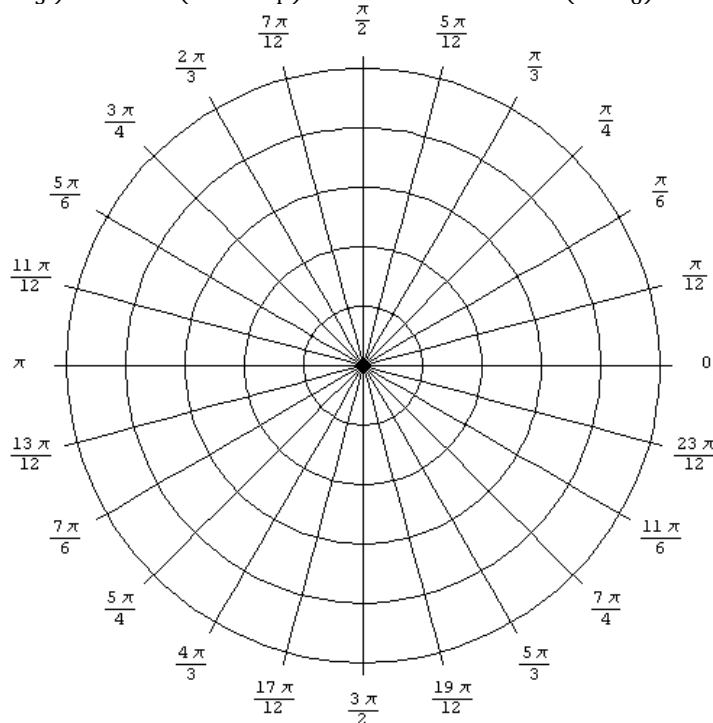


Instructions: Write your work up neatly and attach to this page. Record your final answers (only) directly on this page if they are short; if too long indicate which page of the work the answer is on and mark it clearly. Use exact values unless specifically asked to round.

- Solve each triangle below. If using the law of sines, verify how many triangles are possible. If there are two possible triangles, find BOTH. Round to the nearest tenth.

a. $A = 44^\circ, B = 25^\circ, a = 12$	g. $B = 85^\circ, C = 15^\circ, b = 40$
b. $A = 65^\circ, B = 65^\circ, c = 6$	h. $a = 30, b = 20, A = 50^\circ$
c. $a = 42.1, b = 37, A = 112^\circ$	i. $a = 10, b = 30, A = 150^\circ$
d. $a = 7, b = 28, A = 12^\circ$	j. $a = 9.3, b = 41, A = 18^\circ$
e. $a = 5, b = 7, C = 42^\circ$	k. $a = 7, c = 3, B = 90^\circ$
f. $a = 63, b = 22, c = 50$	l. $a = 5, b = 7, c = 10$
- Two fire-lookout stations are 10 miles apart, with station B directly east of station A. Both stations spot a fire. The bearing from station A is $N25^\circ E$ and from station B it's $N56^\circ W$. How far from each station is the fire (to the nearest tenth of a mile)?
- You are on a fishing boat that leaves its pier and heads east. After traveling 30 miles, there is a report warning of rough seas directly south. The captain turns the boat and follows a bearing of $S45^\circ W$ for 12 miles. How far are you from the boat's pier? What bearing could the board have originally taken to arrive at this point?
- Convert the points below into rectangular coordinates, and plot the points below on the graph. Label each.

- a. $(1, \frac{\pi}{4})$ b. $(3, \frac{4\pi}{3})$ c. $(-3, -\frac{5\pi}{4})$ d. $(-1, -\pi)$ e. $(2, -\frac{\pi}{6})$ f. $(-5, -\frac{7\pi}{4})$



5. Convert the following points to polar coordinates.

- a. $(-2, 2)$ b. $(2, -2\sqrt{3})$ c. $(5, 0)$ d. $(0, -6)$ e. $(-1, -\sqrt{3})$

6. Convert the equation to polar coordinates. Solve for r when feasible.

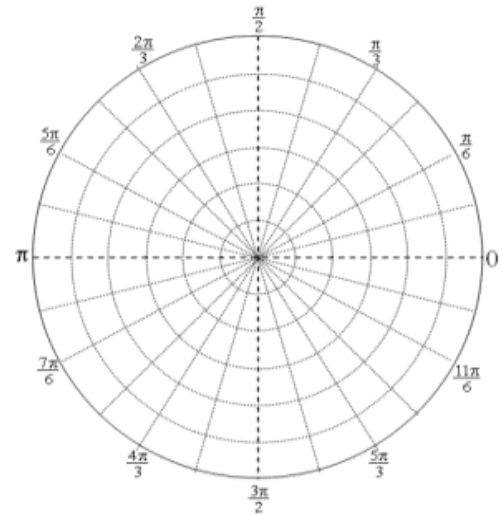
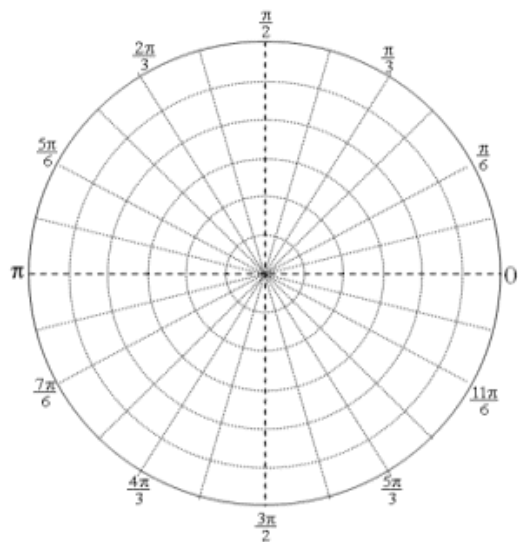
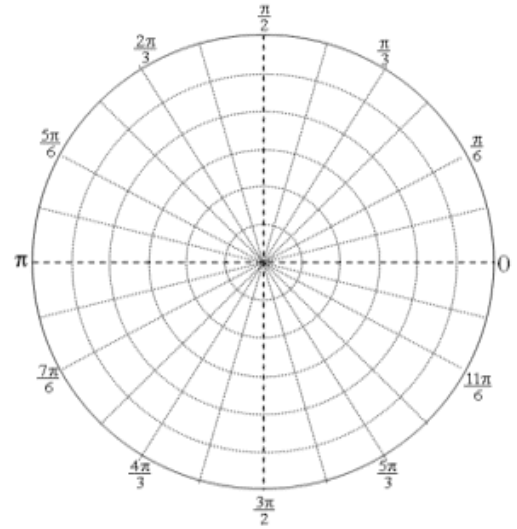
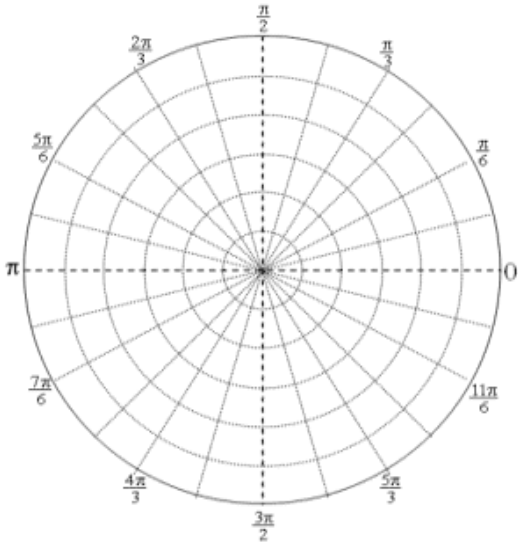
- a. $3x + y = 7$ d. $y = 3$
 b. $x^2 + y^2 = 9$ e. $x^2 + (y + 3)^2 = 9$
 c. $y^2 = 6x$

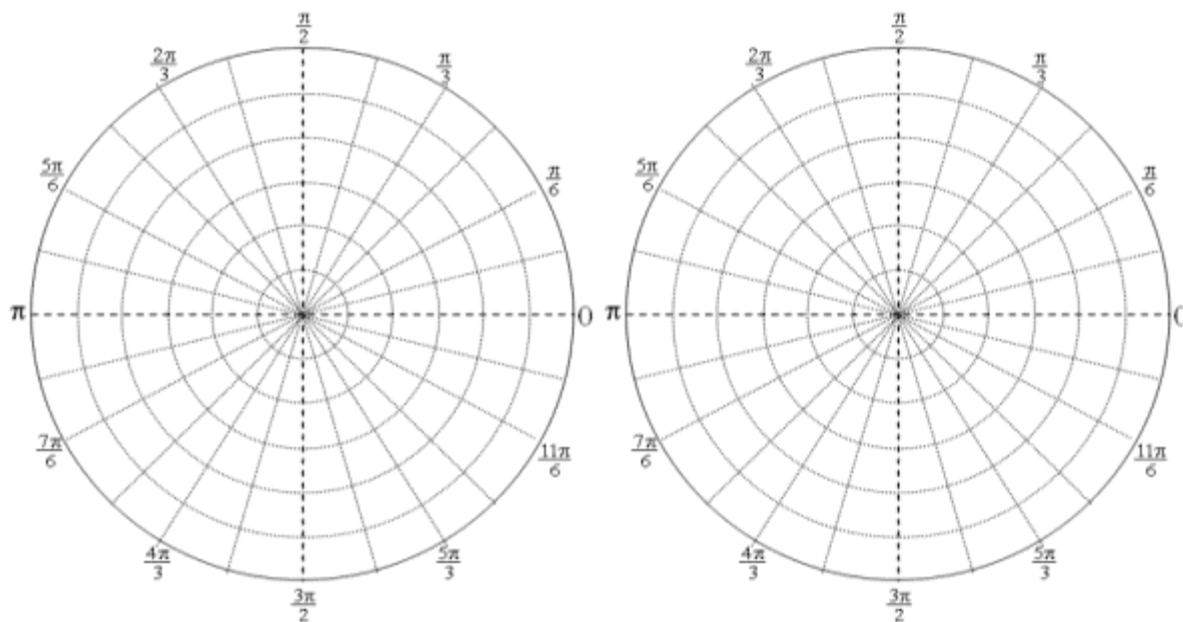
7. Convert the polar coordinates to rectangular coordinates.

- a. $r = 8$ d. $r = 8 \cos \theta + 2 \sin \theta$
 b. $\theta = \frac{2\pi}{3}$ e. $r^2 \sin 2\theta = 4$
 c. $r \sin \theta = 3$ f. $r = 12 \cos \theta$

8. Graph the following functions in polar coordinates by hand on the graphs below.

- a. $r = 4 + 3 \cos \theta$
 b. $r = 2 - 2 \cos \theta$
 c. $r = 4 \sin 3\theta$
 d. $r = 2 \sin \theta$
 e. $r^2 = 9 \sin 2\theta$
 f. $r \cos \theta = -3$





9. Use technology to graph the equations below. Sketch the results. For some graphs $[0, 4\pi]$ should be fine, but for others, you may want $[-2\pi, 2\pi]$ as the domain for θ .
- | | |
|--|---|
| a. $r = \cos\left(\frac{3}{2}\theta\right)$ | d. $r = \sin^4 \theta + \cos 3\theta$ |
| b. $r = \frac{1}{1 - \sin \theta}$ | e. $r = 1.5^{\sin \theta}$ |
| c. $r = \cos^2 5\theta + \sin 3\theta + 0.3$ | f. $r = \ln\left(\theta^2 + \frac{\pi}{4}\right)$ |