Pre-Calculus Review: Angles, Arcs and Sectors
Grombacher/Katterjohn/Rodell

Name: _____
Period: _____ Date: _____

nd the degree and radian measure of the angle in standard position formed by rotating the terminal side by the given amount. Leave radian measures in terms of π.

1. $\frac{2}{3}$ of a circle $\frac{2}{3}(360)$

Radians $\frac{4}{3}\pi$ $240°\left(\frac{\pi}{180°}\right)$

Degrees $240°$

2. $\frac{7}{6}$ of a circle $\frac{7}{6}(360)$

Radians $\frac{7}{3}\pi$ $420°\left(\frac{\pi}{180°}\right)$

Degrees $420°$

Convert each angle to decimal degree form. Round to three decimal places. You must show all work.

3. $85°18'30'' =$ $85.308°$
$\frac{18}{60}$ $\frac{30}{3600}$

4. $54°45' =$ $54.750°$
$\frac{45}{60}$

5. $-408°16'20'' =$ $-408.272°$
$\frac{16}{60}$ $\frac{20}{3600}$
DON'T PUT (−) IN CALC! IT WILL SUGG. ANSWER!

6. $2°2'10'' =$ $2.036°$
$\frac{2}{60}$ $\frac{10}{3600}$

Convert each angle measure to D°M'S" form. You must show work.

7. $-345.12° =$ $-345°7'12''$
$.12(60) = 7.2$
$.2(60) = 12$

8. $3.794° =$ $3°47'38''$
$.794(60) = 47.64$
$.64(60) = 38.4$

9. $3.58° =$ $3°34'48''$
$.58(60) = 34.8$
$.8(60) = 48$

Find the complement of the given angle. Leave answer in terms of π.

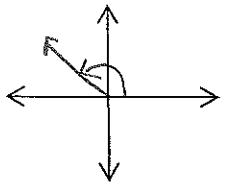
10. $\frac{\pi}{12}$ $\frac{5\pi}{12}$

Complement adds to $90°$ or $\frac{\pi}{2}$

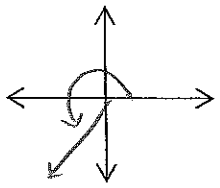
Draw the given angles. Show direction and label the terminal side.

$7 \cdot \frac{180}{\pi} = 401^\circ$ or 7 radians

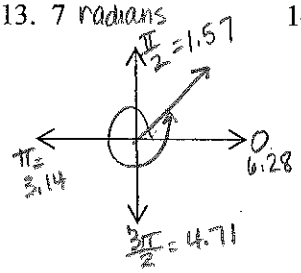
11. 123°



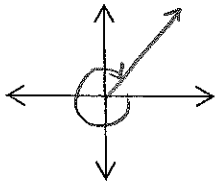
12. $\frac{17\pi}{12} = 1\frac{5}{12}\pi$



13. 7 radians

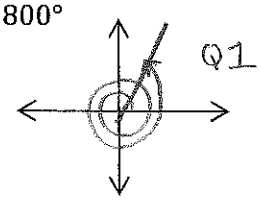


14 −310°

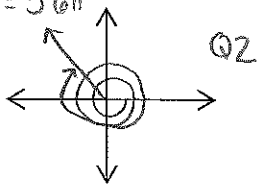


Name the quadrant in which or the axis on which the terminal siade of the give angle would be located. Draw the angle labeling the direction.

15. 800°



16. $-\frac{31\pi}{6} = -5\frac{1}{6}\pi$



Find the following. Show all your work.

17. A circle has a radius of 4 inches. Find the length of the arc intercepted by an angle of 240°. $\frac{16}{3}\pi$ in or 16.755 in

4

$S = r\theta$

$S = 4(240)\frac{\pi}{180}$

r θ

18. A sprinkler on a golf course is set to spray water over a distance of 70 feet and rotates through an angle of 120°. Find the area of the fairway watered by the sprinkler. Round to the nearest square foot.

$A = \frac{1}{2}r^2\theta$

$\frac{1}{2}(70^2)(120)\frac{\pi}{180}$

18. 5131 ft^2

19. Find the degree measure of the angle θ of a sector in a circle whose diameter is 150 cm and an arc length of 360 cm.

$r = 75$

$S = r\theta$

$360 = 75\theta$

$4.8 = \theta$

$4.8\left(\frac{180}{\pi}\right)$

19. 275.020°

20. The second hand of a clock is 5 cm long. How far does it travel in 2 minutes and 15 seconds? 70.686 cm

$S = r\theta$

$= 5\left(\frac{9\pi}{2}\right)$

$4\pi + \frac{\pi}{2} = \frac{9\pi}{2} = \theta$

← Linear Velocity - need to take out radius to get AV

21. Hans rides a vehicle with large tires of radius 16 inches at 24 miles per hour.

a) Find the angular velocity of a tire in radians per minute.

$\frac{24 mi}{hr} \cdot \frac{1 hr}{60 min} \cdot \frac{1 rad}{16 in} \cdot \frac{12 in}{1 ft} \cdot \frac{5280 ft}{mi} =$ 1584 rad/min

$\frac{rad}{min}$

b) Haw many revolutions per minute does the tire make? 252.101

$\frac{1584 rad}{min} \left| \frac{1 rev}{2\pi rad} \right.$ $\frac{rev}{min}$

22. Determine the angular velocity of the tip of the second hand of a clock in radians per second.

$\frac{1 rev}{60 sec} \left| \frac{2\pi rad}{1 rev} \right.$ $\frac{rad}{sec}$

22. .105 rad/sec

23. A Ferris wheel with a diameter of 250 feet makes one rotation every 45 seconds. Determine the linear velocity in feet per minute of a car on the rim of the wheel. ? makes no grammatical sense -whoops!e!

$\frac{1 rev}{45 sec} \left| \frac{60 sec}{1 min} \right| \frac{125 ft}{1 rad} \left| \frac{2\pi rad}{1 rev} \right.$ $\frac{ft}{min}$

23. 1047.198 ft/min

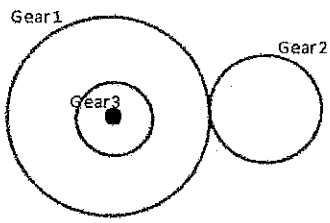
24. A toy racing car is traveling around a circular racing track that is 3.2 m in diamenter. Its linear velocity is 0.5 m/sec, What is its angular velocity in rev/ min?

$\frac{.5 m}{sec} \left| \frac{60 sec}{1 min} \right| \frac{1 rad}{1.6 m} \left| \frac{1 rev}{2\pi rad} \right.$ $\frac{rev}{min}$

24. 2.984 rev/min

25. In the diagram to the right Gear 1 and Gear 3 share the same axle. Gear 1 is driven by Gear 2. Which two gears have the same angular velocity and which two have the same linear velocity?

Same Angular Velocity 1 & 3 Same linear velocity 1 & 2



ANSWERS

1. radians; $\frac{4\pi}{3}$ degrees: 240° **2.** radians: $\frac{7\pi}{3}$ degrees: 420° **3.** 85.308° **4.** 54.750° **5.** -408.272°

6. 2.036° **7.** -345° 7' 12" **8.** 3° 47' 38" **9.** 3° 34' 48" **10.** $\frac{5\pi}{12}$ **11.** QII **12.** QIII

13. QI **14.** QI **15.** QI **16.** QII **17.** 16.755 **18.** 5131 ft^2 **19.** 275.020° **20.** 70.686 cm

21. 1584 *rad/min* **22.** .105 *rad/min* **23.** 1047.198 *ft/min* **24.** 2.984 *rev/min* **25.** Same AV-gear 1 and 3, Same LV- Gear 1 and 2

b, 252.101 rad