



\_\_\_\_\_ (5pts) 1. Find the **exact** value of

$$\sin\left(\sin^{-1}\left(\frac{-3}{5}\right) - \cos^{-1}\left(\frac{12}{13}\right)\right).$$

\_\_\_\_\_ (5 pts) 2. **Exactly** and algebraically solve the system of equations to find all the solutions. Give the answer as a point.

$$45y + 59x = 15$$

$$5y = -8x - 20$$

\_\_\_\_\_ (5pts) 3. **Exactly** find  $\sin 2x$  if  $\tan x = \frac{4}{9}$  and  $\cos x < 0$ .

$\mathbf{u} =$  \_\_\_\_\_ (5pts) 4. Find the unit vector  $\mathbf{u}$  in the direction of  $\mathbf{v} = \mathbf{i} - 8 \mathbf{j}$ .

(6pts) 5. Solve triangle(s) ABC if  $\angle B = 54^\circ$ ,  $a = 42$  and  $b = 38$ . If needed, round to two decimal places.

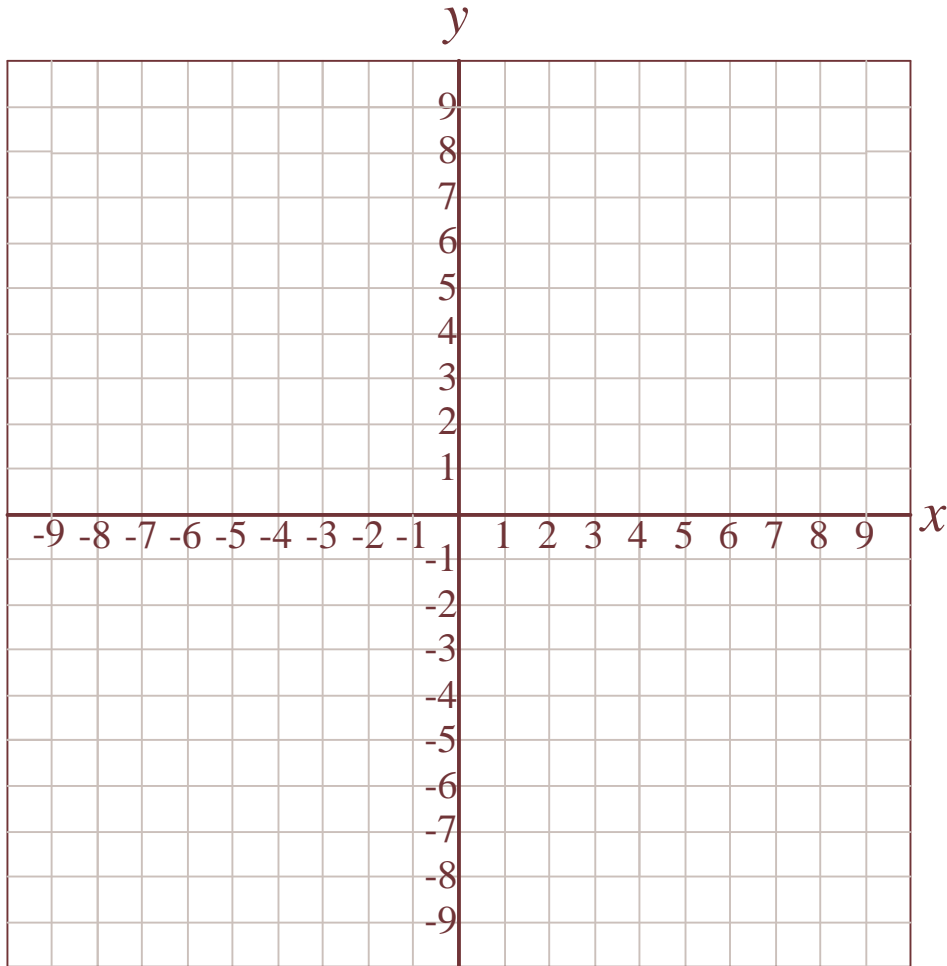
\_\_\_\_\_  $\angle A$

\_\_\_\_\_  $\angle C$

\_\_\_\_\_  $c$

(4pts) 6. Graph the system of inequalities. Shade only the solution set.

$$x \geq y + 2$$
$$x^2 + y^2 > 9$$



\_\_\_\_\_ (5pts) 7. By using appropriate formulas, find the **exact** value for  $\sin \frac{23\pi}{12}$ .

\_\_\_\_\_ (5pts) 8. A jet is traveling with no wind at 430 miles per hour with a heading of  $S45^\circ E$ . It encounters a wind of 68 miles per hour in the direction of  $N30^\circ E$ . What is the resultant speed of the jet to the nearest mile per hour?

\_\_\_\_\_ (5pts) 9. Let  $\mathbf{u} = \langle 2, -4 \rangle$  and let  $\mathbf{v}$  have initial point  $(-3, 1)$  and terminal point  $(5, 6)$ . Find the angle, in degrees to two decimal places, of the angle between  $\mathbf{u}$  and  $\mathbf{v}$ .

x = \_\_\_\_\_ (5pts) 10. Exactly solve  $2\cos^2 \theta + \sin \theta = 2$  on the interval  $[0, 2\pi)$ .