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UNIT 8 Intro to Trigonometry

REVIEW

NAME:_____

DATE:_____

Formulas:

$s = \theta r$ $\quad s = \frac{\theta}{360^\circ} 2\pi r$ $\quad v = rw$ (Puke) $\quad w = \frac{\theta}{t}$ (GAG)

Convert to radians.	Convert to degrees.	Convert to degrees, minutes, seconds.
1. -295° $\quad -\frac{295}{39} \cdot \frac{\pi \text{ RAD}}{180^\circ} = \frac{-59\pi}{36}$	2. $\frac{19\pi}{6} \text{ RAD} \cdot \frac{180^\circ}{\pi \text{ RAD}} = 570^\circ$	3. 128.485° $\quad = 128^\circ + .485(60')$ $= 128^\circ 29.1'$ $= 128^\circ 29' 6''$ $(.1 \cdot 60)$
Convert to decimal degrees.	**Find all coterminal angles.**	**Find a coterminal angle between 0π and 2π.**
4. $48^\circ 32' 12''$ $= 48^\circ + \frac{32^\circ}{60} + \frac{12^\circ}{3600}$ $= 48.537^\circ$	5. $65^\circ + 360^\circ k$ where k is an integer	6. $\frac{11\pi}{4}$ $\quad (2\pi)$ Coterminal: $\frac{11\pi}{4} - \frac{8\pi}{4} = \frac{3\pi}{4}$
State the quadrant in which the terminal side lies.	**Find the measure of the angle.**	**Draw the angle.**
7. $-\frac{4\pi}{3}$ $\quad -\frac{4.5\pi}{3}$ $\quad -\frac{3\pi}{3}$ II	8. $\frac{4\pi}{9}$ $\quad \frac{5\pi}{9}$ $\quad \frac{9\pi}{9}$	9. 645° $\quad 720^\circ$ $\quad 630^\circ$

10. A turntable with ~~12 inch diameter~~ ($r = 6$ in) rotates at 77 revolutions per minute.

a. What is its angular velocity in radians per second?

$\frac{77 \text{ Rev}}{1 \text{ min}} \cdot \frac{2\pi \text{ RAD}}{1 \text{ Rev}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = \frac{154\pi \text{ RAD}}{60 \text{ sec}} \approx 8.063 \text{ RAD/sec}$

b. What is the linear velocity of a point on the edge of the turntable in inches per second?

$\frac{77 \text{ Rev}}{1 \text{ min}} \cdot \frac{2\pi(6 \text{ in})}{1 \text{ Rev}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = \frac{924\pi \text{ in}}{60 \text{ sec}} \approx 48.381 \text{ in/sec}$

c. What is the linear velocity of a point on the edge of the turntable in miles per hour?

$\frac{77 \text{ Rev}}{1 \text{ min}} \cdot \frac{2\pi(6 \text{ in})}{1 \text{ Rev}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} = \frac{55{,}440\pi \text{ mi}}{63{,}360 \text{ hr}} \approx 2.749 \text{ mi/hr}$

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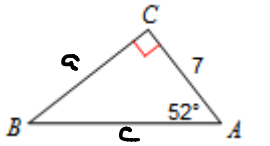
Solve the triangle completely.

11.



$m\angle B + 52^\circ = 90^\circ$

$m\angle B = 38^\circ$

$\cos 52^\circ = \frac{7}{c}$

$c \cdot \cos 52^\circ = 7$

$c = \frac{7}{\cos 52^\circ}$

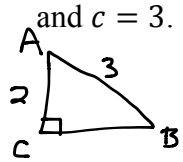
$c \approx 11.370$

$\tan 52^\circ = \frac{a}{7}$

$7 \tan 52^\circ = a$

$8.960 \approx a$

12. Given ΔABC where $\angle C$ is a right angle, $b = 2$, and $c = 3$.



$a^2 + b^2 = c^2$

$a^2 + (2)^2 = (3)^2$

$a^2 + 4 = 9$

$a^2 = 5$

$a^2 = \pm\sqrt{5}$

$a = \sqrt{5}$

$\sin B = \frac{2}{3}$

$B = \sin^{-1}\left(\frac{2}{3}\right)$

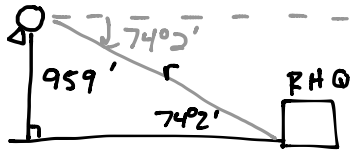
$B \approx 41.810^\circ$

$\cos A = \frac{2}{3}$

$A = \cos^{-1}\left(\frac{2}{3}\right)$

$A \approx 48.190^\circ$

13. From a balloon 959 feet high, the angle of depression to the ranger headquarter is 74°2′. How far is the headquarters from the balloon?



$\sin 74^\circ 2' = \frac{959}{r}$

$r \cdot \sin 74^\circ 2' = 959$

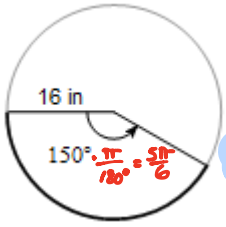
$r = \frac{959}{\sin 74^\circ 2'}$

$r \approx 997.481$ feet

The headquarter is 997.481 feet from the balloon.

APPLICATION

14. Find the length of the arc.



RADIANS

$S = \theta r$

$S = \frac{5\pi}{6}(16\text{ in})$

$S = \frac{40\pi}{3}$ in

15. How many radians is 2.5 revolutions?

$2.5\text{ Rev} \cdot \frac{2\pi\text{ RAD}}{1\text{ Rev}} = 5\pi$

16. The radius of a car wheel is 14 inches. How many revolutions per minute is the wheel making the when the car is travelling at 30 mph?

$\frac{30\text{ mi}}{1\text{ hr}} \cdot \frac{5280\text{ ft}}{1\text{ mi}} \cdot \frac{12\text{ in}}{1\text{ ft}} \cdot \frac{1\text{ Rev}}{2\pi(14\text{ in})} \cdot \frac{1\text{ hr}}{60\text{ min}} = \frac{1{,}900{,}800\text{ Rev}}{1680\pi\text{ min}} \approx 360.145\text{ Rev/min}$

(Circumference)

17. Two wheels are rotating in such a way that the rotation of the smaller wheel causes the larger wheel to rotate. The radius of the smaller wheel is 3.5 cm and the radius of the larger wheel is 19.5 cm. Through how many degrees will the larger wheel rotate if the smaller one rotates 134° ?

These two wheels have the same Linear Distance.

Small wheel

$S = \theta r$

$S = \frac{67\pi}{90}(3.5)$

$S \approx \frac{234.5\pi}{90}$

$134^\circ \cdot \frac{\pi}{180^\circ} = \frac{67\pi}{90}$

Large Wheel

$S = \theta r$

$\frac{234.5\pi}{90} = \theta(19.5)$

$\frac{234.5\pi}{1755} = \theta$

$\frac{234.5\pi}{1755} \cdot \frac{180^\circ}{\pi} \approx 24.051^\circ$