Geometry Regents Exam Questions by State Standard: Topic
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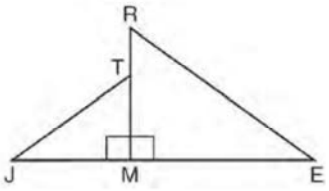
TRIGONOMETRY

G.SRT.C.6: TRIGONOMETRIC RATIOS

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



Which statement is always true?

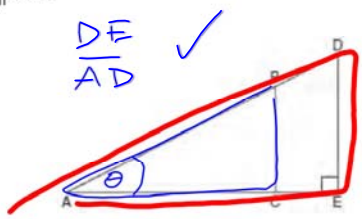
1 $\cos J = \frac{RM}{RE}$

2 $\cos R = \frac{JM}{JT}$

3 $\tan T = \frac{RM}{EM}$

4 $\tan E = \frac{TM}{JM}$

193 In the diagram of right triangle ADE below, $\overline{BC} \parallel \overline{DE}$.



Which ratio is always equivalent to the sine of $\angle A$?

1 $\frac{AD}{DE}$

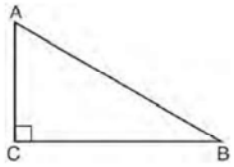
2 $\frac{AE}{AD}$

3 $\frac{BC}{AB}$

4 $\frac{AB}{AC}$

G.SRT.C.7: COFUNCTIONS

194 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 $\sin A = \cos B$

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195 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 $\frac{5}{\sqrt{21}}$

cofunctions

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

197 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.

$2x + .1 = 4x - .7$
$-2x \quad -2x$
$.1 = 2x - .7$
$+.7 \quad +.7$
$.8 = 2x$
$\frac{.8}{2} = \frac{2x}{2}$
$.4 = x$

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

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

$\sin x = \cos y$
$x + y = 90$

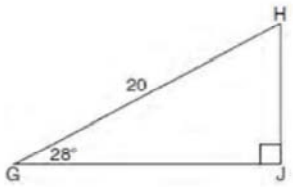
199 In $\triangle ABC$, the complement of $\angle B$ is $\angle A$. Which statement is always true?

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

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

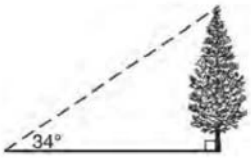
$R = 17°$
The sum of 73 and R must be complementary.

201 When instructed to find the length of $\overline{HJ}$ in right triangle HJG, Alex wrote the equation $\sin 28° = \frac{HJ}{20}$ while Marlene wrote $\cos 62° = \frac{HJ}{20}$. Are both students' equations correct? Explain why.



G.SRT.C.8: USING TRIGONOMETRY TO FIND A SIDE

202 As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34°.



If the point is 20 feet from the base of the tree, what is the height of the tree, to the *nearest tenth of a foot*?

1 29.7
2 16.6
3 13.5
4 11.2

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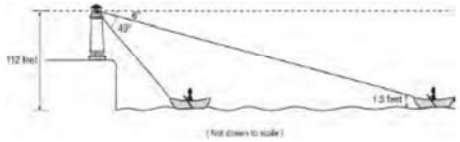
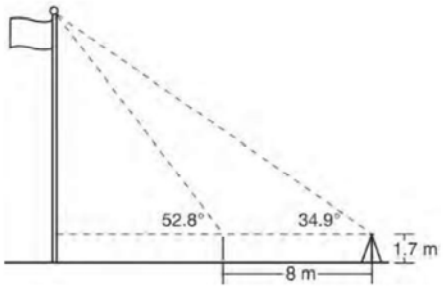
203 As shown below, a canoe is approaching a lighthouse on the coastline of a lake. The front of the canoe is 1.5 feet above the water and an observer in the lighthouse is 112 feet above the water.



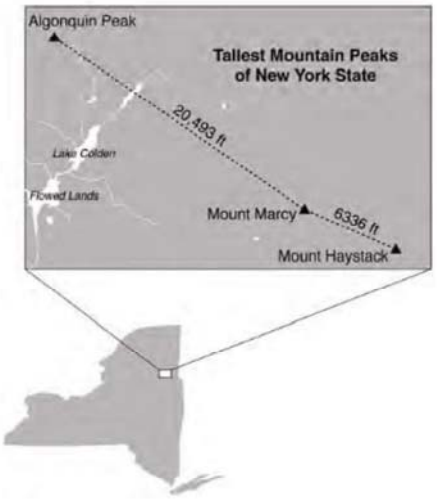
At 5:00, the observer in the lighthouse measured the angle of depression to the front of the canoe to be 6°. Five minutes later, the observer measured and saw the angle of depression to the front of the canoe had increased by 49°. Determine and state, to the *nearest foot per minute*, the average speed at which the canoe traveled toward the lighthouse.

204 Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be 34.9°. She walks 8 meters closer and determines the new measure of the angle of elevation to be 52.8°. At each measurement, the survey instrument is 1.7 meters above the ground.



Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

205 The map below shows the three tallest mountain peaks in New York State: Mount Marcy, Algonquin Peak, and Mount Haystack. Mount Haystack, the shortest peak, is 4960 feet tall. Surveyors have determined the horizontal distance between Mount Haystack and Mount Marcy is 6336 feet and the horizontal distance between Mount Marcy and Algonquin Peak is 20,493 feet.



The angle of depression from the peak of Mount Marcy to the peak of Mount Haystack is 3.47 degrees. The angle of elevation from the peak of Algonquin Peak to the peak of Mount Marcy is 0.64 degrees. What are the heights, to the *nearest foot*, of Mount Marcy and Algonquin Peak? Justify your answer.

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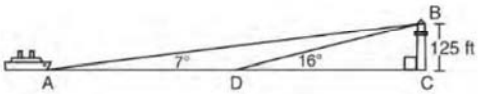
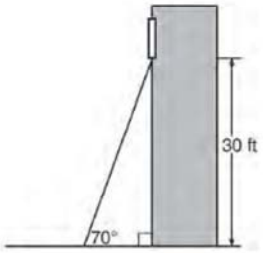
206 As shown in the diagram below, a ship is heading directly toward a lighthouse whose beacon is 125 feet above sea level. At the first sighting, point A, the angle of elevation from the ship to the light was 7°. A short time later, at point D, the angle of elevation was 16°.



To the *nearest foot*, determine and state how far the ship traveled from point A to point D.

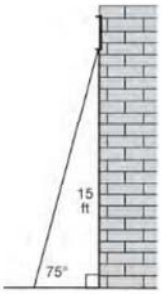
207 A carpenter leans an extension ladder against a house to reach the bottom of a window 30 feet above the ground. As shown in the diagram below, the ladder makes a 70° angle with the ground. To the *nearest foot*, determine and state the length of the ladder.



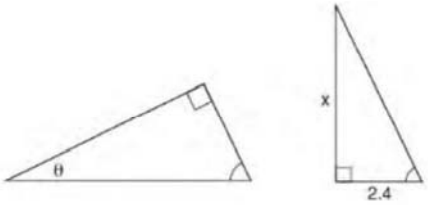
208 A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?

1 6.8
2 6.9
3 18.7
4 18.8

209 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.



210 The diagram below shows two similar triangles.



If $\tan\theta = \frac{3}{7}$, what is the value of x, to the *nearest tenth*?

1 1.2
2 5.6
3 7.6
4 8.8

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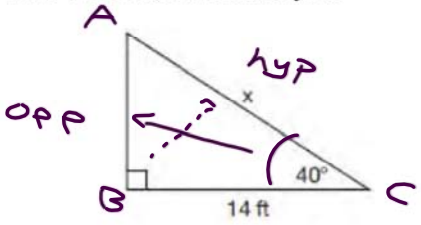
211 Given the right triangle in the diagram below, what is the value of x, to the *nearest foot*?



1 11
2 17
3 18
4 22

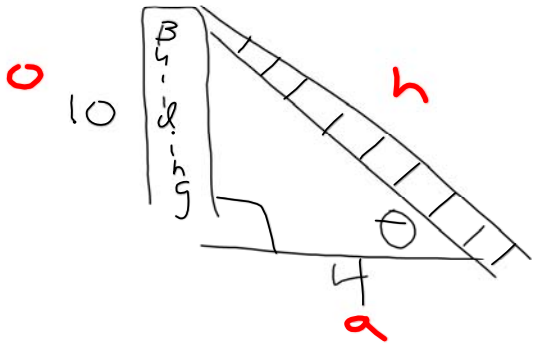
SOH CAH TOA
hyp
opp
adj
$\cos 40 = \frac{14}{x}$
$x = 18$

G.SRT.C.8: USING TRIGONOMETRY TO FIND AN ANGLE

212 A man who is 5 feet 9 inches tall casts a shadow of 8 feet 6 inches. Assuming that the man is standing perpendicular to the ground, what is the angle of elevation from the end of the shadow to the top of the man's head, to the *nearest tenth of a degree*?

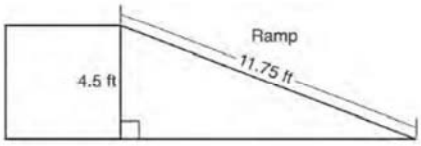
1 34.1
2 34.5
3 42.6
4 55.9

213 A ladder leans against a building. The top of the ladder touches the building 10 feet above the ground. The foot of the ladder is 4 feet from the building. Find, to the *nearest degree*, the angle that the ladder makes with the level ground.



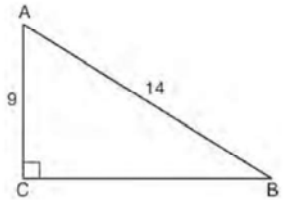
$\tan\theta = \frac{10}{4}$
$\tan^{-1}\left(\frac{10}{4}\right) = 68°$

214 The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



Determine and state, to the *nearest degree*, the angle of elevation formed by the ramp and the ground.

215 In the diagram of right triangle ABC shown below, $AB = 14$ and $AC = 9$.



What is the measure of $\angle A$, to the *nearest degree*?

1 33
2 40
3 50
4 57

#31