Lesson 7

READY, SET, GO! Name Period Date

• Answers may vary - a possibility is ...
• One strategy: Find the radius. Choose an x that is less than the radius. Sub into find

READY

Topic: Finding the coordinates of points on a circle

Given the equation of a circle centered at (0,0), find one point in each quadrant that lies on the given circle.

1. $x^2 + y^2 = 25$ quadrant I $(3, 4)$ quadrant II $(-3, 4)$
$r = \sqrt{25} = 5$
∴ Choose $0 < x < 5$ quadrant III $(-3, -4)$ quadrant IV $(3, -4)$
ex. $x = 3$
$3^2 + y^2 = 25$ $y^2 = 16$ $y = 4$

2. $x^2 + y^2 = 4$ quadrant I $(1, \sqrt{3})$ quadrant II $(-1, \sqrt{3})$
$r = \sqrt{4} = 2$
∴ Choose $0 < x < 2$ ex. $x = 1$ quadrant III $(-1, -\sqrt{3})$ quadrant IV $(1, -\sqrt{3})$
$1^2 + y^2 = 4$ $y^2 = 3$ $y = \sqrt{3}$

3. $x^2 + y^2 = 36$ quadrant I $(2, 4\sqrt{2})$ quadrant II $(-2, 4\sqrt{2})$
$r = \sqrt{36} = 6$
∴ Choose $0 < x < 6$ ex. $x = 2$ quadrant III $(-2, -4\sqrt{2})$ quadrant IV $(2, -4\sqrt{2})$
$2^2 + y^2 = 36$ $y^2 = 32$ $y = \sqrt{32} = 4\sqrt{2}$

4. $x^2 + y^2 = 1$ quadrant I $(\frac{1}{2}, \frac{\sqrt{3}}{2})$ quadrant II $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$
$r = \sqrt{1} = 1$
∴ Choose $0 < x < 1$ ex. $x = \frac{1}{2}$ quadrant III $(-\frac{1}{2}, -\frac{\sqrt{3}}{2})$ quadrant IV $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$
$(\frac{1}{2})^2 + y^2 = 1$ $y^2 = \frac{3}{4}$ $y = \frac{\sqrt{3}}{2}$

5. $x^2 + y^2 = 9$ quadrant I $(2, \sqrt{5})$ quadrant II $(-2, \sqrt{5})$
$r = \sqrt{9} = 3$
∴ Choose $0 < x < 3$ ex. $x = 2$ quadrant III $(-2, -\sqrt{5})$ quadrant IV $(2, -\sqrt{5})$
$2^2 + y^2 = 9$ $y^2 = 5$ $y = \sqrt{5}$

SET

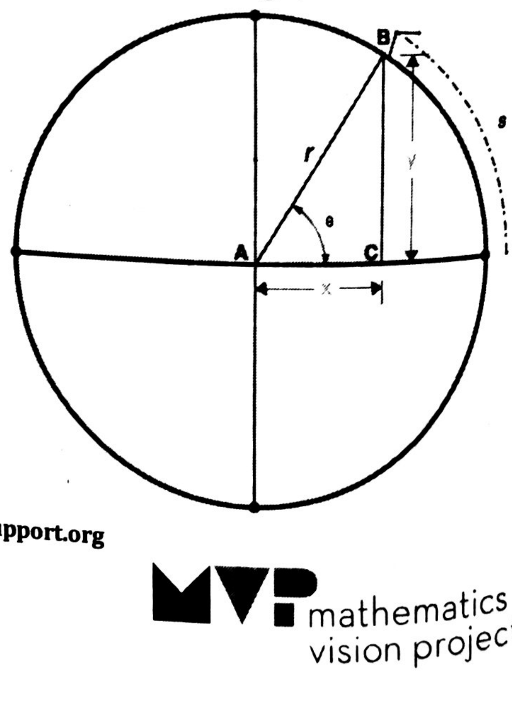
Topic: Locating points in terms of rectangular coordinates, arc length, reference angle, and radius

In the diagram triangle ABC is a right triangle.

Point B lies on the circle and is described by the rectangular coordinates (x, y).

s is the length of the arc subtended by angle θ.

r is the radius of circle A.



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giver
x
d y.

Use the given information to answer the following questions.

6. Point B has coordinates $(5, 12)$.

a. Find r. 13 $5^2+12^2=r^2$ $169=r^2$

b. Find θ to the nearest tenth of a degree.
$\sin\theta = 12/13$ $\theta = \sin^{-1}(\frac{12}{13})$ $\theta = 67.4°$

c. Find s by using the formula $s = \frac{\theta}{360°}(d\pi)$ $2\pi r$
$s = \frac{67.4}{360} \cdot 2\pi(13) = 15.3$

d. Describe point B using the coordinates (r, θ).
$(13, 67.4°)$

e. Describe point B using the radius and arc length (r, s). $(13, 15.3)$

7. Point B has coordinates $(33, 56)$.

a. Find r. 65 $33^2+56^2=r^2$ $4225=r^2$

b. Find θ to the nearest tenth of a degree.
$\sin\theta = \frac{56}{65}$ $\theta = \sin^{-1}(\frac{56}{65})$ $\theta = 59.5°$

c. Find s by using the formula $s = \frac{\theta}{360°}(d\pi)$ $2\pi r$
$s = \frac{59.5}{360} \cdot 2\pi(65) = 67.5$

d. Describe point B using the coordinates (r, θ).
$(65, 59.5°)$

e. Describe point B using the radius and arc length (r, s). $(65, 67.5)$

8. B is described by (r, θ) where $\theta \approx 58.11°$ and $r = 53$.

$\sin 58.11° = \frac{y}{53}$
$53 \sin 58.11° = y$
$45 = y$

a. Find (x, y) to the nearest whole number.
$x^2+45^2=53^2$ $x^2=784$ $x=28$ $(28, 45)$

b. Find s by using the formula $s = \frac{\theta}{360°}(d\pi)$ $2\pi r$
$s = \frac{58.11}{360} \cdot 2\pi(53) = 53.75$

c. Describe point B using the radius and arc length (r, s). $(53, 53.75)$

9. B is described by (r, θ) where $\theta \approx 25.01°$ and $r = 85$.

$\sin 25.01° = \frac{y}{85}$
$85 \sin 25.01° = y$
$36 = y$

a. Find (x, y) to the nearest whole number.
$x^2+36^2=85^2$ $x^2=5929$ $x=77$ $(77, 36)$

b. Find s by using the formula $s = \frac{\theta}{360°}(d\pi)$ $2\pi r$
$s = \frac{25.01}{360} \cdot 2\pi(85) = 37.10$

c. Describe point B using the radius and arc length (r, s). $(85, 37.10)$

10. B is described by (r, s) where $s \approx 46$ and $r = 37$.

$\sin 71.2 = \frac{y}{37}$
$37 \sin 71.2 = y$
$35 = y$

a. Find (x, y) to the nearest whole number.
$x^2+35^2=37^2$ $x^2=144$ $x=12$ $(12, 35)$

*Find θ 1st

b. Find θ by using the formula $s = \frac{\theta}{360°}(d\pi)$ $2\pi r$
$46 = \frac{\theta}{360} \cdot 2\pi(37)$ $\theta = \frac{(360 \cdot 46)}{(2\pi \cdot 37)} = 71.2°$

c. Describe point B using (r, θ)
$(37, 71.2°)$

11. B is described by (r, s) where $s \approx 62.26$ and $r = 73$.

$\sin 48.9° = \frac{y}{73}$
$73 \sin 48.9° = y$
$55 = y$

a. Find (x, y) to the nearest whole number.
$x^2+55^2=73^2$ $x^2=2304$ $x=48$ $(48, 55)$

b. Find θ by using the formula $s = \frac{\theta}{360°}(2\pi r)$.
$62.26 = \frac{\theta}{360} \cdot 2\pi(73)$ $\theta = \frac{(360 \cdot 62.26)}{(2\pi \cdot 73)} = 48.9°$

c. Describe point B using (r, θ)
$(73, 48.9°)$

GO

Topic: Making sense of radian measure

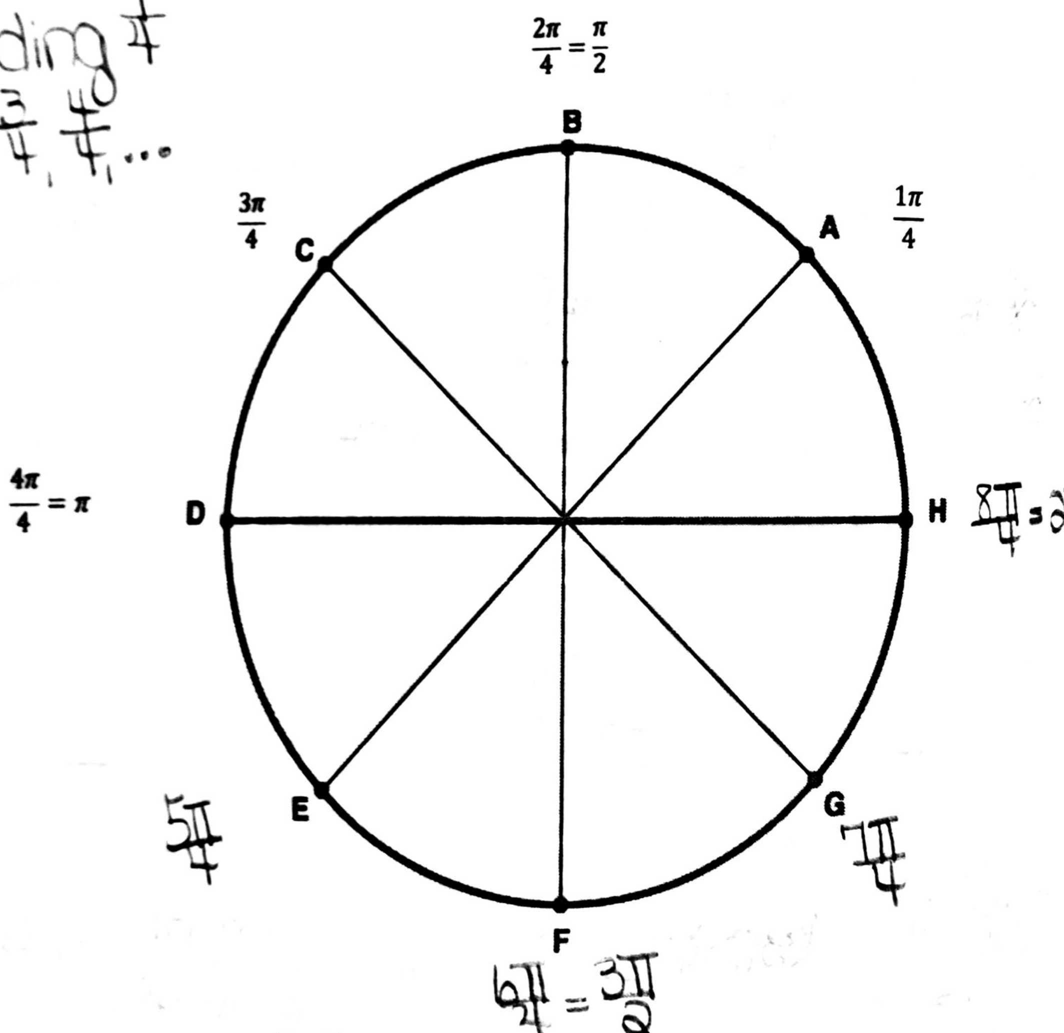
Label each point on the circle with the measure of the angle of rotation. Angle measures should be in radians. (Recall a full rotation around the circle would be 2π radians.)

Example: The circle has been divided equally into 8 parts. Each part is equal to $\frac{2\pi}{8}$ *or* $\frac{\pi}{4}$ radians. Indicate how many parts of $\frac{\pi}{4}$ radians there are at each position around the circle. ($\frac{1}{4}\pi$)

Finish the example by writing the angle measures for points E, F, G, and H.

Keep adding $\frac{1}{4}$

$\therefore \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \ldots$



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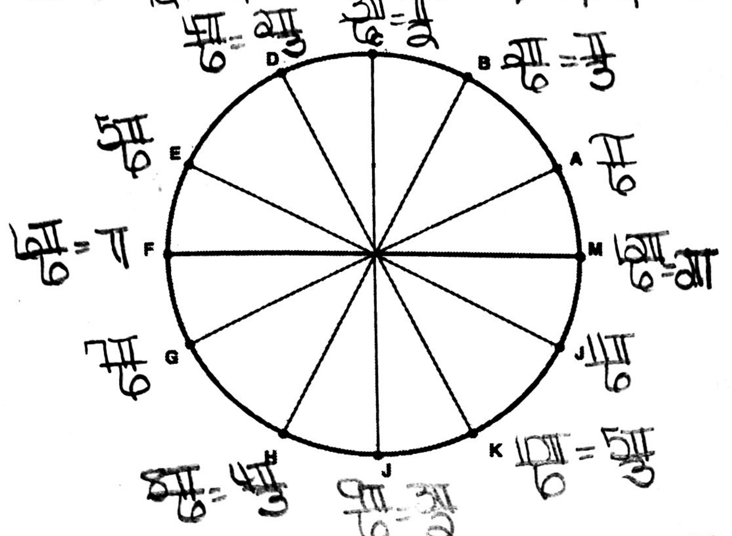
Label the figures below using a similar approach as the example.

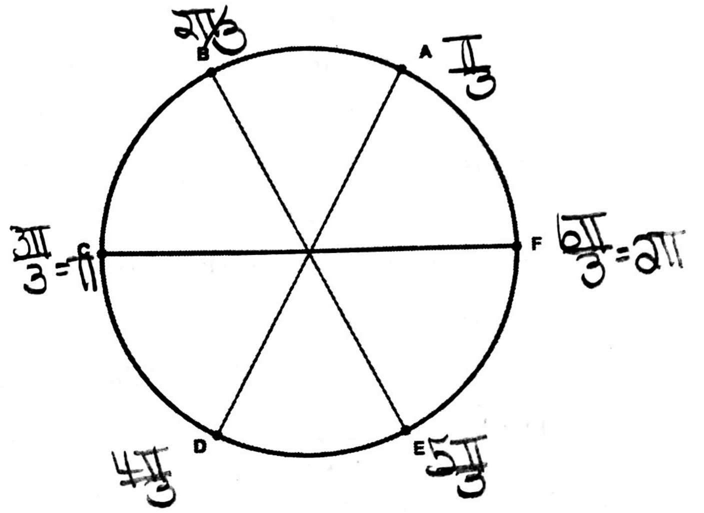
12 parts $\therefore \frac{2\pi}{12} = \frac{\pi}{6}$ → Keep adding $\frac{1}{6}$ $\therefore$ 1/6, 2/6, 3/6, 4/6, ...

12.

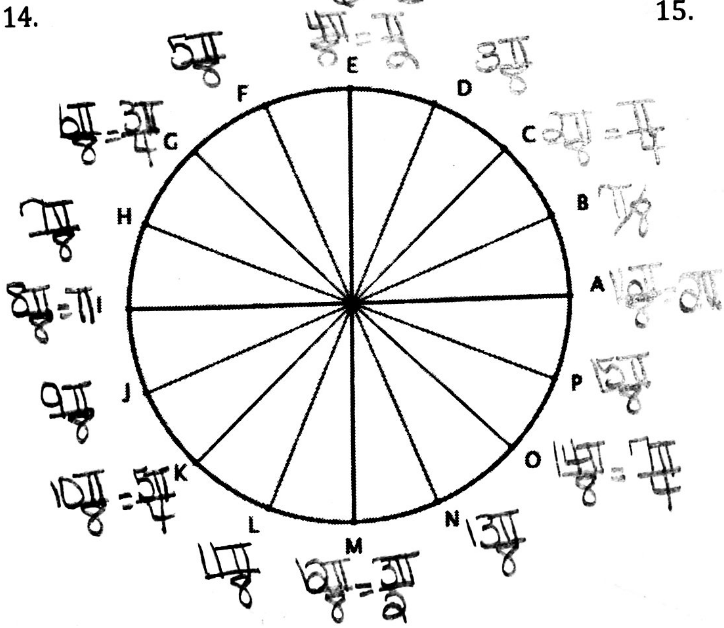


6 parts $\therefore \frac{2\pi}{6} = \frac{\pi}{3}$ → Keep adding $\frac{1}{3}$ $\therefore$ 1/3, 2/3, 3/3, 4/3, ...

13.

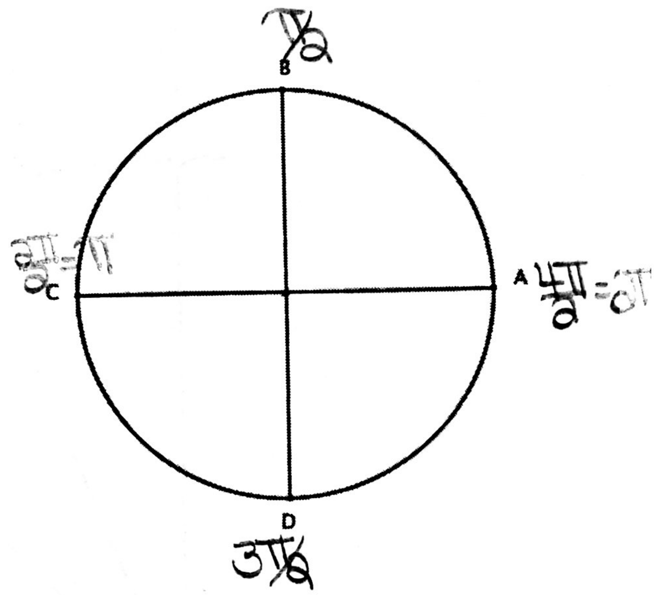


14.



16 parts $\therefore \frac{2\pi}{16} = \frac{\pi}{8}$ → Keep adding 1/8 $\therefore$ 1/8, 2/8, 3/8, 4/8, ...

15.



4 parts $\therefore \frac{2\pi}{4} = \frac{\pi}{2}$ → Keep adding $\frac{1}{2}$ 1/2, 2/2, 3/2, ...

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