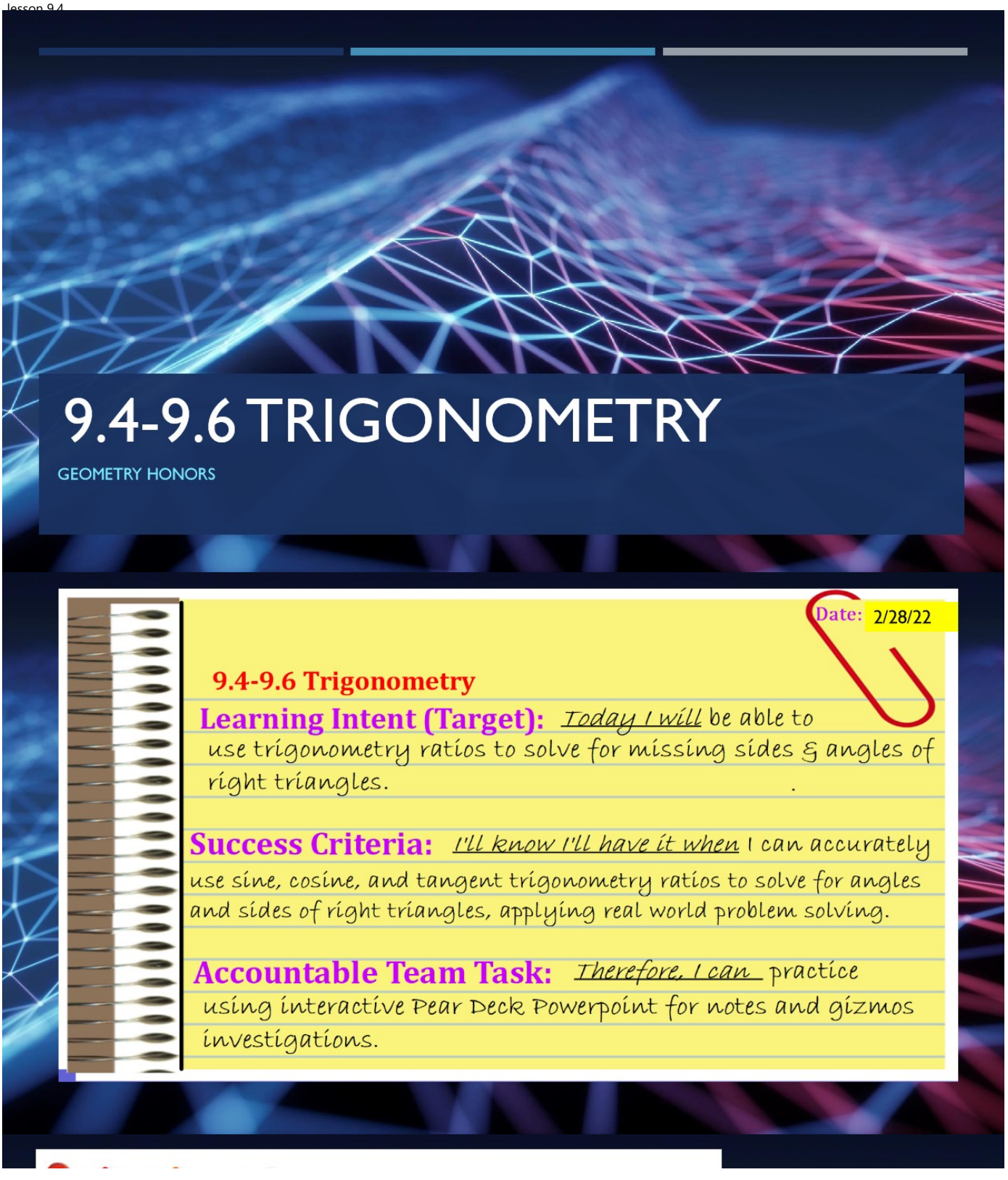
Lesson 9.4 thru 9.6 Trigonometry

Sunday, February 27, 2022 3:00 PM

Click on link below for peardeck interactive lesson:

https://app.peardeck.com/student/tahyzohjk

trigonom... lesson 9.4



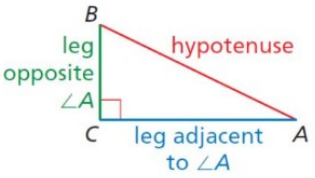
Core Concept

Sine and Cosine Ratios

Let $\triangle ABC$ be a right triangle with acute $\angle A$. The sine of $\angle A$ and cosine of $\angle A$ (written as $\sin A$ and $\cos A$) are defined as follows.

$$\sin A = \frac{\text{length of leg opposite } \angle A}{\text{length of hypotenuse}} = \frac{BC}{AB}$$

$$\cos A = \frac{\text{length of leg adjacent to } \angle A}{\text{length of hypotenuse}} = \frac{AC}{AB}$$



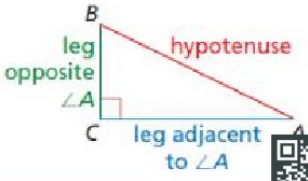
Core Concept

Tangent Ratio

Let $\triangle ABC$ be a right triangle with acute $\angle A$.

The tangent of $\angle A$ (written as $\tan A$) is defined as follows.

$$\tan A = \frac{\text{length of leg opposite } \angle A}{\text{length of leg adjacent to } \angle A} = \frac{BC}{AC}$$



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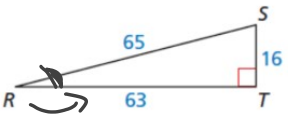
SOH CAH TOA

Find sin S, sin R, cos S, and cos R. Write each answer as a fraction and as a decimal rounded to four places.

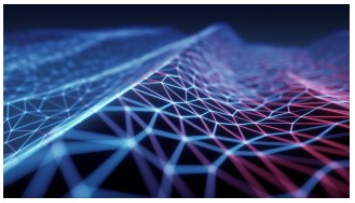


$\sin S = \frac{63}{65} = 0.9692$

$\sin R = \frac{16}{65} = 0.0154$

$\cos S = \frac{16}{65} = 0.0154$

$\cos R = \frac{63}{65} = 0.9692$



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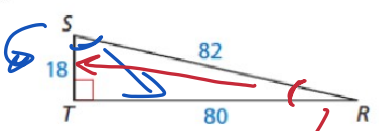
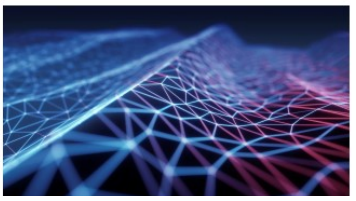
Find tan S and tan R. Write each answer as a fraction and as a decimal rounded to four places.

$\tan = \frac{\text{OPP}}{\text{Adj}}$





$\tan S = \frac{80}{18} = 4.4$

$\tan R = \frac{18}{80} = 0.225$

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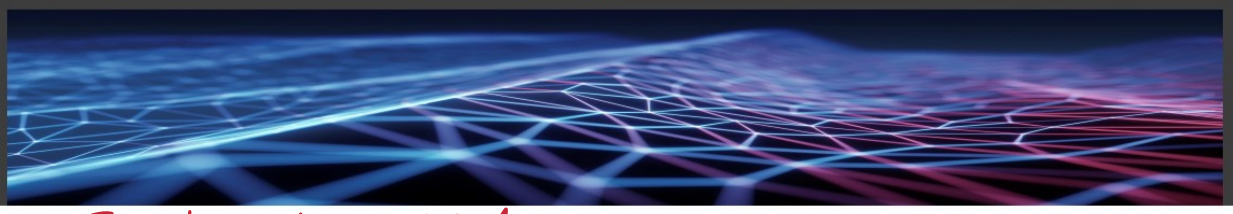
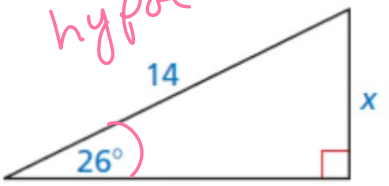


SOH CAH TOA

Find the values of x and y using sine and cosine. Round your answers to the nearest tenth.



$\frac{14(\sin 26 = \frac{x}{14})14}{14(\sin 26) = x}$ $x = 6.1$

$\frac{14(\cos 26 = \frac{y}{14})14}{}$ $14(\cos 26) = y$ $12.6 = y$

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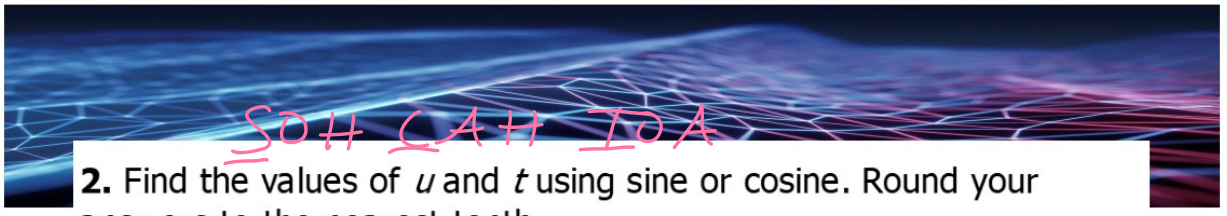
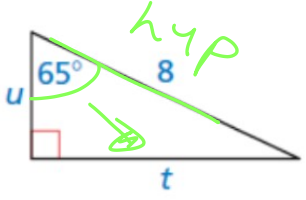


SOH CAH TOA

2. Find the values of u and t using sine or cosine. Round your answers to the nearest tenth.



$\frac{8(\cos 65 = \frac{u}{8})8}{8(\cos 65) = u}$ $3.4 = u$

opp

$\frac{8(\sin 65 = \frac{t}{8})8}{8(\sin 65) = t}$ $7.3 = t$

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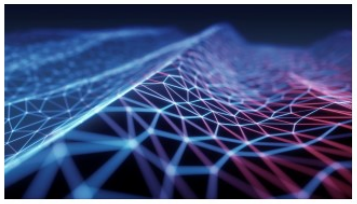
SOH CAH TOA

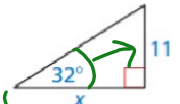


Find the value of x. Round your answer to the nearest tenth.

$x\left(\tan 32 = \frac{11}{x}\right)x$

$\frac{x(\tan 32)}{(\tan 32)} = \frac{11}{\tan 32}$

$x = 17.6$



opp

Adj

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SOH CAH TOA

Find the value of x. Round your answer to the nearest tenth.

3.

Adj

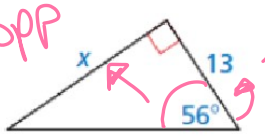
opp

$x\left(\tan 61 = \frac{22}{x}\right)x$

$\frac{x(\tan 61)}{(\tan 61)} = \frac{22}{\tan 61}$

$x = 12.2$

4.



opp

Adj

$13\left(\tan 56 = \frac{x}{13}\right)13$

$13(\tan 56) = x$

$19.3 = x$

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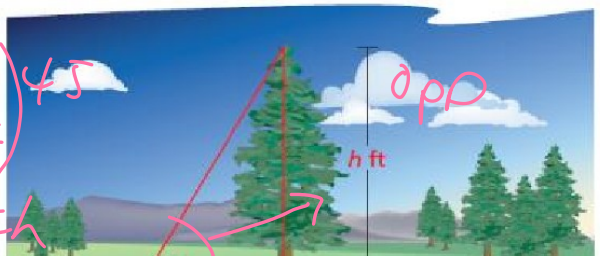
SOH
CAH
TOA

You are measuring the height of a spruce tree. You stand 45 feet from the base of the tree. You measure the angle of elevation from the ground to the top of the tree to be 59°. Find the height h of the tree to the nearest foot.



$45\left(\tan 59 = \frac{h}{45}\right)45$

$45(\tan 59) = h$

opp

74.9 = h
75 ft = h

Adj

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6. You are measuring the height of a lamppost. You stand 40 inches from the base of the lamppost. You measure the angle of elevation from the ground to the top of the 70° lamppost to be 70°. Find the height *h* of the lamppost to the nearest inch.

SOH CAH TOA

Opp
Adj

$40(\tan 70 = \frac{h}{40})40$

$40(\tan 70) = h$

$110 = h$

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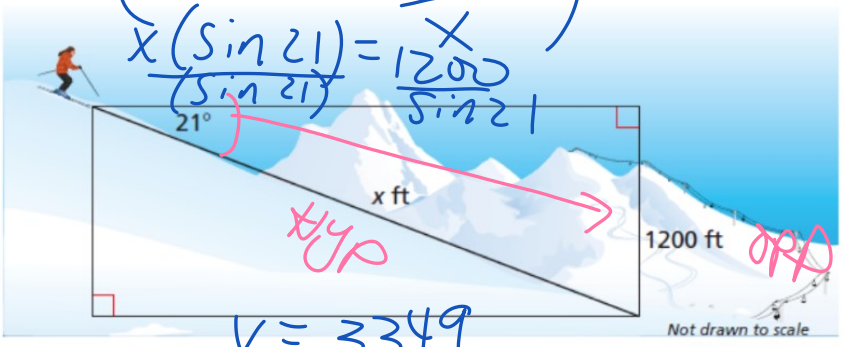
You are skiing on a mountain with an altitude of 1200 feet. The angle of depression is 21°. Find the distance *x* you ski down the mountain to the nearest foot.

SOH CAH TOA

$x(\sin 21 = \frac{1200}{x})x$

$\frac{x(\sin 21)}{(\sin 21)} = \frac{1200}{\sin 21}$



Hyp

Opp

$x = 3349$

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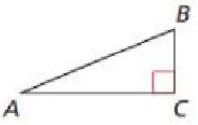
Core Concept

Inverse Trigonometric Ratios

Let $\angle A$ be an acute angle.



Inverse Tangent If $\tan A = x$, then $\tan^{-1} x = m\angle A$. $\tan^{-1} \frac{BC}{AC} = m\angle A$

Inverse Sine If $\sin A = y$, then $\sin^{-1} y = m\angle A$. $\sin^{-1} \frac{BC}{AB} = m\angle A$

Inverse Cosine If $\cos A = z$, then $\cos^{-1} z = m\angle A$. $\cos^{-1} \frac{AC}{AB} = m\angle A$

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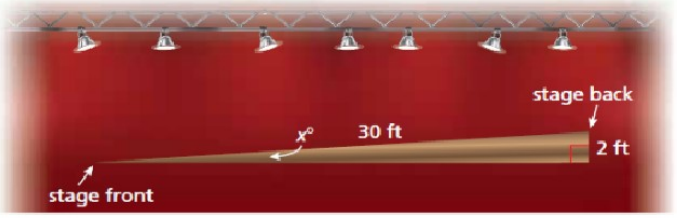
Your school is building a *raked stage*. The stage will be 30 feet long from front to back, with a total rise of 2 feet. You want the rake (angle of elevation) to be 5° or less for safety. Is the raked stage within your desired range?



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11. A boat is pulled in by a winch on a dock 12 feet above the deck of the boat. When the winch is fully extended to 25 feet, what is the angle of elevation from the boat to the winch?