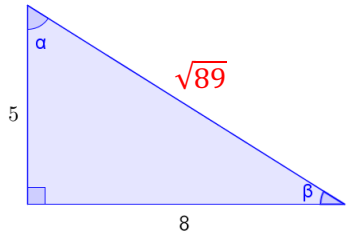
Name: _____

SM2 8.3: Trig Ratios

Problems: Use the figure below to answers questions 1-12. Leave answers in exact form.



1) $\sin\alpha = \frac{8}{\sqrt{89}} = \frac{8\sqrt{89}}{89}$

2) $\csc\alpha = \frac{\sqrt{89}}{8}$

3) $\sin\beta = \frac{5}{\sqrt{89}} = \frac{5\sqrt{89}}{89}$

4) $\csc\beta = \frac{\sqrt{89}}{5}$

5) $\cos\alpha = \frac{5}{\sqrt{89}} = \frac{5\sqrt{89}}{89}$

6) $\sec\alpha = \frac{\sqrt{89}}{5}$

7) $\cos\beta \frac{8}{\sqrt{89}} = \frac{8\sqrt{89}}{89}$

8) $\sec\beta = \frac{\sqrt{89}}{8}$

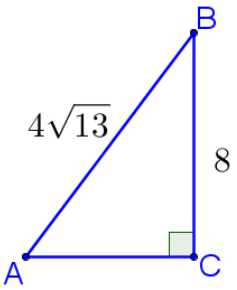
9) $\tan\alpha = \frac{8}{5}$

10) $\cot\alpha = \frac{5}{8}$

11) $\tan\beta = \frac{5}{8}$

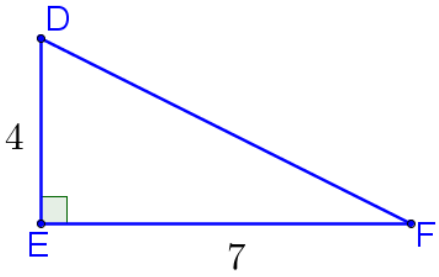
12) $\cot\beta = \frac{8}{5}$

Find the indicated trig ratio.

13) 

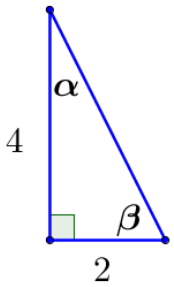
$\sin A$

$\frac{8}{4\sqrt{13}} = \frac{2}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$

14) 

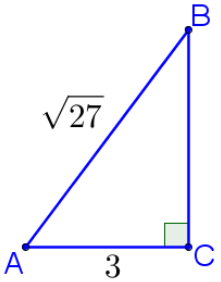
$\tan F$

$\frac{4}{7}$

15) 

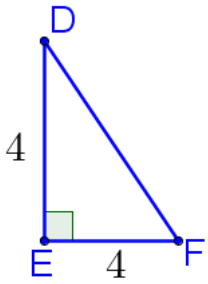
$\cos\alpha$

$\frac{4}{2\sqrt{5}} = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

16) 

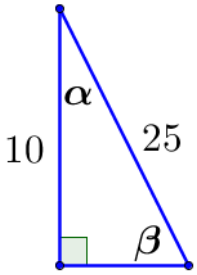
$\sec B$

$\frac{\sqrt{27}}{3\sqrt{2}} = \frac{\sqrt{6}}{2}$

17) 

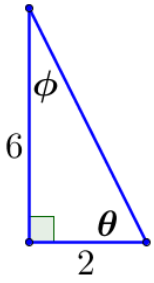
$\csc D$

$\frac{4\sqrt{2}}{4} = \sqrt{2}$

18) 

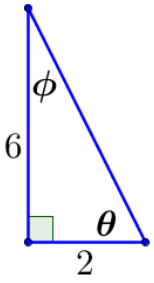
$\cot\beta$

$\frac{5\sqrt{21}}{10} = \frac{\sqrt{21}}{2}$

19) 

$\sin\phi$

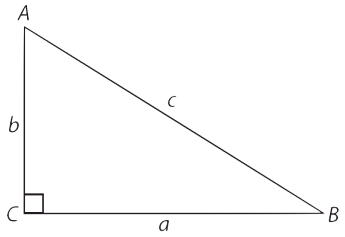
$\frac{2}{2\sqrt{10}} = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$

20) 

$\cos\theta$

$\frac{2}{2\sqrt{10}} = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$

Using the figure below, determine if each statement is true or false. Justify your response.



21) $\sin A = \sin B$
False; $\frac{a}{c} \neq \frac{b}{c}$

22) $\sin B = \cos A$
True; $\frac{b}{c} = \frac{b}{c}$

23) $\cos B = \sin A$
True; $\frac{a}{c} = \frac{a}{c}$

24) $\cos A = \cos B$
False; $\frac{b}{c} \neq \frac{a}{c}$

25) $\angle A$ and $\angle B$ are complementary.
True; there are $180°$ in a triangle and $m\angle C = 90°$ so $m\angle A + m\angle B = 90°$

26) Explain what $\sin A = \cos(90° - A)$ means.
Since $\angle A$ and $\angle B$ are complementary, then $B = 90° - A$, so it's saying that the $\sin A$ is the same as the $\cos B$.

27) Explain what $\cos A = \sin(90° - A)$ means.
Since $\angle A$ and $\angle B$ are complementary, then $B = 90° - A$, so it's saying that the $\cos A$ is the same as the $\sin B$.

Use the complementary properties of sine and cosine to answer the following questions.

28) If $\cos 34° = 0.829$, what is the $\sin 56°$?
0.829

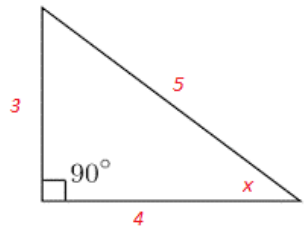
29) If $\sin 40° = 0.643$, what is the $\cos 50°$?
0.643

30) If $\sin 30° = \frac{1}{2}$, what is the $\cos 60°$?
$\frac{1}{2}$

31) If $\cos 83° = .122$, what is the $\sin 7°$?
$.122$

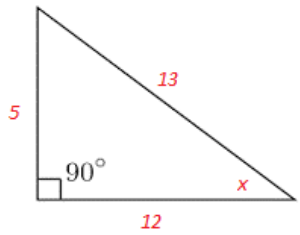
Find the indicated trig ratio.

32) If $\sin x = \frac{3}{5}$, what is the $\tan x$?



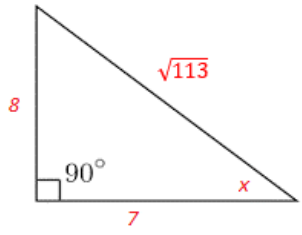
$\tan x = \frac{3}{4}$

33) If $\cos x = \frac{12}{13}$, what is the $\sin x$?



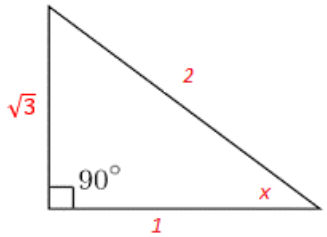
$\sin x = \frac{5}{13}$

34) If $\tan x = \frac{8}{7}$, what is the $\cos x$?



$\cos x = \frac{7\sqrt{113}}{113}$

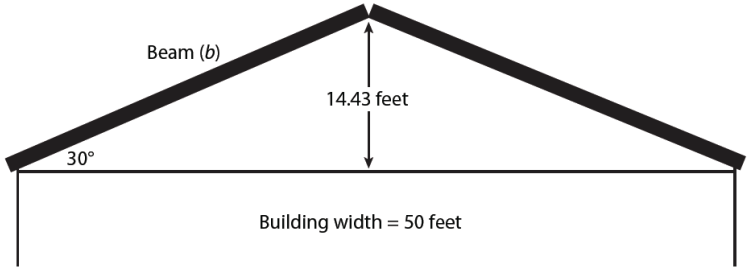
35) If $\sin x = \frac{\sqrt{3}}{2}$, what is the $\cos x$?



$\cos x = \frac{1}{2}$

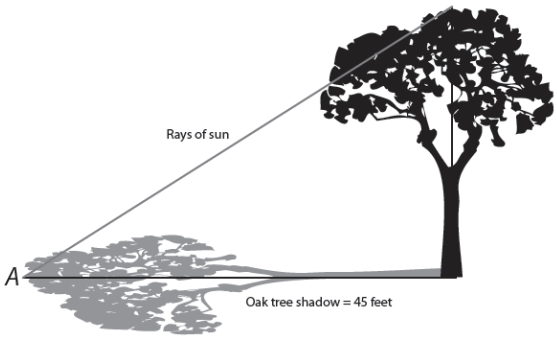
Application Problems:

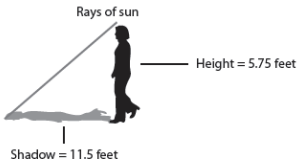
36) A carpenter needs to measure the length of the beams that will support a roof. The roof will rise at an angle of 30° from the top of the walls. The peak of the roof is 14.43 feet above the top of the walls. The side adjacent to the 30° angle is half the width of the building. How long is each supporting beam, *b*?



$$25^2 + 14.43^2 = b^2$$
$$b^2 = 833.2249$$
$$b = 28.9\ ft$$

37) Students are having a contest to see who can find the tallest tree in a park. To win, a student must measure the height of the tree without climbing the tree. Martha locates a very tall oak tree. She measures that the tree's shadow is 45 feet long. Martha has a shadow that is 11.5 feet long. She is 5.75 feet tall. How tall is the oak tree?





Similar Right Triangles

$$\frac{x}{45} = \frac{5.75}{11.5}$$
$$x = 22.5\ ft$$