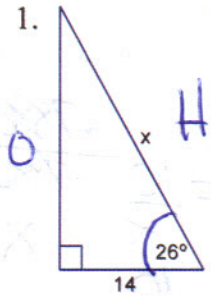
Name Schlansky
Mr. Schlansky

Date _____
Geometry

Right Triangles Regents Review

In each example, find the value of x and round to the nearest tenth if necessary

1.



SOH CAH TOA

$\cos\theta = \frac{A}{H}$

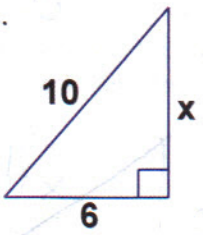
$\cos 26 = \frac{14}{x}$

$.8988 = \frac{14}{x}$

$.8988x = 14$

$x = 15.6$

2.



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

$x^2+6^2=10^2$

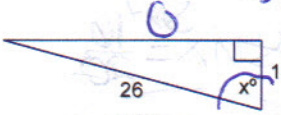
$x^2+36=100$

$-36 \quad -36$

$\sqrt{x^2}=\sqrt{64}$

$x=8$

3.



SOH CAH TOA

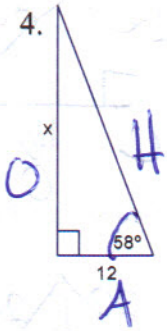
$\cos\theta = \frac{A}{H}$

$\cos^{-1}\cos x = \cos^{-1}\frac{10}{26}$

$x = \cos^{-1}\left(\frac{10}{26}\right)$

$x = 67.4$

4.



SOH CAH TOA

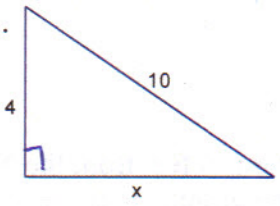
$\tan\theta = \frac{O}{A}$

$\tan 58 = \frac{x}{12}$

$\frac{1.6003}{1} = \frac{x}{12}$

$x = 19.2$

5.



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

$x^2+4^2=10^2$

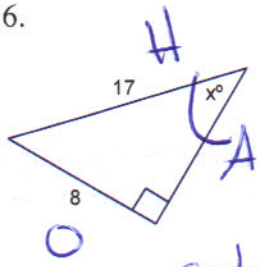
$x^2+16=100$

$-16 \quad -16$

$\sqrt{x^2}=\sqrt{84}$

$x=9.2$

6.



SOH CAH TOA

$\sin\theta = \frac{O}{H}$

$\sin^{-1}\sin x = \sin^{-1}\frac{8}{17}$

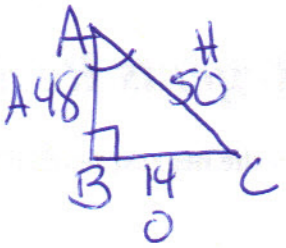
$x = \sin^{-1}\left(\frac{8}{17}\right)$

$x = 28.1$

7. In $\triangle ABC$, the measure of $\angle B = 90°$, $AC = 50$, $AB = 48$, and $BC = 14$. Which ratio represents the tangent of $\angle A$?

1) $\frac{14}{50}$ 3) $\frac{48}{50}$

2) $\frac{14}{48}$ 4) $\frac{48}{14}$

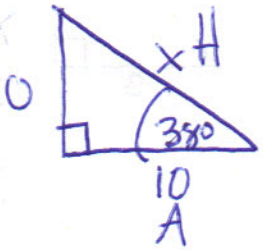


$\tan\theta = \frac{O}{A}$

$\tan A = \frac{14}{48}$

8. A right triangle contains a 38° angle whose adjacent side measures 10 centimeters. What is the length of the hypotenuse, to the *nearest hundredth of a centimeter*?

1) 7.88
2) 12.69
3) 12.80
4) 16.24



$\cos\theta = \frac{A}{H}$

$\cos 38 = \frac{10}{x}$

$\cos\theta = \frac{10}{x}$

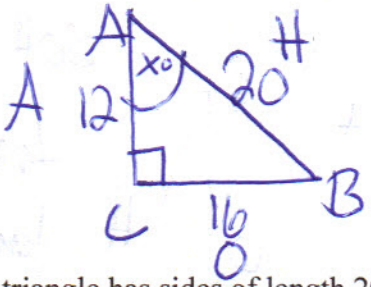
$.7880 = \frac{10}{x}$

$.7880x = 10$

$\frac{.7880x}{.7880} = \frac{10}{.7880}$

$x = 12.69$

9. In right triangle ABC, $AB = 20$, $AC = 12$, $BC = 16$, and $m\angle C = 90$. Find, to the *nearest degree*, the measure of $\angle A$.



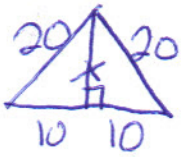
Your choice! $\sin\theta = \frac{O}{H}$

$\sin^{-1}\sin x = \sin^{-1}\frac{16}{20}$

$x = 53°$

10. An equilateral triangle has sides of length 20. To the *nearest tenth*, what is the height of the equilateral triangle?

1) 10.0
2) 11.5
3) 17.3
4) 23.1



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

$10^2 + x^2 = 20^2$

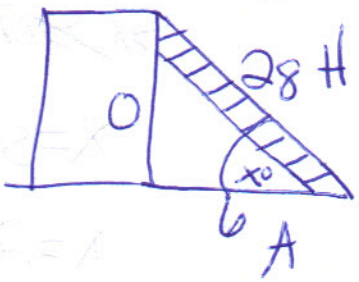
$100 + x^2 = 400$

$-100 \quad -100$

$\sqrt{x^2} = \sqrt{300}$

$x = 17.3$

11. A 28-foot ladder is leaning against a house. The bottom of the ladder is 6 feet from the base of the house. Find the measure of the angle formed by the ladder and the ground, to the *nearest degree*.



$\cos\theta = \frac{A}{H}$

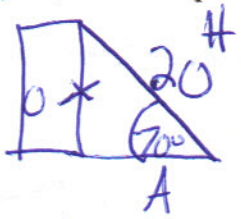
$\cos^{-1}\cos x = \cos^{-1}\frac{6}{28}$

$x = \cos^{-1}\frac{6}{28}$

$x = 78°$

12. A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?

1) 6.8
2) 6.9
3) 18.7
4) ~~18.8~~

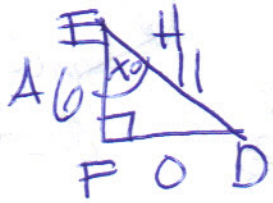


$\sin\theta = \frac{O}{H}$ $\quad .9397 = \frac{x}{20}$

$\sin 70 = \frac{x}{20}$ $\quad x = 18.8$

13. In right triangle EFD, $ED = 11$, $EF = 6$, and $m\angle F = 90$. What is the measure of angle E, to the *nearest degree*?

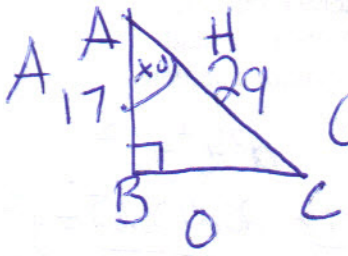
1) 61
2) ~~57~~
3) 33
4) 29



$\cos\theta = \frac{A}{H}$ $\quad \theta = \cos^{-1}\frac{6}{11}$

$\cos^{-1}\cos\theta = \frac{6}{11}$ $\quad \theta = 57°$

14. In right triangle ABC shown below, $AC = 29$ inches, $AB = 17$ inches, and $m\angle ABC = 90$. Find the number of degrees in the measure of angle BAC, to the *nearest degree*. Find the length of $\overline{BC}$ to the *nearest inch*.



$\cos\theta = \frac{A}{H}$

$\cos^{-1}\cos x = \cos^{-1}\frac{17}{29}$

$x = \cos^{-1}\frac{17}{29}$

$x = 54°$

Your choice

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

$x^2 + 17^2 = 29^2$

$x^2 + 289 = 841$

$-289 \quad -289$

$\sqrt{x^2} = \sqrt{552}$

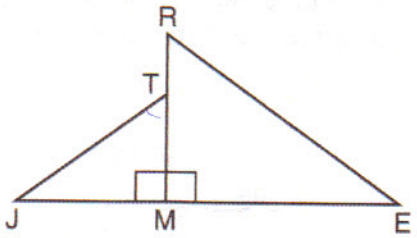
$x = 23$

15. In $\triangle ABC$, where $\angle C$ is a right angle, $\cos A = \frac{\sqrt{21}}{5}$. What is $\sin B$?

1) $\frac{\sqrt{21}}{5}$
2) $\frac{\sqrt{21}}{2}$
3) $\frac{2}{5}$
4) $\frac{5}{\sqrt{21}}$

$\cos A = \sin B$

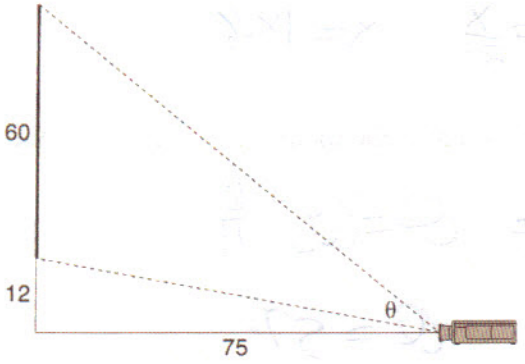
16. In the diagram below, $\triangle ERM \sim \triangle JTM$.



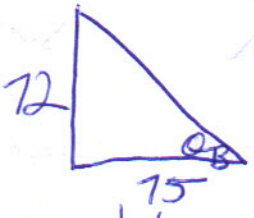
Which statement is always true?

1) $\cos J = \frac{RM}{RE}$ $\frac{A}{H} = \cos E$ X
2) $\cos R = \frac{JM}{JT}$ $\frac{A}{H} = \cos T$ X
3) $\tan T = \frac{RM}{EM}$ $\frac{O}{A} = \tan R$ X
4) ~~$\tan E = \frac{TM}{JM}$~~ $\frac{O}{A} = \tan T$ ✓

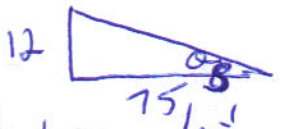
17. As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.
Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.



$\theta = \theta_B - \theta_S$
$\theta = 43.83 - 9.09$
$\theta = 34.7°$

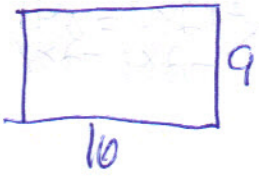


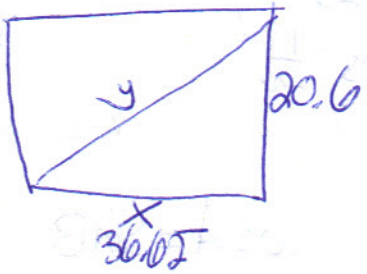
$\tan\theta = \frac{72}{75}$
$\theta = \tan^{-1}\frac{72}{75}$
$\theta_B = 43.83$



$\tan\theta = \frac{12}{75}$
$\theta = \tan^{-1}\frac{12}{75}$
$\theta_S = 9.09$

18. The aspect ratio (the ratio of screen width to height) of a rectangular flat-screen television is 16:9. The length of the diagonal of the screen is the television's screen size. Determine and state, to the *nearest inch*, the screen size (diagonal) of this flat-screen television with a screen height of 20.6 inches.

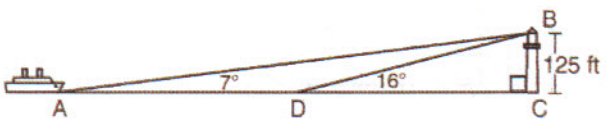


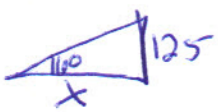


$\frac{9}{20.6} = \frac{16}{x}$
$\frac{9x}{9} = \frac{329.6}{9}$
$x = 36.62$

$a^2 + b^2 = c^2$
$20.6^2 + 36.62^2 = y^2$
$\sqrt{1765.54} = \sqrt{y^2}$
$420 = y$
$42 = y$

19. As shown in the diagram below, a ship is heading directly toward a lighthouse whose beacon is 125 feet above sea level. At the first sighting, point *A*, the angle of elevation from the ship to the light was 7°. A short time later, at point *D*, the angle of elevation was 16°.
To the *nearest foot*, determine and state how far the ship traveled from point *A* to point *D*.





$\tan 16 = \frac{125}{x}$
$.2867 = \frac{125}{x}$
$.2867x = 125$
$\frac{.2867x}{.2867} = \frac{125}{.2867}$
$x = 435.9958$

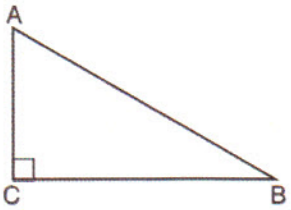
$\tan 7 = \frac{125}{y}$
$.1228 = \frac{125}{y}$
$.1228y = 125$
$\frac{.1228y}{.1228} = \frac{125}{.1228}$
$y = 1017.915$

1017.915
$-\ 435.9958$
582

20. In $\triangle ABC$, the complement of $\angle B$ is $\angle A$. Which statement is always true?

1) $\tan\angle A = \tan\angle B$
2) $\sin\angle A = \sin\angle B$
3) $\cos\angle A = \tan\angle B$
4) $\sin\angle A = \cos\angle B$

21. In scalene triangle ABC shown in the diagram below, $m\angle C = 90°$.



Which equation is always true?

1) $\sin A = \sin B$
2) $\cos A = \cos B$
3) $\cos A = \sin C$
4) $\sin A = \cos B$

22. Explain why $\cos(x) = \sin(90 - x)$ for x such that $0 < x < 90$.

Co-functions are complementary

23. Find the value of R that will make the equation $\sin 73° = \cos R$ true when $0° < R < 90°$. Explain your answer.

$73 + R = 90$
$-73 \quad -73$
$R = 17°$

Co-functions are complementary

24. Which expression is always equivalent to $\sin x$ when $0° < x < 90°$?

1) $\cos(90° - x)$
2) $\cos(45° - x)$
3) $\cos(2x)$
4) $\cos x$

Co-functions are Complementary

25. In a right triangle ABC, where $m\angle C = 90°$, which of the following statements is always true?

(1) $\sin A = \tan B$
(2) $\sin A = \cos B$
(3) $\cos A = \tan B$
(4) $\tan A = \tan B$

26 If $\sin(3x + 2)° = \cos(4x - 10)°$, what is the value of x to the *nearest tenth*?

(1) 7.6 (2) 12.0 (3) 14.0 (4) 26.9

$3x + 2 + 4x - 10 = 90$
$7x - 8 = 90$
$+8 \quad +8$
$\frac{7x}{7} = \frac{98}{7}$
$x = 14$

27. In right triangle ABC with the right angle at C, $\sin A = 2x + 0.1$ and $\cos B = 4x - 0.7$. Determine and state the value of x. Explain your answer.

$2x + 0.1 + 4x - 0.7 = 90$
$6x - 0.6 = 90$
$+0.6 \quad +0.6$
$\frac{6x}{6} = \frac{90.6}{6}$
$x = 15.1$

Co-functions are complementary