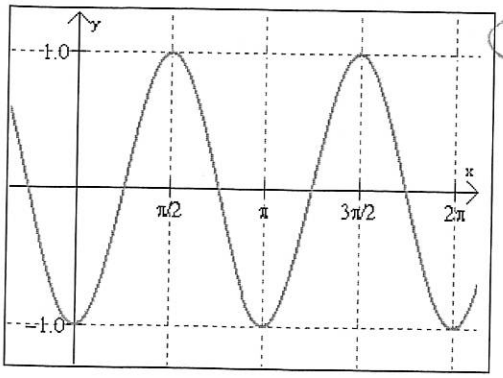
Honors Math 2
Final Review

Name Key
Period_____ Date_____

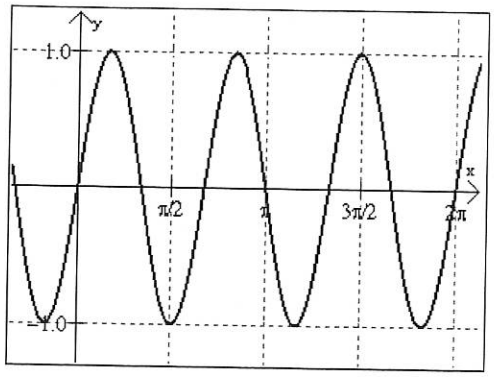
1. Determine an equation for this graph:



Choose:

- $y=-\cos(2x)$
- $y=-\cos\left(\frac{1}{2}x\right)$
- $y=-\sin(2x)$
- $y=-2\cos\left(\frac{1}{2}x\right)$

2. Determine an equation for this graph:

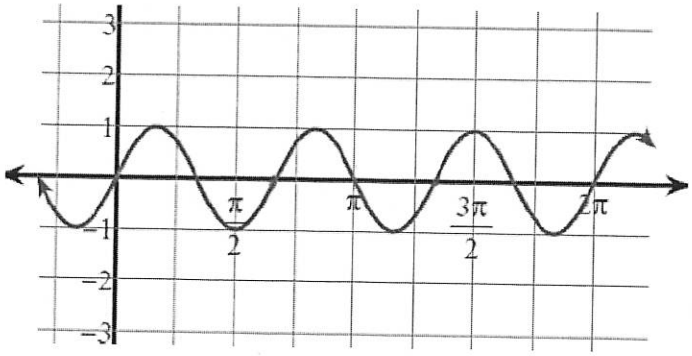


Choose:

- $y=3\sin(x)$
- $y=3\sin(3x)$
- $y=\sin(3x)$
- $y=\sin\left(\frac{1}{3}x\right)$

Write the equation for the given graphs. (There is no horizontal phase shift)

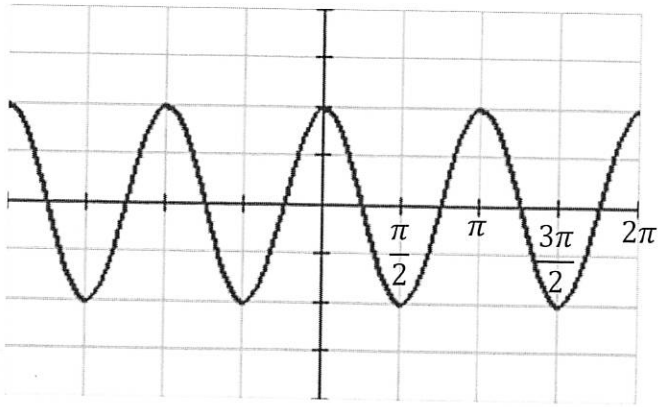
3.



$y = a\sin bx$

$y = 1\sin 3x$

4.



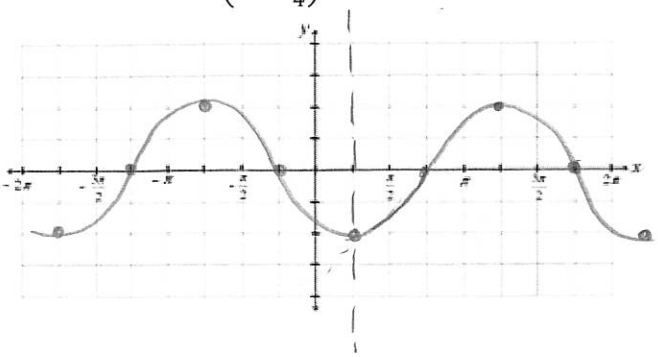
$y = a\cos bx$

$y = 2\cos 2x$

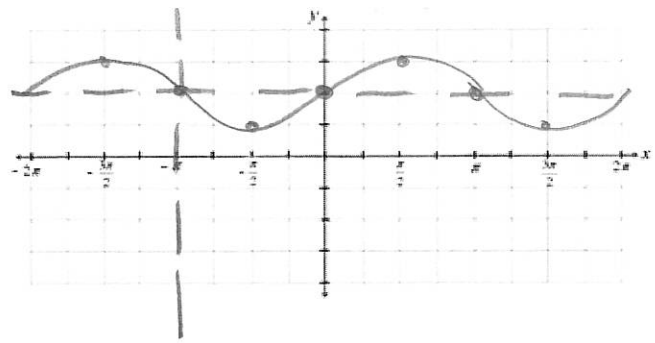
Graph the following functions.

5. $y = -2\cos\left(x - \frac{\pi}{4}\right)$ ← Right

period $\frac{2\pi}{b}$

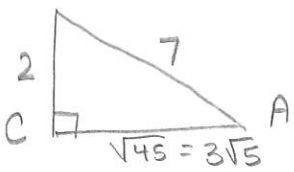


6. $y = -\sin(x + \pi) + 2$ ← left π



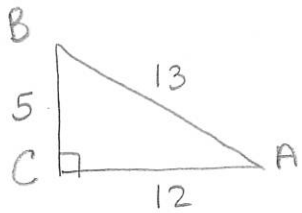
7. Given that $\sin A = \frac{2}{7}$ (opp / hyp), find $\tan B$

draw a right triangle, label the angles
the right angle is always labeled with C



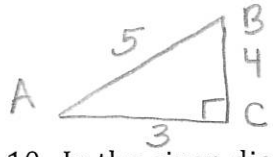
$\tan B = \frac{3\sqrt{5}}{2}$

8. Given that $\tan B = \frac{12}{5}$ (opp / adj), find $\sin B$



$\sin B = \frac{12}{13}$

9. Given that $\cos A = \frac{3}{5}$, find $\sin B$

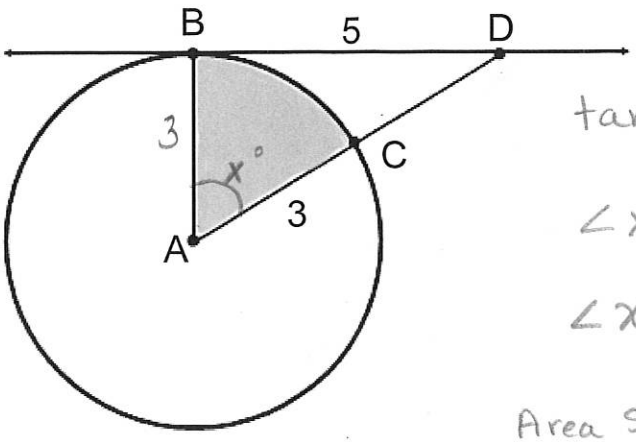


$\sin B = \frac{3}{5}$

10. In the given diagram, A is the center of the circle, the line is tangent to the circle at B, AC = 3, and BD = 5.

a. Find the measure in degrees of ∠BAC.

b. Find the area of the sector whose boundaries are radius AB, radius AC, and arc BC.



$\tan x^\circ = \frac{5}{3}$

$\angle x = \tan^{-1}(5/3)$

$\angle x = 59^\circ$

Area Sector $= \frac{59^\circ}{360^\circ}(\pi)(3)^2$

$= 4.63$ units^2

Simplify the following expressions.

11. $\frac{3x-3}{6} = \frac{x-1}{2}$

12. $\frac{x^3-27}{x^2-9}$ $\frac{(x-3)(x^2+3x+9)}{(x+3)(x-3)}$

$\frac{x^2+3x+9}{x+3}$

13. $\frac{x^2+2x-24}{x^2+7x+6}$ $\frac{(x+6)(x-4)}{(x+6)(x+1)}$

$\frac{x-4}{x+1}$

14. $\frac{x}{x^2-4x+3} + \frac{5}{x-3}$ $\frac{(x-1)}{(x-1)}$

$(x-3)(x-1)$

$\frac{x+5x-5}{(x-3)(x-1)} = \frac{6x-5}{(x-3)(x-1)}$

15. $\frac{3}{x} + \frac{2}{x-2}$ $\frac{(x-2)}{(x-2)}$ $\frac{(x)}{(x)}$

$\frac{3(x-2)+2x}{x(x-2)}$

$\frac{5x-6}{x(x+2)}$

16. $\frac{6}{x+4} - \frac{3}{x+4}$ $(x+4)$

$\frac{6-3(x+4)}{x+4} = \frac{6-3x-12}{x+4}$

$\frac{-6-3x}{x+4}$

17. $\frac{x}{x-4} + \frac{-x+3}{x+2}$ $(x+2)$ $(x-4)$

$x(x+2) + (-x-3)(x-4)$

$x^2+2x \quad -x^2+4x-3x+12$

$\frac{3x+12}{(x-4)(x+2)}$

18. $\frac{3}{x} + \frac{x+2}{x^2}$ (x) (x)

$\frac{3x+x+2}{x^2}$

$\frac{4x+2}{x^2}$

19. $\frac{3x-12}{x+5} \cdot \frac{x+6}{2x-8}$ $3(x-4)$ $2(x-4)$

$\frac{3(x+6)}{2(x+5)}$

20. $\frac{x^2-3x-10}{x^2-2x-15} \cdot (x^2+10x+21)$ $(x-5)(x+2)$ $(x-5)(x+3)$ $(x+7)(x+3)$ 1

$(x+2)(x+7)$

21. $\frac{x^2-x-2}{x^2+4x-5} \div \frac{x-2}{5x+25} \cdot \frac{5(x+5)}{(x-2)}$ $(x-2)(x+1)$ $(x+5)(x-1)$

$\frac{5(x+1)}{(x-1)}$

22. $\frac{x^2+12x+32}{6x+42} \div \frac{x^2+4x}{x^2-49} \cdot \frac{(x+7)(x-7)}{x(x+4)} = \frac{(x+8)(x-7)}{6x}$ $(x+8)(x+4)$ $6(x+7)$

Solve for x.

23. $\frac{3}{x+4} - 2 = \frac{5}{x+4}$

$3 - 2(x+4) = 5$

$3 - 2x - 8 = 5$

$-2x - 5 = 5$

$-2x = 10$

$x = -5$

24. $\frac{x}{x-1} + \frac{-1}{x-2} = \frac{2x-5}{x^2-3x+2}$

$(x-2)$ $(x-1)$

$(x-2)(x-1)$

$x(x-2) - 1(x-1) = 2x-5$

$x^2 - 2x - x + 1 = 2x - 5$

$x^2 - 3x + 1 = 2x - 5$

$x^2 - 5x + 6 = 0$

$(x-2)(x-3)$

$\cancel{x=2}$ $x = 3$

25. $\frac{3}{2}^{(x)} + \frac{1}{x}^{(2)} = 1^{(2x)} + \frac{4}{x}^{(2)}$

$3x + 2 = 2x + 8$

$x = 6$

26. $\frac{5}{x} = \frac{7}{x+2}$

$7x = 5(x+2)$

$7x = 5x + 10$

$2x = 10$

$x = 5$

Using your unit circle, find the exact value of each function. (This means no decimals!)

27. cos 45° $= \frac{\sqrt{2}}{2}$

28. sin 210° $= -\frac{1}{2}$

29. sin 150° $= 1/2$

30. cos (–45°) $= \frac{\sqrt{2}}{2}$

31. tan (240°) $= \sqrt{3}$

32. $\cos \frac{3\pi}{2} = 0$

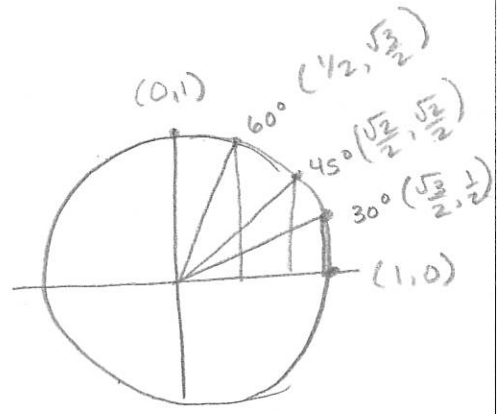
33. $\sin \frac{7\pi}{6} = -\frac{1}{2}$

34. $\cos\left(-\frac{4\pi}{3}\right) = -\frac{1}{2}$

35. $\tan(-\pi) = 0$

36. If $\cos\theta = \frac{1}{2}$ and θ is in Q IV, what is θ in radians? $\frac{5\pi}{3}$

37. If $\sin\theta = -\frac{\sqrt{3}}{2}$ and θ is in Q III, what is θ in degrees? $240°$



38. In which two quadrants is sin θ > 0? I, II

39. In which two quadrants is tan θ < 0? II, IV

40. In which quadrant would θ be located if:

a) tan θ < 0 and cos θ < 0? II

b) sin θ > 0 and cos θ > 0? I

41. List an angle in Q I such that $0 < \theta \leq 2\pi$ and $\cos\theta = \frac{\sqrt{2}}{2}$. $\frac{\pi}{4}$