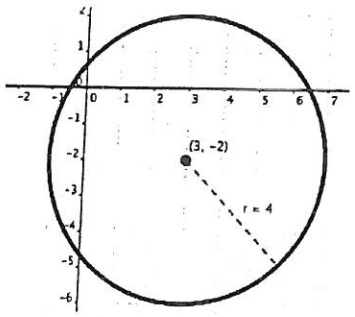
Name: Answer key Per: 3/7 Date: 12/14/15

Serafino • Precalculus S1

3D Circles in Radians

Notes / Classwork



EQUATION OF A CIRLCE: $(x-h)^2+(y-k)^2=r^2$ where (h, k) is center

$(x-3)^2+(y+2)^2=16$

1. **Find the requested information. Sketch if necessary.**

a. Center: (5, –2) Radius: 6

Equation: $(x-5)^2+(y+2)^2=36$

Domain: $x \in [-1, 11]$

Range: $y \in [-8, 4]$

b. Center (–4, 0) Diameter 10 $r=5$

Equation: $(x+4)^2+y^2=25$

Domain: $x \in [-9, 1]$

Range: $y \in [-5, 5]$

c. Center (0, 3): Radius: √14

Equation: $x^2+(y-3)^2=14$

Domain: $x \in [-\sqrt{14}, \sqrt{14}]$

Range: $y \in [3-\sqrt{14}, 3+\sqrt{14}]$

d. Center at the origin, Diameter: ~~6√2~~ $6\sqrt{2}$ $r=3\sqrt{2}$

Equation: $x^2+y^2=18$

Domain: $x \in [-3\sqrt{2}, 3\sqrt{2}]$

Range: $y \in [-3\sqrt{2}, 3\sqrt{2}]$

2. **Write the equations of the circle:**

a. Center (3, 7) Point on circle: (6, 11) $r=\sqrt{4^2+3^2}=5$

$(x-3)^2+(y-7)^2=25$

b. Center is the origin, Point: (–2, –6) $\sqrt{6^2+2^2}=\sqrt{36+4}=\sqrt{40}$

$x^2+y^2=40$

c. Center (–2, 5), Point on circle: (–3, 7) $r=\sqrt{2^2+1^2}=\sqrt{5}$

$(x+2)^2+(y-5)^2=5$

3. **Determine if a point is on the circle:** Think about the relationship between x, y and the radius. $x^2+y^2=r^2$

a. Are the following points on the Unit Circle? If no, state if it is in or outside.

$\left(\frac{\sqrt{5}}{3},\frac{\sqrt{2}}{3}\right)$ No, inside $\left(\frac{5}{9}\right)+\left(\frac{2}{9}\right)\stackrel{?}{=}1$ $\frac{7}{9}<1$

$\left(\frac{-\sqrt{7}}{5},\frac{\sqrt{32}}{5}\right)$ No, outside $\frac{7}{25}+\frac{32}{25}\stackrel{?}{=}1$

$\left(\frac{-\sqrt{2}}{2},\frac{-\sqrt{2}}{2}\right)$ yes, on $\frac{2}{4}+\frac{2}{4}=1$

b. A circle has the equation: $(x-2)^2+(y-3)^2=8$. Are the following points in, on, or outside the circle?

(−1, 3) $(-1-2)^2+(3-3)^2\stackrel{?}{=}8$ $(3)^2+0^2$ $9>8$ outside

(4, 5) $(4-2)^2+(5-3)^2=8$ 2^2+2^2 $4+4=8$ on

(0, 1) $(-2)^2+(1-3)^2=8$ $2^2+2^2=8$ on

(2, 5) $0^2+2^2=8$ inside

4. Name the coordinates of the point (x, y) intersected by the terminal side of an angle, Θ, in standard position. If the angle is special, give an exact value as well as an approximation. $(x,y)=(r\cos\theta, r\sin\theta)$

a. r = 3, Θ = π/3 $=\left(\frac{3}{2},\frac{3\sqrt{3}}{2}\right)$ $\approx(1.5, 2.5981)$

c. r = 5 Θ = 5π/4 $=\left(\frac{-5\sqrt{2}}{2},\frac{-5\sqrt{2}}{2}\right)$ $\approx(-3.536,-3.536)$

e. r = 6 Θ = 5π/3 $\left(6\cdot\frac{1}{2}, 6\cdot\frac{-\sqrt{3}}{2}\right)$ $=(3,-3\sqrt{3})$ $\approx(3,-5.1962)$

b. r = 4 Θ = 7π/30 (2.9726, 2.6765)

d. r = 20 Θ = 199π/180 (−18.9104, −6.5114)

f. r = 10 Θ = 5π/9 (−1.7365, 9.8481)

5. Approximate a solution for Θ, where $0\le\theta<2\pi$ for a circle with a center at the origin:

a. r = 3, Point (2.8978, 0.7765) $3\cos\theta=2.8978$ $\cos\theta=.9659$ $\theta\approx0.2618$

b. r = 6 Point $\frac{(3,3\sqrt{3})}{6\ \ 6}$ $\left(\frac{1}{2},\frac{\sqrt{3}}{2}\right)$ $\theta=\frac{\pi}{3}\approx1.047$

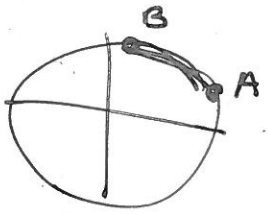
c. r = √2 Point: $\frac{(1,1)}{\sqrt{2}\ \sqrt{2}}$ $\theta=\frac{\pi}{4}\approx0.7854$

6. Find the length of the arc between the points on a circle with a center at the origin:

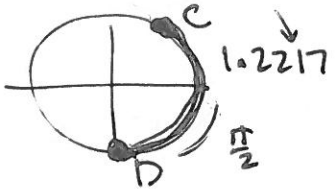
a. r = 5, A (4.5315, 2.1131) B (0.4358, 4.981)

$\theta=.43635$ $\theta=1.4835$

$\overset{\frown}{AB}$ $\theta=1.04717$ $S=5.23587$ units



b. r = 7, C (2.3941, 6.5778) D (0, −7)



$\theta=1.2217+\frac{\pi}{2}=2.7925$ $S=19.5477$ units