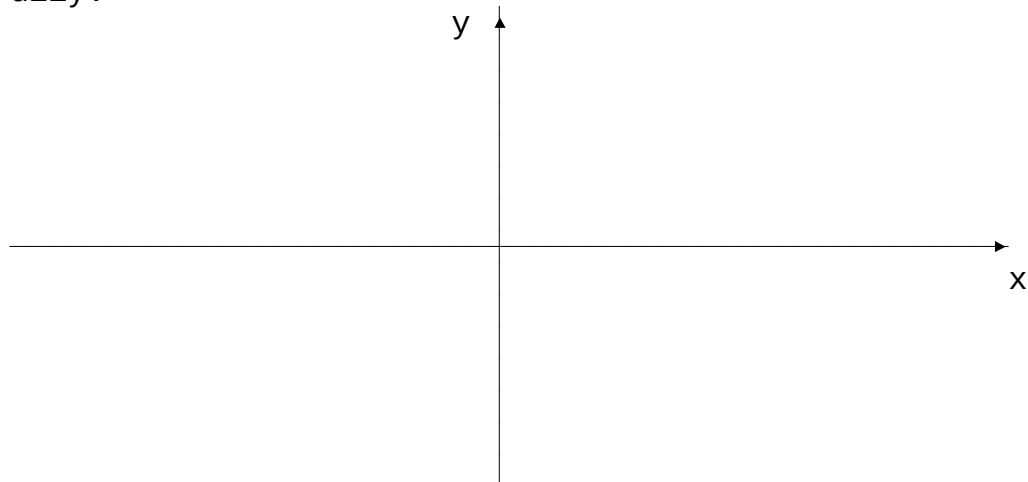
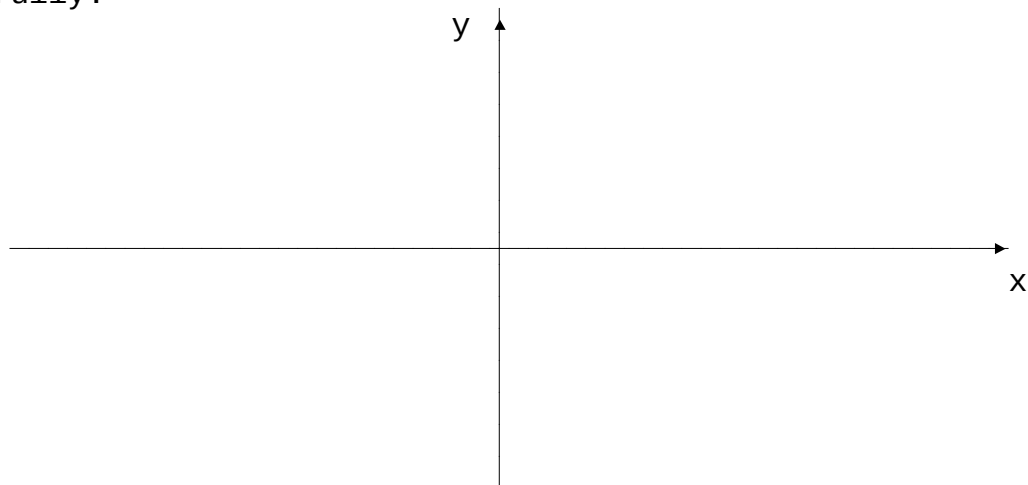

Read Me First: Show all essential work neatly. Use correct notation when presenting your computations. Write using complete sentences. In particular, be very careful when using "=", **equals**, and " $\Rightarrow$ ", **implies**. Do not "box" your answers. Communicate.

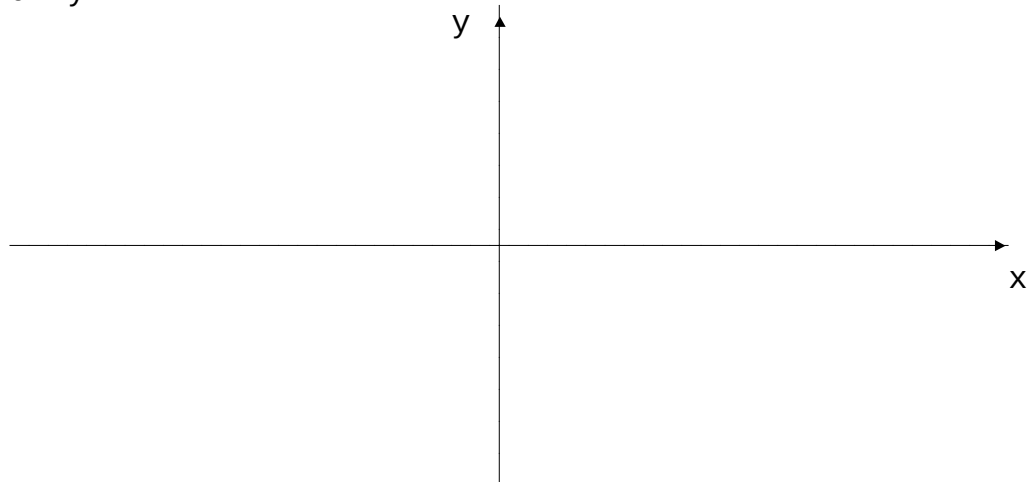
1. (5 pts.) Carefully sketch the graph of $y = \sin^{-1}(x)$. Label very carefully.



2. (5 pts.) Carefully sketch the graph of $y = \cos^{-1}(x)$. Label very carefully.



3. (5 pts.) Carefully sketch the graph of $y = \tan^{-1}(x)$. Label very carefully.



4. (5 pts.) Use your calculator to find the value of $\sec^{-1}(-4/3)$ rounded to two decimal places.

$$\sec^{-1}(-4/3) =$$

5. (5 pts.) Find the exact value of $\sin^{-1}(\sin(-7\pi/6))$.

$$\sin^{-1}(\sin(-7\pi/6)) =$$

6. (5 pts.) Write $\sin(2\sin^{-1}(v))$ as an algebraic expression containing v .

$$\sin(2\sin^{-1}(v)) =$$

7. (5 pts.) Find the exact value of $\tan(2 \cdot \tan^{-1}(3/4))$.

$$\tan(2 \cdot \tan^{-1}(3/4)) =$$

8. (5 pts.) (a) Obtain all solutions to the equation below, and then (b) list the solutions θ with $0 \leq \theta < 2\pi$.

$$\sin(3\theta) = -1$$

9. (10 pts.) A right triangle has one angle of 35° and one leg of length 100 meters. What are the two possible lengths for the hypotenuse?? [You may want to sketch the two situations.]

10. (5 pts.) A triangle has two sides with lengths 5 feet and 8 feet. If the two sides meet in an angle of 30° , what is the exact length of the third side??

11. (10 pts.) Use the Law of Sines to solve the triangle with $\alpha = 110^\circ$, $\gamma = 30^\circ$, and $c = 6$. You may assume that the standard labelling scheme is used.

12. (5 pts.) Determine whether one, two, or no triangles result from the following data. You do not have to solve the triangles that might result. You may assume that the standard labelling scheme is used.

$$a = 3, b = 6, \alpha = 32^\circ$$

13. (10 pts.) To measure the height of the top of a distant object on a level plane, a surveyor takes two sightings of the top of the object 1000 feet apart. The first sighting, which is nearest the object, results in an angle of elevation of 60° . The second sighting, which is most distant from the object, results in an angle of elevation of 30° . If the transit used to make the sightings is 5 feet tall, what is the height of the object. [Hint: Make a diagram of the situation. The distance from the base of the object is unknown.]

14. (5 pts.) If the polar coordinates of a point are given by $(r, \theta) = (9.5, 110^\circ)$, find the rectangular coordinates for the point. In doing this, make clear which values are exact and which are approximations.

15. (5 pts.) If the rectangular coordinates of a point are given by $(x, y) = (-5, -5\sqrt{3})$, obtain polar coordinates for the point.

16. (10 pts.) (a) Obtain all solutions to the equation below, and then (b) list the solutions θ with $0 \leq \theta < 2\pi$.

$$2 \cdot \sin^2(\theta) + 3 \cdot \sin(\theta) + 1 = 0$$