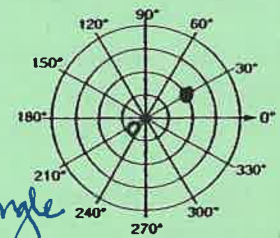
Chapter 8

NAME ______________ DATE ______________ PERIOD Key

Review for Test

Write the letter for the correct answer in the blank at the right of each problem.

1. Find the polar coordinates that do *not* describe the point in the given graph. 1. A

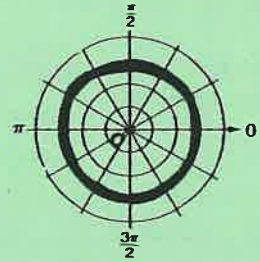


A. $(-2, 30°)$
B. $(-2, 210°)$
C. $(2, 30°)$
D. $(-2, -150°)$

r θ

negative r value means move away from given angle

2. Find the equation represented in the given graph. 2. B

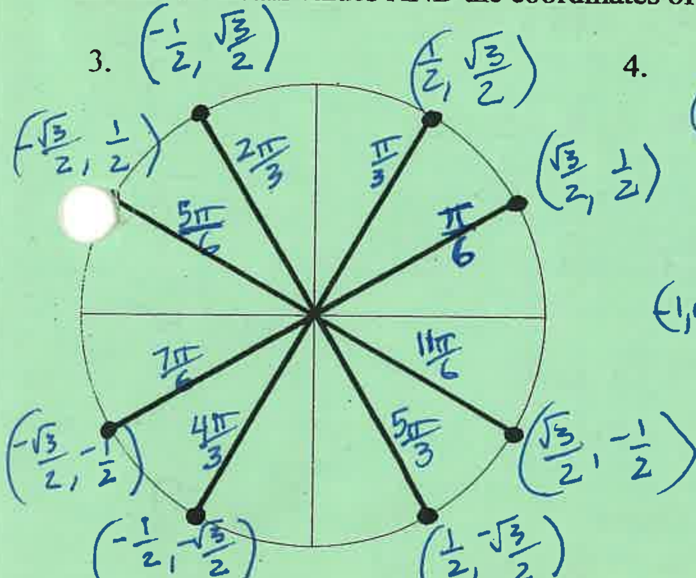


A. $\theta = 3$
B. $\boxed{r = 3}$
C. $\theta = 2\pi$
D. $r = 2$

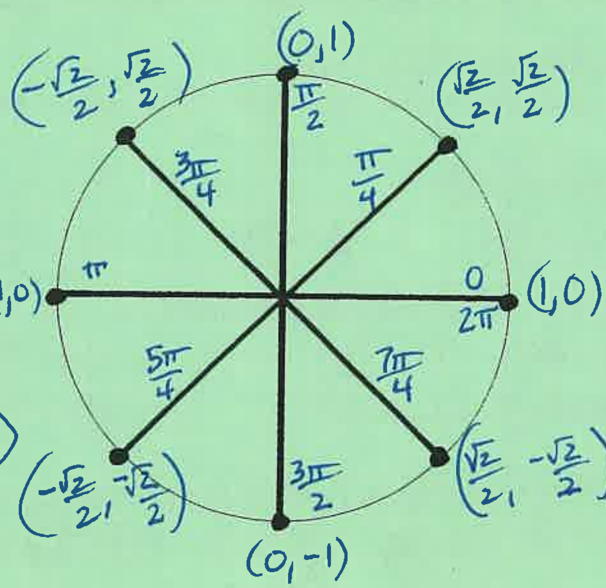
radius = 3 ... incorporates all possible angle values

Label the radian values AND the coordinates of the highlighted points for each unit circle.

3.



4.



5. a) $\sin\theta = \boxed{y}$

b) $\cos\theta = \boxed{x}$

c) $\tan\theta = \boxed{\frac{y}{x}}$

Check #6,7

-1 $\frac{5\pi}{3}$
$-\frac{1}{2}$ $\frac{5\pi}{6}$
0 $\frac{7\pi}{6}$
$\frac{\sqrt{3}}{2}$ $\frac{7\pi}{6}$
$\frac{\pi}{4}$ $\frac{11\pi}{6}$
$\frac{3\pi}{4}$

6. Evaluate using *exact* answers. Refer to the tables listed above.

a. $\sin\frac{2\pi}{3} = \boxed{\frac{\sqrt{3}}{2}}$ b. $\tan\frac{7\pi}{4} = \boxed{-1}$ c. $\sin\frac{7\pi}{6} = \boxed{-\frac{1}{2}}$ d. $\cos\frac{\pi}{2} = \boxed{0}$

7. Evaluate using *radians*. Be sure to find the proper number of solutions.
All solutions should be in the interval: $0 \le \theta < 2\pi$

a. two solutions $\arccos\left(\frac{-\sqrt{3}}{2}\right) =$ $\boxed{\frac{5\pi}{6} \text{ \& } \frac{7\pi}{6}}$

b. $\text{Arcsin}\left(\frac{-1}{2}\right) = \boxed{\frac{11\pi}{6}}$ one solution Quad I or IV

c. two solutions $\arcsin\left(\frac{\sqrt{2}}{2}\right) =$ $\boxed{\frac{\pi}{4} \text{ \& } \frac{3\pi}{4}}$

d. one solution Quad I or IV $\text{Arctan}\left(\frac{-2\sqrt{3}}{2}\right) = \boxed{\frac{5\pi}{3}}$ $\tan\theta = (-\sqrt{3})$

principal values (uppercase notation)

Review for Test

$$\boxed{\begin{aligned} i^0 &= 1 \\ i^1 &= i \\ i^2 &= -1 \\ i^3 &= -i \end{aligned}}$$ pattern of 4 repeating values

$i^4 = 1$
$i^5 = i$
$i^6 = -1$
$i^7 = -i$

8. $(\sqrt{3}, 1)$ given → find (r, θ) $= \boxed{\left(2, \frac{\pi}{6}\right)}$ B

x y — Quad I

$r = \sqrt{x^2 + y^2}$ $\quad r = \sqrt{\sqrt{3}^2 + 1^2} \quad r = \sqrt{4} \quad \boxed{r = 2}$

new book → $\tan\theta = \frac{y}{x}$

$\theta = \text{Arctan } \frac{y}{x}$ $\quad \theta = \text{Arctan } \frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$ $\quad \boxed{\theta = \frac{\pi}{6}}$

Quad I.
positive (given info in Quad I)

9. $(3, 180°)$ given → find (x, y) $= \boxed{(-3, 0)}$ A

r θ ($180° = \pi$)

$x = r\cos\theta$ → $x = 3\cos 180°$ $\quad x = 3(-1) = \boxed{-3}$

$y = r\sin\theta$ → $y = 3\sin 180°$ $\quad y = 3(0) = \boxed{0}$

10. $x = 3$ ← substitute polar value

$r\cos\theta = 3$ then solve for r

$r = \frac{3}{\cos\theta}$

$\boxed{r = 3\sec\theta}$ or D ⇒ $r\cos\theta = 3$

(11.) $r = 3$

substitute rectangular equation

$\sqrt{x^2+y^2} = 3$

$\boxed{x^2+y^2=9}$ C

(12) $(3+i)-2(i^2-5i)$

$3+i-2(-1-5i)$

$3+i+2+10i$

$= \boxed{5+11i}$ A

(13) $(5-3i)(2+4i)$

$= 10-6i+20i-12i^2$ $\quad i^2 = -1$

$= 10+14i+12$

$= \boxed{22+14i}$ B

$i^2=-1$

(14) $\dfrac{5+2i}{3-4i}$ use conjugate $\dfrac{(5+2i)(3+4i)}{(3-4i)(3+4i)} = \dfrac{15+20i+6i+8i^2}{9-12i+12i-16i^2}$

$= \dfrac{15+26i-8}{9+16}$

$= \dfrac{7+26i}{25}$

$= \boxed{\dfrac{7}{25}+\dfrac{26}{25}i}$ D

given info
in Quad II

polar form on formula sheet

(15) $-2\sqrt{2} + 2\sqrt{2}i \rightarrow r(\cos\theta + i\sin\theta)$

$a + bi$ polar form

so solve for r and θ

$a = -2\sqrt{2}$
$b = 2\sqrt{2}$

$r = \sqrt{a^2 + b^2}$

$r = \sqrt{(-2\sqrt{2})^2 + (2\sqrt{2})^2}$

$r = \sqrt{4 \cdot 2 + 4 \cdot 2}$

$r = \sqrt{8+8}$

$r = \sqrt{16}$

$r = 4$

$\tan\theta = \frac{b}{a}$

$\tan\theta = \frac{2\sqrt{2}}{-2\sqrt{2}}$

$\theta = \text{Arctan}(-1)$

$\theta = \frac{3\pi}{4}$ Quad II

so... $\boxed{4\left(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}\right)}$ C

(16) $10\left(\cos\frac{7\pi}{6} + i\sin\frac{7\pi}{6}\right)$ given

* simplify as is using unit circle

$= 10\left(-\frac{\sqrt{3}}{2} + i\left(-\frac{1}{2}\right)\right)$

$= \boxed{-5\sqrt{3} - 5i}$ D

(17.) modulus $= r_1 \cdot r_2$

$= 8(0.5)$

$= 4$

amplitude $= \theta_1 + \theta_2$

$= \frac{2\pi}{3} + \frac{\pi}{3}$

$= \frac{3\pi}{3}$

$= \pi$

substitute into polar form & simplify

$= 4(\cos\pi + i\sin\pi)$

$= 4(-1 + 0i)$

$= \boxed{-4}$ D

(18.) modulus $= \frac{r_1}{r_2}$

$= \frac{8}{0.5}$

$= 16$

amplitude $= \theta_1 - \theta_2$

$= \frac{2\pi}{3} - \frac{\pi}{3}$

$= \frac{\pi}{3}$

substitute into polar form

$= 16\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$

$= 16\left(\frac{1}{2} + \frac{\sqrt{3}}{2}i\right)$

$= \boxed{8 + 8\sqrt{3}i}$ A