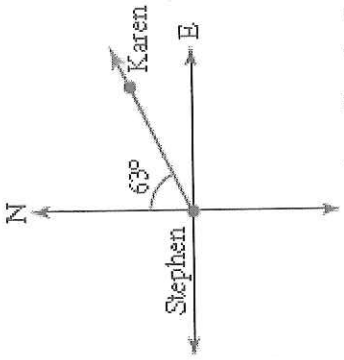
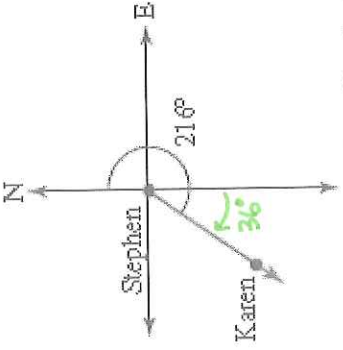
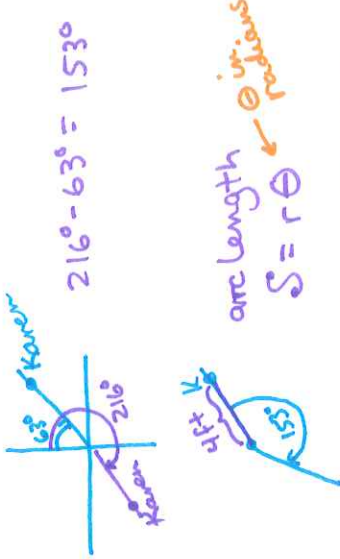
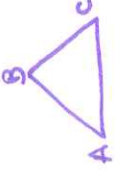
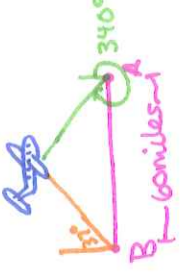


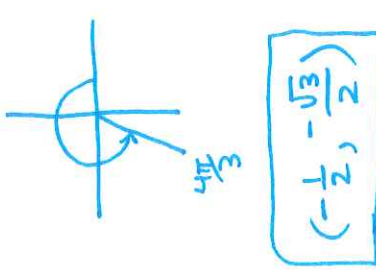
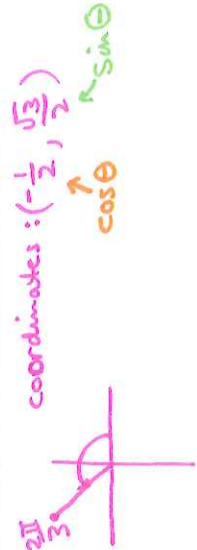
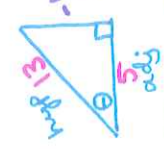
Target 5A: Describe and convert between radian and degree measure

DOK 1 Apply	DOK2 Analyze	DOK2 Analyze
<p>Express 200° in radians.</p> <p>Express $\frac{7\pi}{18}$ in degrees.</p>	 <p>Using the diagram above, describe the bearing of Karen.</p> <p>Convert the angle to radians.</p>	 <p>Using the diagram above, describe the bearing of Karen.</p> <p>Convert the angle to radians.</p>
$200^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{200\pi}{180}$ $= \frac{10\pi}{9} \text{ or } 3.491$ $\frac{7\pi}{18} \cdot \frac{180^\circ}{\pi} = 7(10) = 70^\circ$	<p>Karen's bearing: N 63° E</p> $63^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{7\pi}{20} \text{ or } 1.100$	<p>Karen's bearing: $216 - 180 = 36^\circ$</p> <p>S 36° W</p> $36^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{\pi}{5} \text{ or } 0.628$

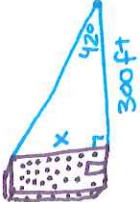

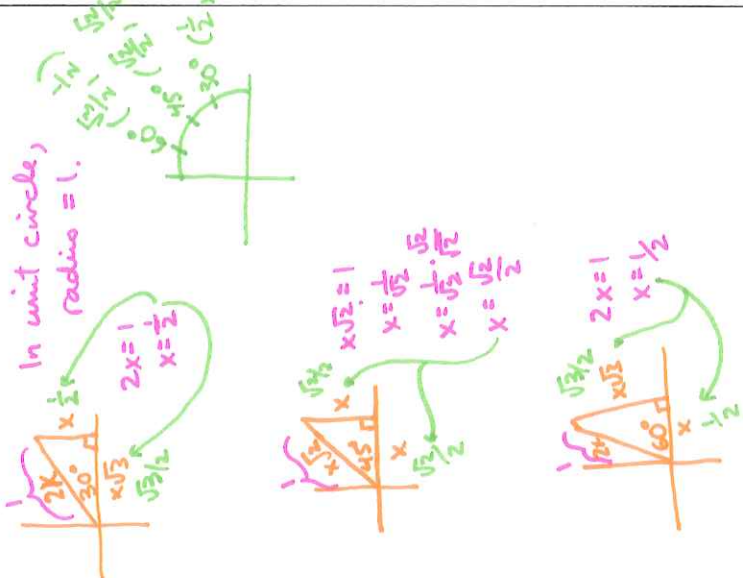
Target 5A: Describe and convert between radian and degree measure

DOK3 Analyze	DOK3 Understand	DOK4 Understand
<p>Using the two drawings to the left, Karen is 4 feet from Stephen. How far did Karen move if she rotates from her 1st location to her 2nd location?</p>  <p> $216^\circ - 63^\circ = 153^\circ$ arc length $S = r\theta$ $S = 4(2.670)$ $S = 10.681 \text{ ft}$ $\theta = 153^\circ = 153 \left(\frac{\pi}{180}\right) = 2.670$ *store in calc. Karen moved 10.681 ft </p>	<p>Can the radian measure of all three angles in a triangle be integers? Explain your thinking with supporting work.</p>  <p> In a Δ, all \angles sum up to 180°. $180^\circ = \pi$ radians so, can $\angle A + \angle B + \angle C = \pi$ if $\angle A, \angle B, \angle C$ are integers? Integers are whole #'s (positive/negative) So, Can 3 integers add up to π? No! \therefore the 3 \angles of Δ if measured in radians can't be integers. </p>	<p>Control Tower A is 60 miles east of control tower B. At a certain time an airplane is at a navigational angle of 340° from tower A and 37° from tower B. Describe why knowing this information would be useful.</p>  <p> This information could be used to find out how far the plane is from Tower A or from Tower B, or how high the plane is from the ground. </p>

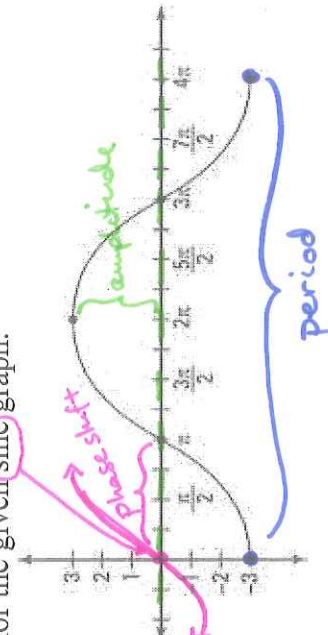
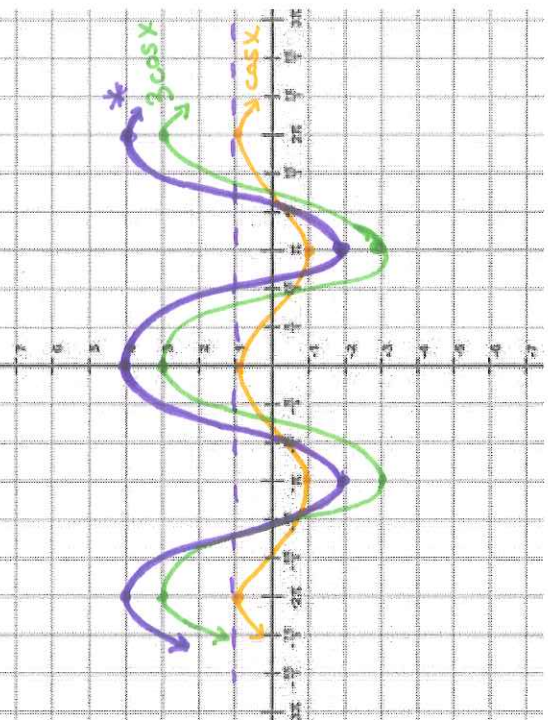
Target 5B/C/D: Generate Unit Circle from Special Right Triangles; Evaluate Trig Functions & Expressions Using Unit Circle; Use Reference Angles to Evaluate Trig Ratios Given Specific Constraints

DOK 1 Remember	DOK 1 Apply	DOK 2 Translate
<p>Identify the coordinates of the point on the terminal side of $\frac{4\pi}{3}$.</p> 	<p>For $\theta = \frac{2\pi}{3}$, evaluate $\sec \theta$ and $\tan \theta$.</p>  <p>coordinates: $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$</p> <p>$\sec \theta = \frac{1}{\cos \theta} = -2$</p> <p>$\tan \frac{2\pi}{3} = \frac{\sqrt{3}/2}{-1/2} = -\sqrt{3}$</p> <p>$\tan \frac{2\pi}{3} = \frac{\sqrt{3}}{2} \cdot \frac{-2}{1} = -\sqrt{3}$</p>	<p>Given $\sec \theta = \frac{13}{5}$ and $\sin \theta < 0$, find $\tan \theta$.</p> <p><i>hyp</i> ← 13 and <i>adj</i> ← 5 → <i>side is negative</i></p> <p>$\sec \theta = \frac{1}{\cos \theta} = \frac{\text{hyp}}{\text{adj}} \Rightarrow \cos \theta = \frac{\text{adj}}{\text{hyp}}$</p>  <p>need -12 b/c sin must be negative</p> <p>$5^2 + a^2 = 13^2$ $25 + a^2 = 169$ $a^2 = 144$ $a = 12$</p> <p>$\tan \theta = \frac{\text{opp}}{\text{adj}} = \frac{-12}{5}$</p>

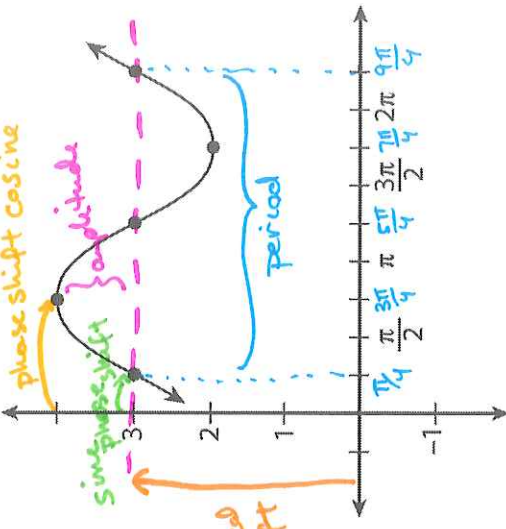
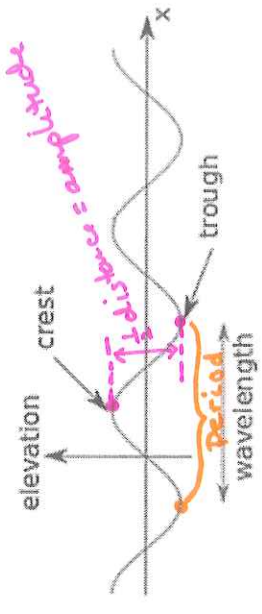
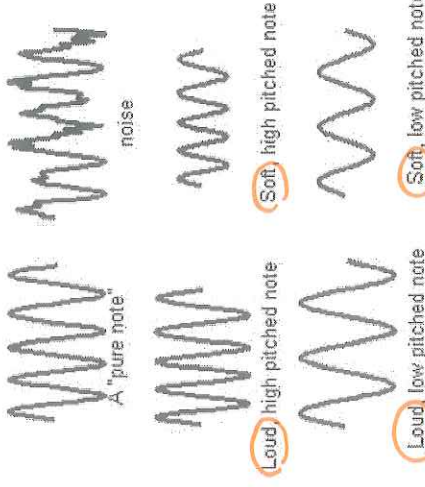
Target 5B/C/D: Generate Unit Circle from Special Right Triangles; Evaluate Trig Functions & Expressions Using Unit Circle; Use Reference Angles to Evaluate Trig Ratios Given Specific Constraints

DOK3 Apply	DOK4 Evaluate	DOK4 Understand
<p>From a point 300 ft along a horizontal line from the base of a building, the angle of elevation to the top of the building is 42°. How tall is the building?</p>  $\tan 42^\circ = \frac{x}{300}$ $300 \tan 42^\circ = x$ $270.121 = x$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>The building is 270.121 ft tall.</p> </div>	<p>Explain why the sine of an acute angle is equal to the cosine of its complement.</p> <p>$\hookrightarrow \angle + \text{its complement} = 90^\circ$</p> <p>Draw a right \triangle.</p>  <p>$\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{a}{c} = \frac{a}{c}$</p> <p>$\alpha + \theta = 90^\circ$ $\text{so, } \alpha = 90^\circ - \theta$ (an \angle and its complement add up to 90°)</p> <p>$\cos \alpha = \frac{\text{adj}}{\text{hyp}} = \frac{b}{c} = \frac{a}{c}$</p> <p>$\therefore$ sine of acute angle is equal to cosine of its complement</p>	<p>Show how special right triangles are used to generate the unit circle.</p> 


Target 5E: Rigid and Non-Rigid Transformations of Sinusoids

DOK 1 Apply	DOK2 Apply	DOK2 Apply
<p>Identify the amplitude and period for:</p> $y = 4 \sin 6x$	<p>Sketch two full periods of the graph of the function:</p> $f(x) = 3 \cos x + 1.$ <p>amplitude 3 vertical shift up 1</p>	<p>Identify the amplitude, period, and the phase shift for the given sine graph.</p> 
<p>amplitude = $a = \boxed{4}$</p> <p>period = $\frac{2\pi}{ b } = \frac{2\pi}{6} = \boxed{\frac{\pi}{3}}$</p>	 <p>* final graph $f(x) = 3\cos x + 1$</p>	<p>amplitude = 3</p> <p>Period = 4π</p> <p>Phase shift = π to the right</p>

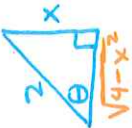
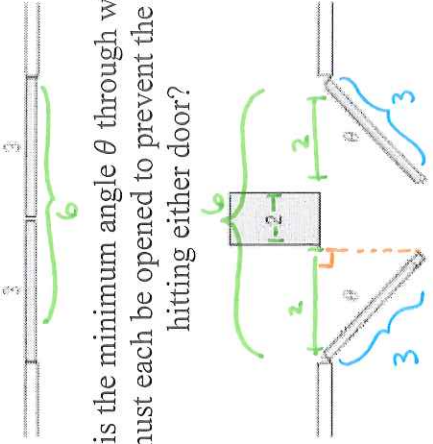
Target 5E: Rigid and Non-Rigid Transformations of Sinusoids

DOK3 Understand	DOK4 Understand	DOK4 Understand
 <p>Write two different functions for the given graph.</p>	 <p>A tsunami wave can be modeled by a sine curve. Describe the terminology used for a tsunami wave in terms of the terminology used for sinusoidal curves.</p>	 <p>Describe the differences in the sound waves of notes shown above in terms of the terminology used for sinusoidal curves.</p>
<p>amplitude = 1, so a = 1</p> <p>period = $\frac{9\pi}{4} - \frac{\pi}{4} = \frac{8\pi}{4} = 2\pi$</p> <p>$\frac{2\pi}{b} = 2\pi$ $2\pi = 2\pi b$ $1 = b$</p> <p>so, vertical shift = 3 up, so, d = 3</p> <p>phase shift cosine = $\frac{3\pi}{4}$ right</p> <p>for sine $\frac{c}{b} = \frac{\pi}{4}$ $\frac{c}{1} = \frac{\pi}{4}$ $c = \frac{\pi}{4}$</p> <p>① $y = \sin(x - \frac{\pi}{4}) + 3$</p> <p>② $y = \cos(x - \frac{3\pi}{4}) + 3$</p>	<p>The <u>wavelength</u> of a tsunami is the <u>period</u> of a sinusoidal curve</p> <p>Half the <u>vertical distance</u> from the <u>crest</u> to the <u>trough</u> is the <u>amplitude</u> of a sinusoidal curve.</p> <p>($\frac{1}{2}$ (crest - trough) = amplitude)</p>	<p><u>Loud</u> notes have <u>greater amplitudes</u> than <u>soft</u> notes.</p> <p><u>High-pitched</u> notes have <u>shorter periods</u> than <u>low-pitched</u> notes.</p> <p>A "pure note" is <u>sinusoidal</u> while <u>noise</u> is not <u>sinusoidal</u>.</p>

Target 5F: Evaluate Inverse and Composite Trigonometric Functions and Expressions Using the Unit Circle

DOK 1 Apply	DOK2 Understand	DOK2 Understand
<p>Evaluate, in radians, $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$ and $\arcsin\left(\frac{\sqrt{2}}{2}\right)$.</p> <p>$\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) = \left[\frac{\pi}{6}\right]$</p> <p>$\arcsin\left(\frac{\sqrt{2}}{2}\right) = \left[\frac{\pi}{4}\right]$</p>	<p>Using a calculator, evaluate $\cos^{-1}(0.32)$, in degrees. Explain what your answer means.</p> <p>$\cos^{-1}(0.32) = \boxed{71.337^\circ}$</p> <p>This means the cosine of 71.337° is 0.32.</p>	<p>Evaluate $\sin\left(\arctan\left(\frac{2}{5}\right)\right)$</p>  <p>$\sin(\arctan(\frac{2}{5}))$</p> <p>opp hyp</p> <p>$5^2 + 2^2 = c^2$ $25 + 4 = c^2$ $29 = c^2$ $\sqrt{29} = c$</p> <p>$\sin(\arctan(\frac{2}{5})) = \frac{2}{\sqrt{29}}$</p>

Target 5F: Evaluate Inverse and Composite Trigonometric Functions and Expressions Using the Unit Circle

DOK3 Understand	DOK3 Apply	DOK4 Analyze
<p>Evaluate $\cos\left(\arcsin\left(\frac{x}{2}\right)\right)$.</p> <p><i>opp</i> $\left(\frac{x}{2}\right)$ <i>hyp</i></p>  <p> $x^2 + a^2 = 2^2$ $x^2 + a^2 = 4$ $a^2 = 4 - x^2$ $a = \sqrt{4 - x^2}$ </p> <p> $\cos\left(\arcsin\left(\frac{x}{2}\right)\right)$ $\stackrel{\text{adj}}{\text{hyp}} \cos(\theta) = \frac{\sqrt{4 - x^2}}{2}$ </p>	<p>What is the minimum angle θ through which the doors must each be opened to prevent the cart from hitting either door?</p>  <p> $\cos \theta = \frac{2}{3}$ $\cos(\cos \theta) = \cos^{-1}\left(\frac{2}{3}\right)$ $\theta = \cos^{-1}\left(\frac{2}{3}\right)$ $\theta = 48.190^\circ$ </p> <p>The minimum angle the doors must be opened is 48.190°</p>	<p>Explain why for all real numbers x $\sin(\sin^{-1} x) = x$ is true false.</p> <p> If $x = \frac{1}{2}$, $\sin(\sin^{-1}(\frac{1}{2}))$ } example. $\sin(\frac{\pi}{6})$ $\frac{1}{2}$ </p> <p>but, if $x > 1$ or $x \leq -1$, then if $x = 2$, $\sin(\sin^{-1}(2))$ undefined $\therefore \sin(\sin^{-1}(x)) \neq x$ </p> <p>So, $\sin(\sin^{-1} x) = x$ is only true when $-1 \leq x \leq 1$</p>