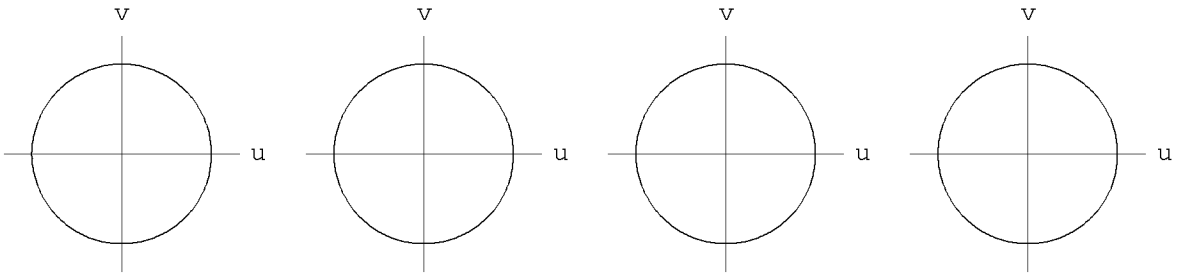
Homework: http://math.mnrt.net/

Name _____ raw scaled percent

Math 11 Trimester 2 Practice Exam 1P

Trigonometry

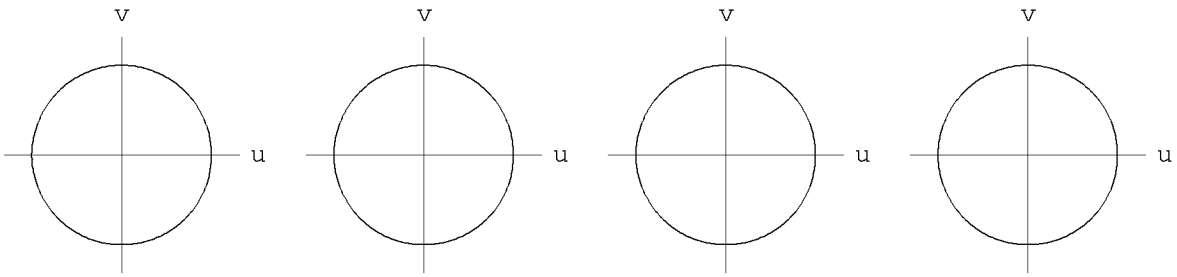
- **Partial credit may be given for correct work. Therefore, it is to your advantage to write clear solutions. If I cannot understand a solution within 90 seconds, then it will receive no partial credit.**
- **Answers must be completely simplified. No denominators may include radicals. All fractions reduced. Arithmetic must be completely performed; e.g. write 9 instead of $\sqrt{81}$.**
- **All angles you write for answers must be written with respect to the angle zero and measured in the positive direction (counter clockwise). For example, write $\theta = \frac{3\pi}{2}$ rather than $\theta = -\frac{\pi}{2}$.**
- **No calculators. All answers must be exact.**



- **A. Find the values of the following.**
  [NB: for some of these you will use the identities of side 1 or the unit circle, for others you will use the identities of side 2.]

[1] $\cos \frac{-4\pi}{3}$

[2] $\sin \frac{5\pi}{6}$



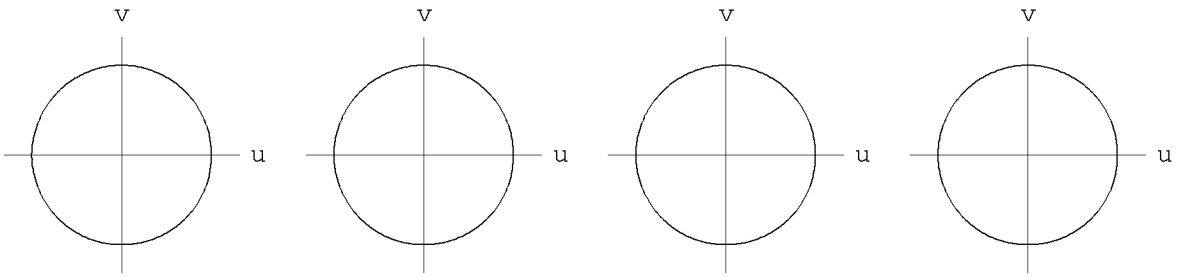
[3] $\cos \frac{\pi}{12}$

[4] $\sin \frac{2\pi}{3}$

[5] $\cos 29\pi$

[6] $\tan \frac{7\pi}{12}$

[7] $\sin 15^{\circ}$



■ **B. Answer the following. Use correct notation.**

[1] Find all values of x for which $\sin x = \frac{-\sqrt{3}}{2}$.

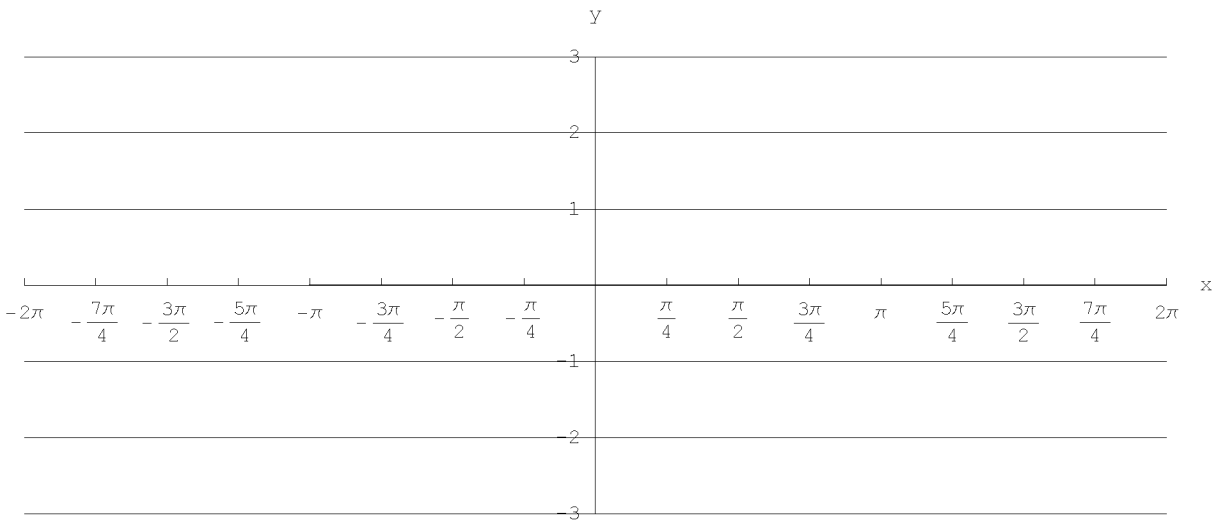
[2] Find all values of x, $0 \le x < 2\pi$, for which $\sin x \le \frac{-\sqrt{3}}{2}$.

[3] Find all values of x, $0 \le x < 2\pi$, for which $\cos x \ge \frac{-\sqrt{3}}{2}$

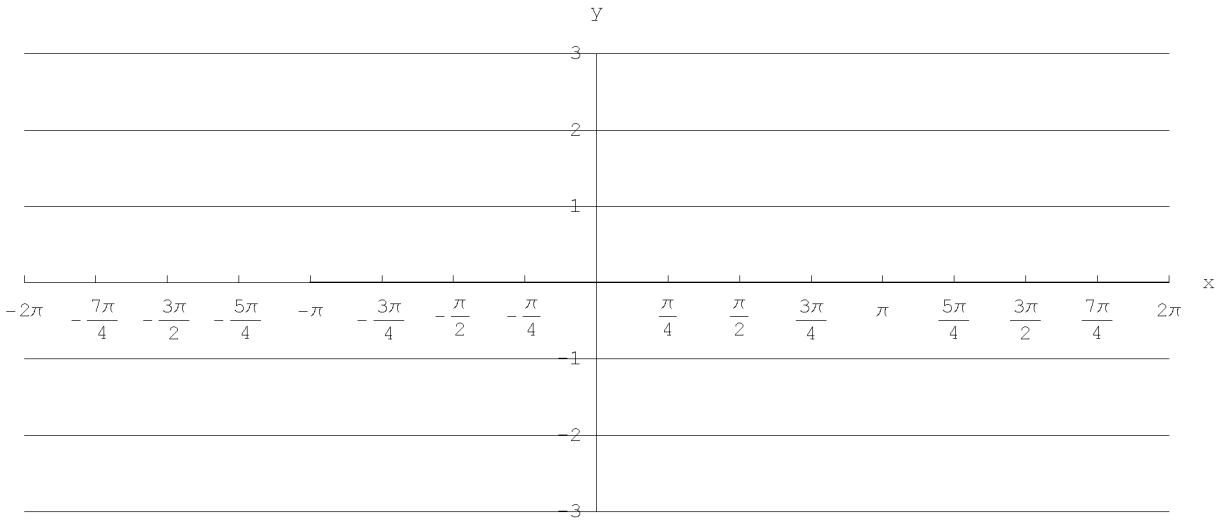
[4] Find all values of x, $0 \le x < 2\pi$, for which $\tan x > 0$.

■ C. Graph the following (neatly).

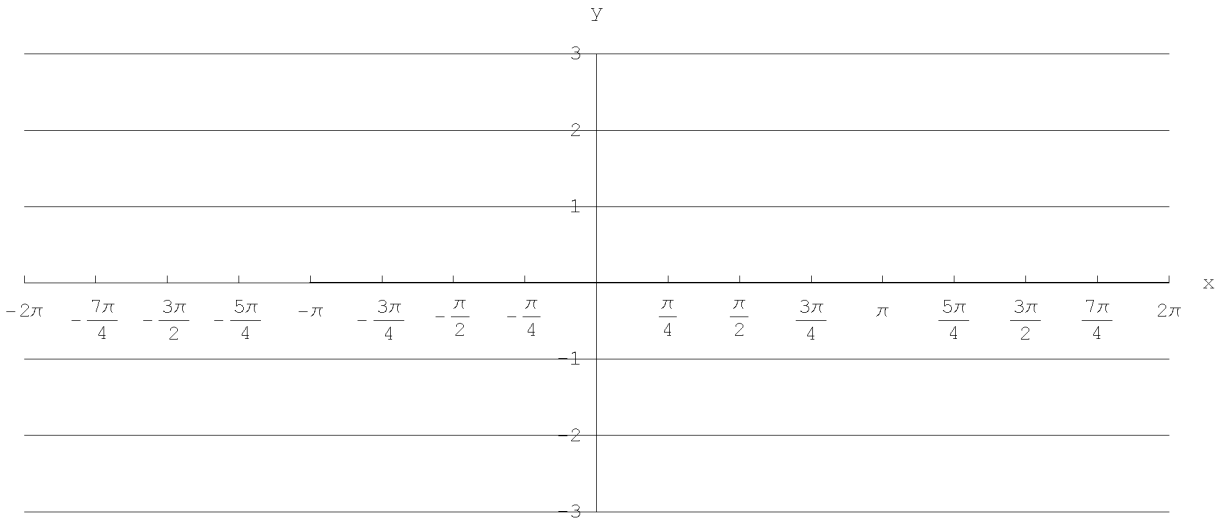
[1] The tangent function



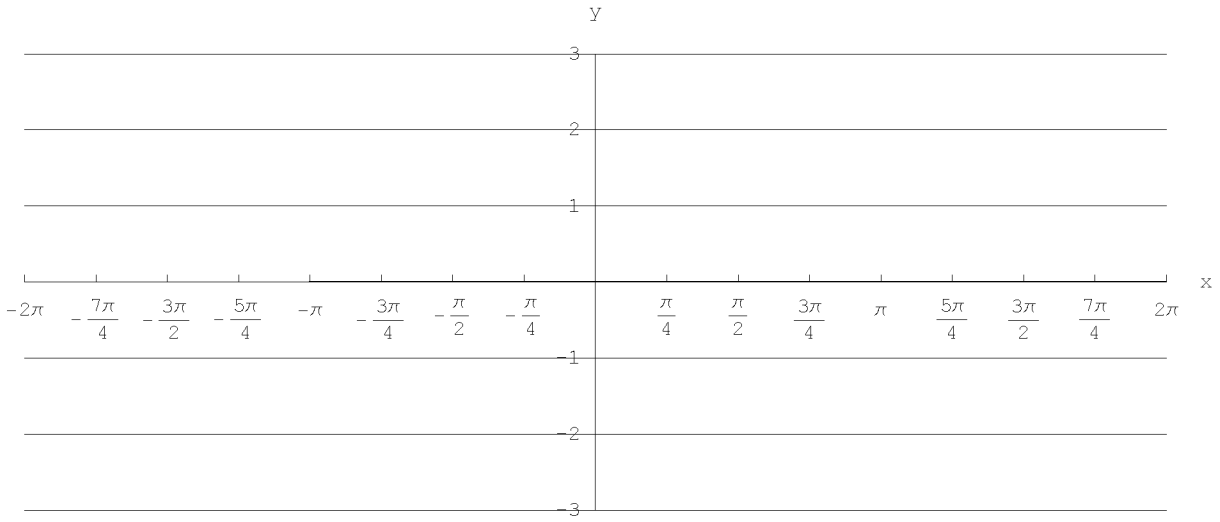
[2] $\sin(x - \frac{\pi}{4})$



[3] $3 \sin 2x$

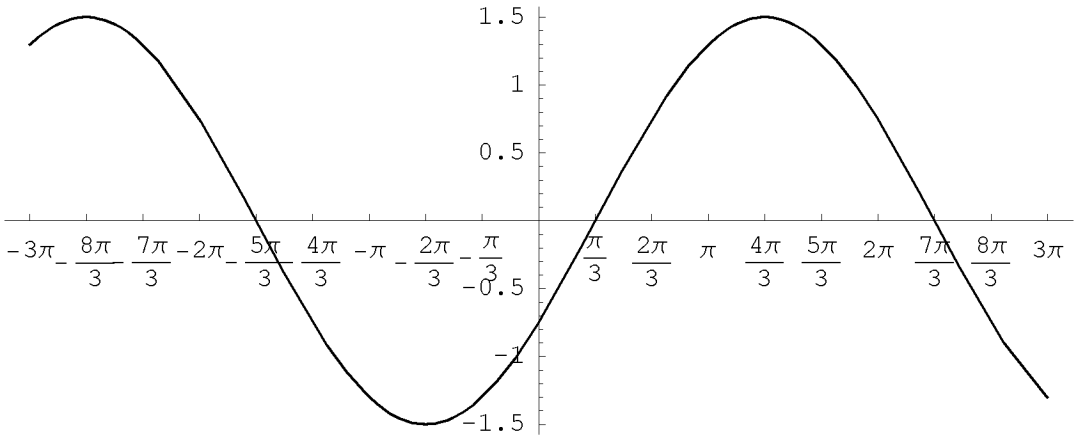


[4] $2 \sin(2x - \frac{\pi}{2})$



■ **D. Write the function for each graph.**

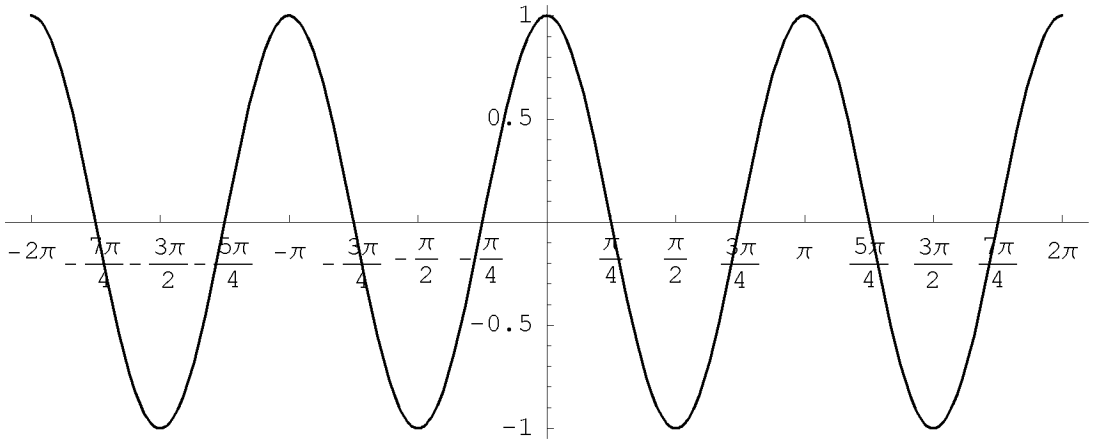
[1] The graph crosses the x-axis at $-\frac{5\pi}{3}$, $\frac{\pi}{3}$, $\frac{7\pi}{3}$. It has a maximum of 1.5 and a minimum of -1.5.



The function of graph [1] is:

Answer

[2] The graph crosses the x-axis at $-\frac{5\pi}{3}$, $\frac{3\pi}{4}$, $\frac{-\pi}{4}$, $\frac{\pi}{4}$, $\frac{3\pi}{4}$, $\frac{5\pi}{4}$. It has a maximum of 1.0 and a minimum of -1.0.



The function of graph [2] is:

Answer

■ D. Proofs

[1] Prove any one of the addition theorems that involves only sines and cosines.

[2] Prove: $\sin 2\alpha = 2\sin\alpha\cos\alpha$

[3] Prove: $\sin\alpha\cos\beta = \frac{1}{2}[\sin(\alpha+\beta)+\sin(\alpha-\beta)]$

[4] Prove: $\cos 2x = 2\cos^2 x - 1$

■ E. Answer the following

[1] Find the maximum and minimum values of $y = \sin\theta + \sqrt{3}\cos\theta$ and state the values of θ, $0 \le \theta < 2\pi$, at which they occur.

[2] Solve for θ, $0 \le \theta \le 2\pi$, if $\sin\theta = 2\sin^2\theta$.

[3] Solve for x, if $\mathbf{5\cos 3x - 1 = 4\cos 3x + 1}$

[4] Solve for x, if $\mathbf{\cos 2x - 1 = 3\cos 2x - 1}$

[5] Solve for θ, if $\mathbf{\sin 4\theta = -\sin 3\theta}$

■ **F. Answer the following. These involve the Law of Sines and the Law of Cosines. Quantities given are exact. Use a calculator to answer correct to 4 significant figures.**

[1] Solve $\triangle ABC$ if $\alpha = 47°,\ a = 25\,\text{ft},\ b = 30\,\text{ft}$

[1] Solve $\triangle ABC$ if $a = 56\,\text{ft},\ b = 83\,\text{ft},\ \gamma = 97°$