

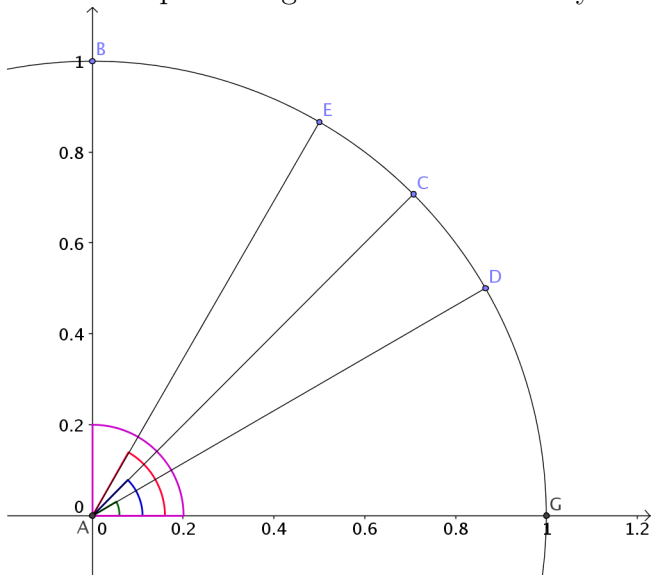
Name _____

Date _____

Please show ALL of your work if full or partial credit is desired. Communicating your solution is as important as stating your answer.

PLEASE, NO CALCULATORS ON THIS FIRST PAGE. THANK YOU.

1. Label the special angles and their x- and y- coordinates for the first quadrant.



2. Find the following exactly:

(a) $\arcsin\left(\frac{-1}{2}\right) =$

(b) $\arccos\left(\frac{\sqrt{3}}{2}\right) =$

(c) $\arctan(-1) =$

(d) $\arctan(\sqrt{3}) =$

3. Find $\cos\left(\arctan\left(\frac{3}{4}\right)\right)$ exactly.

4. Rewrite the following:

(a) $\frac{\sin(\theta)}{\cos(\theta)} =$

(e) $\frac{1}{\sin(\theta)} =$

(b) $\sin^2(\psi) + \cos^2(\psi) =$

(f) $1 - \cos^2(\theta) =$

(c) $\sin(-\theta) =$

(g) $1 - \sin^2(\theta) =$

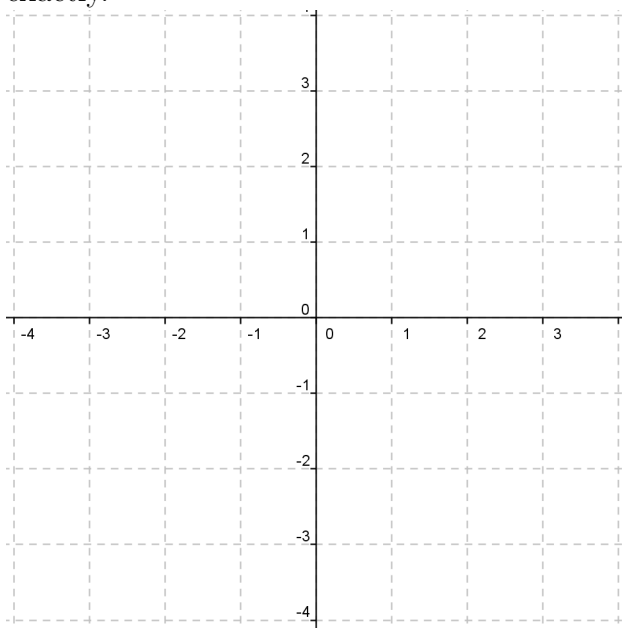
(d) $\cos(-\theta) =$

(h) $\cos(\phi - \theta) =$

5. In a circle of radius 5 cm an arc of 10 cm long subtends an angle of how many radians? How many degrees? (answers to the nearest hundredth)
6. Solve the triangle, giving the missing sides and angles exactly. $A = \frac{\pi}{3}$ rad, $c = 2$ cm, $C = \frac{\pi}{2}$ rad
7. Solve the triangle, giving the missing sides and angles to the nearest thousandth. $A = \frac{3\pi}{4}$ rad, $c = 2\sqrt{2}$ cm, $a = \sqrt{29}$ cm
8. Solve the triangle, giving the missing sides and angles to the nearest thousandth. $A = 42^\circ$, $b = 3$ cm, $c = 2$ cm
9. Find the area of the triangle from the previous problem.

10. Gary's bicycle has wheels with a 700 mm diameter. If the wheel is making 2.5 revolutions per second, what is the speed of Gary's bicycle to the nearest kilometer per hour?

11. Graph the function $f(x) = 3 \cos(\pi x)$. Identify the period, amplitude, and phase shift. Show 2 periods. Label the x-intercepts, the y-intercept, and the maximum and minimum values exactly.



12. Prove or disprove one of the following:

(a) $-2 \sin^2(\theta) = 2 \cos^2(\theta) - 2$

(b) $\tan(\theta) = \frac{\sqrt{1-\cos^2(\theta)}}{\cos(\theta)}$

(c) $\tan(\theta) \sec(\theta) = \frac{\sin(\theta)}{1-\sin^2(\theta)}$

13. Solve one of the following for θ on the interval $[-2\pi, 2\pi]$:

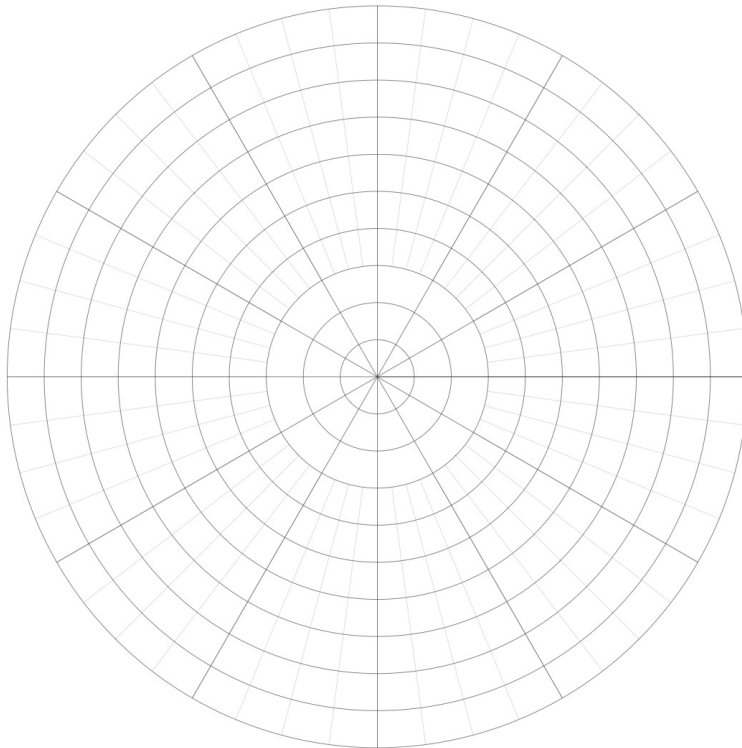
(a) $\sin(\theta) = \cos(2\theta)$

(b) $\cos^2(\theta) + 2\cos(\theta) + 1 = 0$

(c) $\cos(\theta) = \frac{-\sqrt{3}}{2}$.

(d) $\sin(2\theta) = \sin(\theta)$

14. Graph the polar function $r(\theta) = \cos(3\theta)$. Include a table showing at least 8 points, show the direction of the graph and label 4 values of θ on the curve.



15. Vector \vec{v} is 2 cm long E 60° N. Vector \vec{u} is 4 cm long E. They can be used to make a parallelogram. Draw the parallelogram. Find the lengths of the diagonals of the parallelogram.

16. Convert the polar coordinates to rectangular coordinates.

(a) $(4; 60^\circ)$

(b) $(-1; \frac{\pi}{6})$

17. Convert rectangular coordinates to polar coordinates.

(a) $(11, -7)$

(b) $(0.6, 0.8)$