

7.03 Quiz Review WS #2

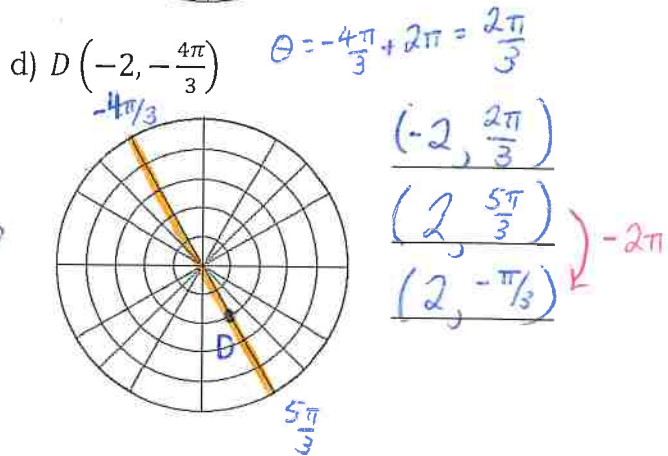
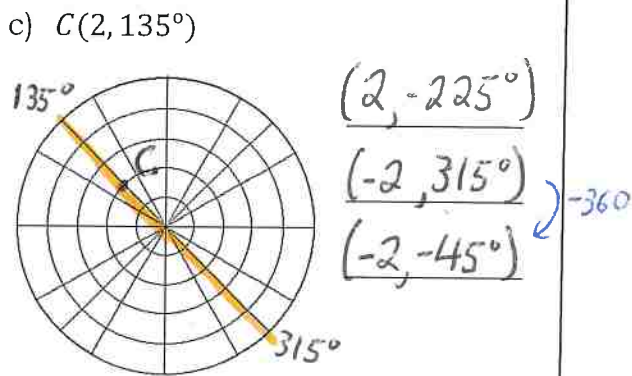
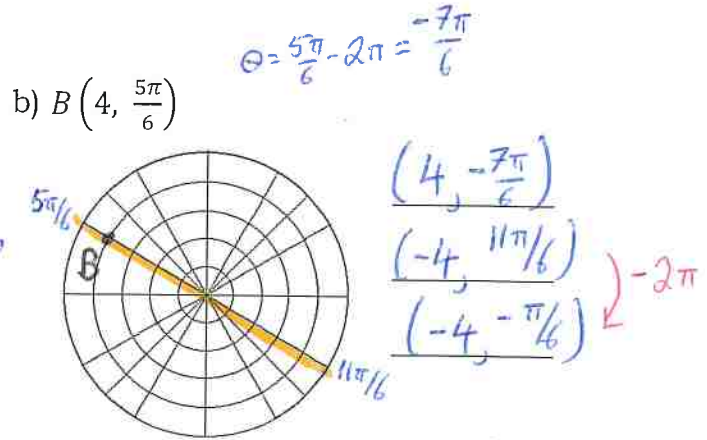
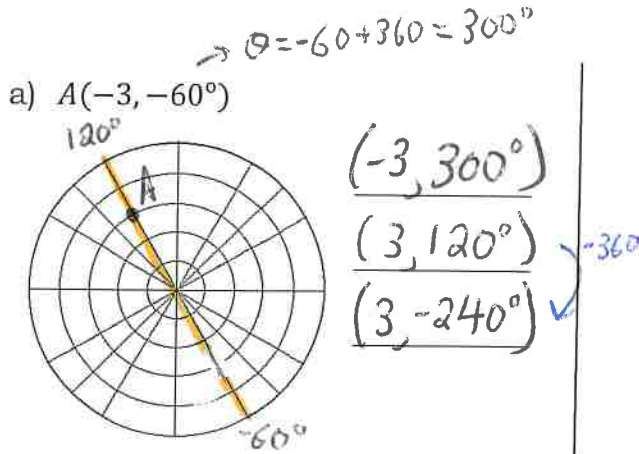
Date Key

Polar Coordinates, Equations, and Distance

1) Graph each point on the polar grid. Find three other pairs of polar coordinates that name the point

if $-360^\circ \leq \theta \leq 360^\circ$

if $-2\pi \leq \theta \leq 2\pi$



2) Given the polar distance formula between two points $A(r_1, \theta_1)$ and $B(r_2, \theta_2)$:

$AB = \sqrt{r_1^2 + r_2^2 - 2r_1r_2 \cos(\theta_2 - \theta_1)}$, find the distance between A and B.

$r_1 \theta_1 \quad r_2 \theta_2$

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a) $A(2, 120^\circ) \quad B(-4, 45^\circ)$

b) $A(3, \frac{5\pi}{3}) \quad B(-4, -\frac{\pi}{4})$

$= \sqrt{2^2 + 4^2 - 2(2)(-4) \cos(45 - 120)}$

$= \sqrt{3^2 + 4^2 - 2(3)(-4) \cos(-\frac{\pi}{4} - \frac{5\pi}{3})}$

$= \sqrt{20 + 16 \cos(-75)}$

$\sqrt{25 + 24 \cos(-\frac{23\pi}{12})}$

a) $AB = \underline{4.913 \text{ units}}$

b) $AB = \underline{6.941 \text{ units}}$

* degree mode

* Radian Mode

3) Find the rectangular coordinates for each point with the given polar coordinates.

Answer in exact form. $(r \cos \theta, r \sin \theta)$

$r_1 \theta_1$
 a) $(-2, -\frac{4\pi}{3})$
 $(-2 \cos(-\frac{4\pi}{3}), -2 \sin(-\frac{4\pi}{3}))$
 $(-2 \cdot (-\frac{1}{2}), -2 \cdot (+\frac{\sqrt{3}}{2}))$
 a) $(1, -\sqrt{3})$

b) $(5, \frac{5\pi}{4})$
 $(5 \cos(\frac{5\pi}{4}), 5 \sin(\frac{5\pi}{4}))$
 $(5(-\frac{\sqrt{2}}{2}), 5(-\frac{\sqrt{2}}{2}))$
 b) $(\frac{-5\sqrt{2}}{2}, \frac{-5\sqrt{2}}{2})$

c) $(3, \frac{11\pi}{6})$
 $3 \cos(\frac{11\pi}{6}), 3 \sin(\frac{11\pi}{6})$
 $3(\frac{\sqrt{3}}{2}), 3(-\frac{1}{2})$
 c) $(\frac{3\sqrt{3}}{2}, -\frac{3}{2})$

d) $(-5, -\frac{7\pi}{4})$
 $-5 \cos(-\frac{7\pi}{4}), -5 \sin(-\frac{7\pi}{4})$
 $-5(\frac{\sqrt{2}}{2}), -5(\frac{\sqrt{2}}{2})$
 d) $(\frac{-5\sqrt{2}}{2}, \frac{-5\sqrt{2}}{2})$

4) Find four unique polar coordinates for each point given as rectangular coordinates. Use $-360^\circ \leq \theta \leq 360^\circ$. Round to the nearest thousandths.

a) $(5, -3)$ $r = \sqrt{5^2 + 3^2} = \sqrt{34}$
 $\theta = \tan^{-1}(\frac{-3}{5}) \rightarrow -30.964 + 360$
 $\theta = 329.04^\circ$
Q4

b) $(-4, 7)$ $r = \sqrt{4^2 + 7^2} = \sqrt{65}$
 $\theta = \tan^{-1}(\frac{7}{-4}) = -60.255^\circ + 180 = 119.745^\circ$
Q2

a) $(\sqrt{34}, 329.04^\circ)$ $(\sqrt{34}, -30.964^\circ)$
 $(-\sqrt{34}, 149.036^\circ)$ $(-\sqrt{34}, -210.964^\circ)$
 (Arrows indicate -180° and -360° rotations)

b) $(\sqrt{65}, 119.745^\circ)$ $(\sqrt{65}, -240.255^\circ)$
 $(-\sqrt{65}, 299.745^\circ)$ $(-\sqrt{65}, -60.255^\circ)$
 (Arrows indicate -360° and $+180^\circ$ rotations)

Use $-2\pi \leq \theta \leq 2\pi$. Round to the nearest thousandths.

Q2 c) $(-2, 2\sqrt{3})$ $r = \sqrt{2^2 + (2\sqrt{3})^2} = 4$
 $\theta = \tan^{-1}(\frac{2\sqrt{3}}{-2}) = -1.047 + \pi = 2.0943$

d) $(-4, -3)$ $r = \sqrt{4^2 + 3^2} = 5$
Q3 $\theta = \tan^{-1}(\frac{-3}{-4}) = 0.644 + \pi = 3.785$

c) $(4, 2.094)$ $(4, -4.189)$
 $(-4, 5.236)$ $(-4, -1.048)$
 (Arrows indicate $+2\pi$ and -2π rotations)

d) $(5, 3.785)$ $(5, -2.498)$
 $(-5, 0.644)$ $(-5, -5.639)$
 (Arrows indicate -2π and $-\pi$ rotations)