

8. **MINI LAB** Determine the pattern in the coordinates of points that are  $\frac{1}{4}$  rotation apart on the unit circle.

$90^\circ$  or  $\frac{\pi}{2}$  radians  
right angle.

**Step 1** Start with the points  $P(0) = (1, 0)$ ,

$$P\left(\frac{\pi}{3}\right) = \left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right), \text{ and}$$

$$P\left(\frac{5\pi}{3}\right) = \left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right).$$


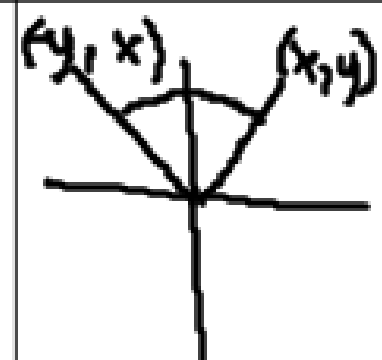
Show these points on a diagram.

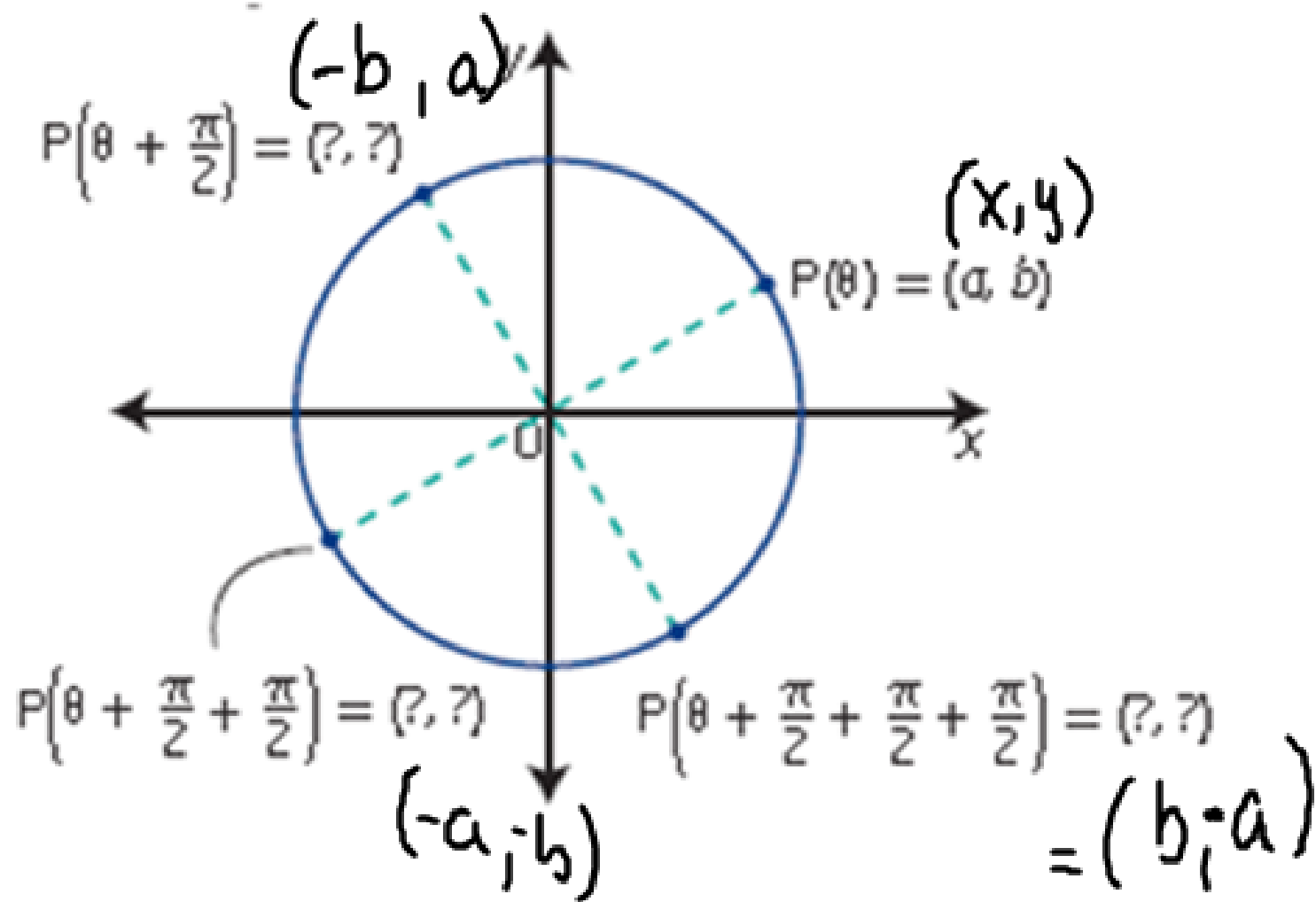
**Step 2** Move  $+\frac{1}{4}$  rotation from each point.

Determine each new point and its coordinates. Show these points on your diagram from step 1.

**Step 3** Move  $-\frac{1}{4}$  rotation from each original point. Determine each new point and its coordinates. Mark these points on your diagram.

**Step 4** How do the values of the  $x$ -coordinates and  $y$ -coordinates of points change with each quarter-rotation? Make a copy of the diagram and complete the coordinates to summarize your findings.

| Point   | Step 2:   | Step 3:  | Step 4:<br>Description             | Diagram  |
|---|---|--|------------------------------------|--|
| $P(0) = (1,0)$  | $+\frac{1}{4}$ turn<br>$P\left(\frac{\pi}{2}\right) = (0,1)$<br>$0 + \frac{\pi}{2} = \frac{\pi}{2}$   | $-\frac{1}{4}$ turn<br>$P\left(-\frac{\pi}{2}\right) = (0,1)$<br>$0 - \frac{\pi}{2} = -\frac{\pi}{2}$<br>$\frac{\pi}{2} + \frac{\pi}{2} = \pi$   | Switched<br>x and y<br>coordinates |   |
| $P\left(\frac{\pi}{3}\right) =$<br>$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$   | $P\left(\frac{\pi}{3} + \frac{\pi}{2}\right) =$<br>$\frac{2\pi}{6} + \frac{3\pi}{6} = \frac{5\pi}{6}$<br>$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$  | $P\left(\frac{\pi}{3} - \frac{\pi}{2}\right) =$<br>$\frac{2\pi}{6} - \frac{3\pi}{6} = -\frac{\pi}{6} + \frac{12\pi}{6} = \frac{11\pi}{6}$<br>$\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ | x and y<br>switch                  |  |
| $P\left(\frac{5\pi}{3}\right) =$<br>$\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ | $P\left(\frac{5\pi}{3} + \frac{\pi}{2}\right) =$<br>$\frac{10\pi}{6} + \frac{3\pi}{6} = \frac{13\pi}{6}$<br>$\frac{13\pi}{6} - \frac{12\pi}{6} = \frac{\pi}{6}$<br>$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ | $P\left(\frac{5\pi}{3} - \frac{\pi}{2}\right) =$<br>$\frac{10\pi}{6} - \frac{3\pi}{6} = \frac{7\pi}{6}$<br>$\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$                                  | x and y<br>switch                  |  |



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Practice Day with Radians

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worksheet

## Reminder of Radical Rules

1. can't leave a radical on the bottom (multiply top and bottom by it to get rid of it)

$$\frac{3}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5}}{5} \checkmark$$

2. multiplying radicals you multiply whats outside the radical sign and you multiply whats under the radical sign

$$6\sqrt{3} (4\sqrt{2}) = 24\sqrt{6}$$

3. if theres two terms on the bottom and one or both is radical you multiply by the conjugate (same two terms, different sign between)

$$\frac{3+\sqrt{3}}{2-\sqrt{6}} \cdot \frac{2+\sqrt{6}}{2+\sqrt{6}} = \frac{6+3\sqrt{6}+2\sqrt{3}+\sqrt{18}}{4+\cancel{2\sqrt{6}}-\cancel{2\sqrt{6}}-\sqrt{36}} = \frac{6+3\sqrt{6}+2\sqrt{3}+3\sqrt{2}}{-2}$$

4. simplifying radicals (break it up using perfect squares)

$$\sqrt{75} = \sqrt{25 \cdot 3} = \sqrt{25}\sqrt{3} = 5\sqrt{3}$$