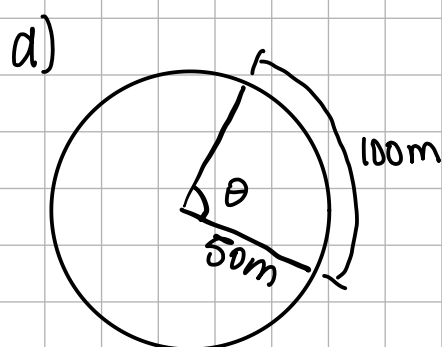
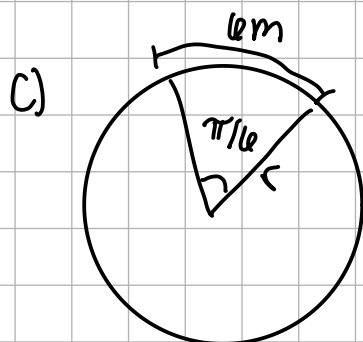
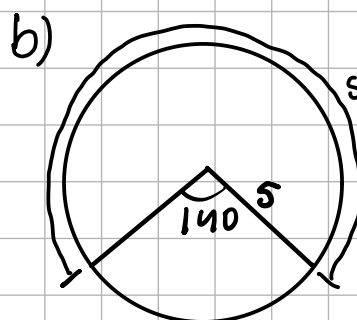
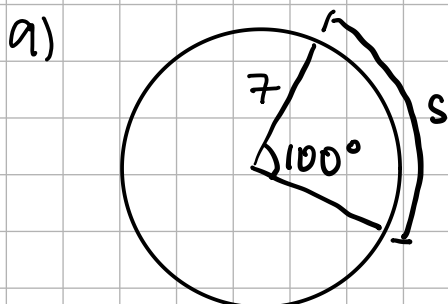


Name: _____ Date: 10/14/25

Unit 3 Test prep

★ Warmup: solve for the missing variable



(θ in radians
and degrees)

1. Memphis, TN and New Orleans, LA lie approximately on the same meridian (longitude line). Memphis has a latitude 35°N and New Orleans has a latitude of 30°N . Find the distance between these cities if the radius of the Earth is 3960 mi.

2. A radial saw has a blade with a 6-inch radius. Suppose the blade spins at 1000 rpm

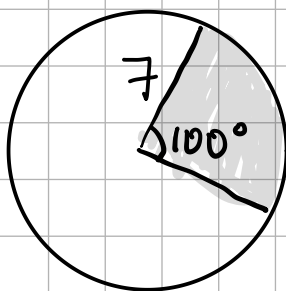
a) Find the angular speed of the blade in rad/min

b) Find the linear velocity of the saw in ft/sec

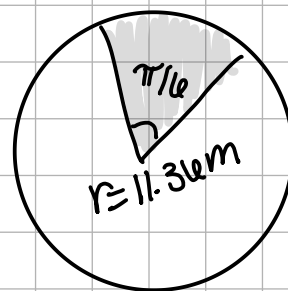
3. The wheels of a car have a diameter of 22 inch and are rotating at 600 rpm. Find the speed of the car in mi/hr

4. Find the area of the shaded region

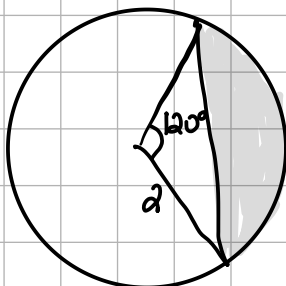
a)



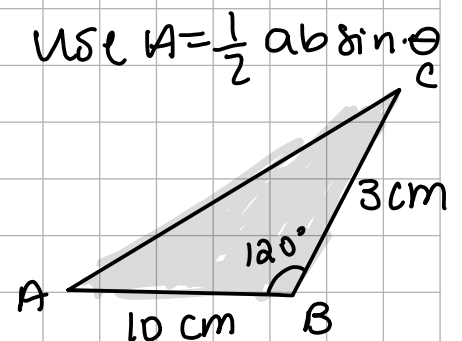
b)



c)



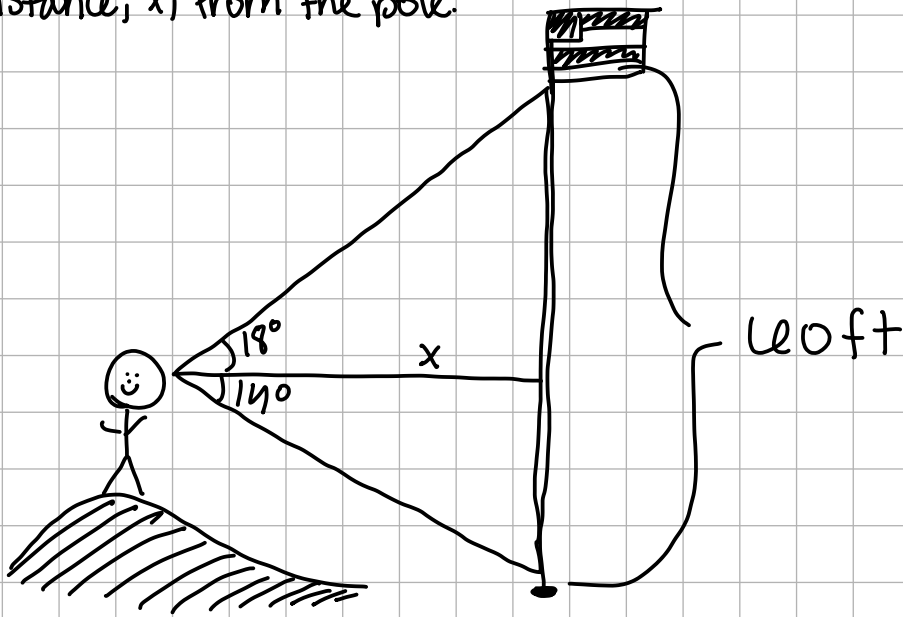
d)



5. From a point on the ground 12 ft from the base of a flagpole, the angle of elevation of the top of the pole measures 53° . How tall is the flagpole?

6. An Observer at the top of a 50 m tower notes that the angle of depression of a house lying due east is 49° and the angle of depression of a house lying due west is 31° . Find the distance between the houses.

7. A hiker standing on a hill sees a 120 ft tall flagpole. The angle of depression to the bottom of the pole is 14° , and the angle of elevation to the top of the pole is 18° . Find the hiker's distance, x , from the pole.



Trig Identities

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

another good bit of information to remember:

SOHCAHTOA

8. Express $\sin \theta$ in terms of $\cos \theta$

9. Given that $\cot \theta = \frac{3}{2}$ and $\cos \theta < 0$, find the other five trig functions.

10. Find $\sin(\cos^{-1}(-8/17))$

11. Write $\sin(\cos^{-1}(x))$ as an algebraic expression in x

Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

You'll be given
one variation
of each formula

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \sin A$$

$$b^2 = c^2 + a^2 - 2ca \sin B$$

$$c^2 = a^2 + b^2 - 2ab \sin C$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos B = \frac{c^2 + a^2 - b^2}{2ca}$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

12. All cases of Law of Sines. Solve the triangles

a) ASA $\rightarrow \angle A = 41^\circ, \angle B = 70^\circ, \text{ and } c = 5$

b) SSA: No solution $\rightarrow a = 7, \angle A = 30^\circ, b = 12$

c) SSA: One solution $\rightarrow a = 10, \angle A = 42^\circ, b = 7$

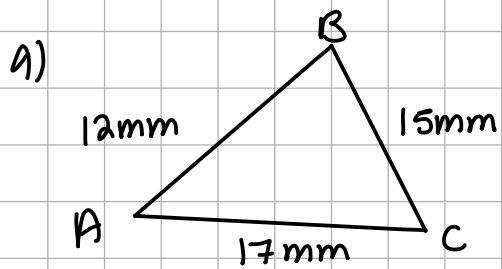
d) SSA: two solutions $\rightarrow a=4, \angle A=48^\circ, b=5$

13. All cases for Law of Cosines. Solve the triangles

a) SAS $\rightarrow \angle A=30^\circ, b=12, c=24$

b) SSS $\rightarrow a=40, b=70, c=106$

14. Find the area of the triangles



b) $a=4, b=7, c=9$