Name: _____   Date: _____

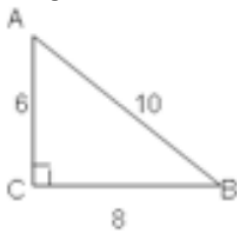## AIM: WHAT ARE COFUNCTIONS?

Do Now: If two **_complementary_** angles are represented by $4x$ and $7x - 9$, what is the value of x?
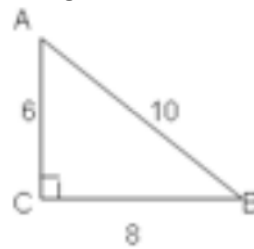
Determine the following:	Determine the following:
sinA =	sinB =
cosB =	cosA =
What is the *measure* of angle A?	What is the *measure* of angle A?
What is the *measure* of angle B?	What is the *measure* of angle B?
What is the relationship between these angles?	What is the relationship between these angles?

SINE AND COSINE OF COMPLEMENTARY ANGLES

If A and B are complementary angles,

$$\boxed{\begin{aligned} sinA &= cosB \\ cosA &= sinB \end{aligned}}$$

When $0° < \theta < 90°$, $sin(90° - \theta) = cos\theta$ and $sin\theta = cos(90° - \theta)$

Therefore, sine and cosine are called_____**!**

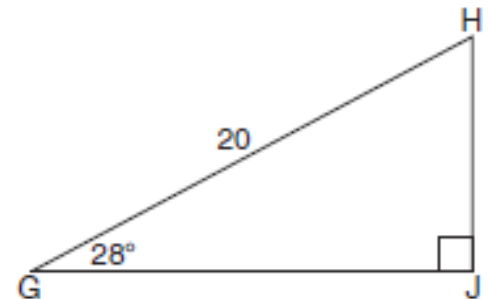| 1. In right triangle DEF, where $m\angle D = 90^o$, which of the following statements is always true?	2. In right triangle ABC, where $m\angle B = 90^o$, which of the following statements is always true?
1) $\sin D = \cos F$ 2) $\tan E = \cos F$ 3) $\sin F = \cos E$ 4) $\tan D = \sin E$	1) $\sin A = \cos B$ 2) $\sin A = \cos C$ 3) $\tan A = \cos C$ 4) $\sin A = \tan B$
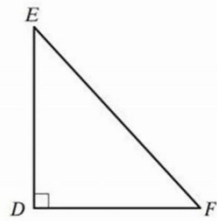
3. Each of the following diagrams and examples is a right triangle. Fill in the blanks based on the sine & cosine of angles that add to 90°

	Right Triangle ABC with $m\angle C = 90^o$.	Right Triangle DEF with $m\angle E = 90^o$.	
sin___ = cos_____ or sin___ = cos_____	sin___ = cos_____ or sin___ = cos_____	sin___ = cos_____ or sin___ = cos_____	sin___ = cos_____ or sin___ = cos_____

4. When instructed to find the length of $\overline{HJ}$ in right triangle *HJG*, Jia wrote the equation $\sin 62^o = \dfrac{GJ}{20}$ while Dan wrote $\cos 28^o = \dfrac{GJ}{20}$. Are both students' equations correct? Explain why.

Sine & Cosine of Angles that add to 90°
$$\sin A = \cos B \text{ if } A + B = \underline{\quad\quad}^o$$

5. Solve the following.

a) sin 27 ° = cos _____ °

b) cos 55 ° = sin _____ °

c) sin 17.8 ° = cos _____ °

d) cos 90 ° = sin _____ °

e) cos 45 ° = sin _____ °

f) $\sin 62\frac{2}{3}° = \cos$ _____ °

6. Find the value of θ that will make the equation $\sin\theta = \cos 37°$ true when $0° < \theta < 90°$. Explain your answer.

7. In a right triangle, $\sin(2x-15)^o = \cos(x-12)^o$. What is the value of x?

8. In a right triangle, $\sin(x+5)^o = \cos(4x+10)^o$. What is the value of x?

9. Find the value of B that will make the equation $\sin 62^o = \cos B$ true when $0° < B < 90°$. Explain your answer.

NOW YOU TRY SOME! For questions 1-6, find values for θ that make each statement true:

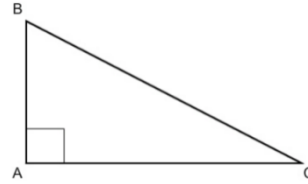| 1. $sin\theta = cos25°$	2. $sin80° = cos\theta$
3. $sin\theta = cos(\theta + 10)°$	4. $sin(\theta - 45)° = cos\theta$

Name: _____ Date: _____

UNIT 6 **LESSON 8**

HOMEWORK

1. In scalene triangle *ABC* shown in the diagram below, $m\angle A = 90^o$. Which equation is always true?
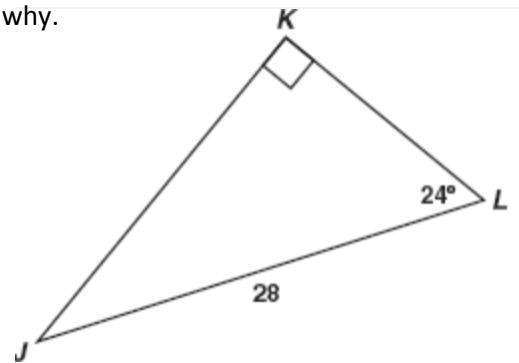
1) $\cos C = \cos B$

2) $\sin C = \sin B$

3) $\sin B = \cos C$

4) $\cos B = \sin A$

2. In a right triangle, sin (5x + 15)$^{\circ}$ = cos (4x − 6)$^{\circ}$. What is the value of x?

4. Find the value of B that will make the equation $\sin 89^o = \cos B$ true when $0° < B < 90°$. Explain your answer.

3. When instructed to find the length of $\overline{KL}$ in right triangle *HJG*, Conor wrote the equation $\cos 24^o = \dfrac{KL}{28}$ while

Steve wrote $\sin 66^o = \dfrac{KL}{28}$. Are both students' equations correct? Explain why.
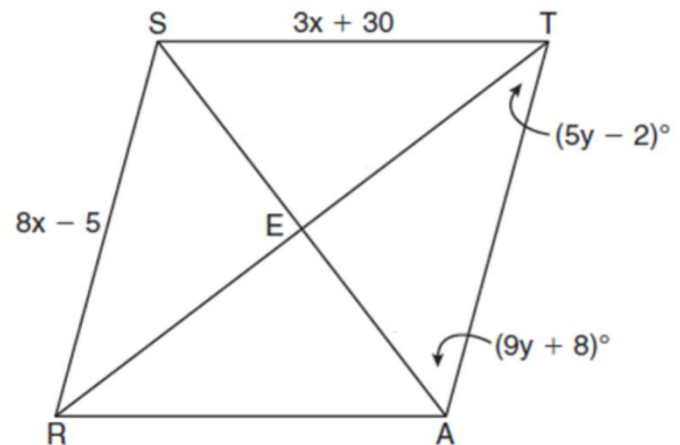
Review Question

5. As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 37-foot-tall screen is 11 feet off the ground. The projector sits on the ground at a horizontal distance of 43 feet from the screen. Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

(*Hint: Find the big angle of elevation, small angle of elevation and subtract!*)
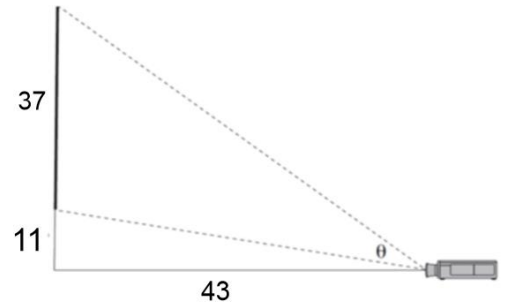
6. In the diagram below, quadrilateral *STAR* is a **rhombus** with diagonals $\overline{SA}$ and $\overline{TR}$ intersecting at *E*.
$ST = 3x + 30$, $SR = 8x - 5$, $m\angle RTA = 5y - 2$, and $m\angle TAS = 9y + 8$

   (a) Find x:

   (b) Find y: