1.1 determine the exact values of the sine, cosine, and tangent of the special angles: 0°, 30°, 45°, 60°, and 90°

(5.2)

1.2 determine the values of the sine, cosine, and tangent of angles from 0° to 360°, through investigation using a variety of tools (e.g., dynamic geometry software, graphing tools) and strategies (e.g., applying the unit circle; examining angles related to special angles)

1.3 determine the measures of two angles from 0° to 360° for which the value of a given trigonometric ratio is the same

1.4 define the secant, cosecant, and cotangent ratios for angles in a right triangle in terms of the sides of the triangle (e.g., $\sec A = \frac{hypotenuse}{adjacent}$), and relate these ratios to the cosine, sine, and tangent ratios (e.g., $\sec A = \frac{1}{\cos A}$)

1.5 prove simple trigonometric identities, using the Pythagorean identity $\sin^2 x + \cos^2 x = 1$; the quotient identity $\tan x = \frac{\sin x}{\cos x}$; and the reciprocal identities $\sec x = \frac{1}{\cos x}$, $\csc x = \frac{1}{\sin x}$, and $\cot x = \frac{1}{\tan x}$

Sample problem: Prove that $1 - \cos^2 x = \sin x \cos x \tan x$.

1.6 pose problems involving right triangles and oblique triangles in two-dimensional settings, and solve these and other such problems using the primary trigonometric ratios, the cosine law, and the sine law (including the ambiguous case)

$$\sin 45° + \tan 30°$$

$$= \frac{1}{\sqrt{2}}\cdot\frac{\sqrt{3}}{\sqrt{3}} + \frac{1}{\sqrt{3}}\cdot\frac{\sqrt{2}}{\sqrt{2}}$$

$$= \frac{\sqrt{3}+\sqrt{2}}{\sqrt{6}}\cdot\frac{\sqrt{6}}{\sqrt{6}}$$

$$= \frac{\sqrt{3\cdot 6}+\sqrt{2\cdot 6}}{\sqrt{36}}$$

$$= \frac{\sqrt{\cancel{3}\cdot 2\cdot \cancel{3}}+\sqrt{\cancel{2}\cdot\cancel{2}\cdot 3}}{6}$$

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

1.1 determine the exact values of the sine, cosine, and tangent of the special angles: 0°, 30°, 45°, 60°, and 90° (5.2)

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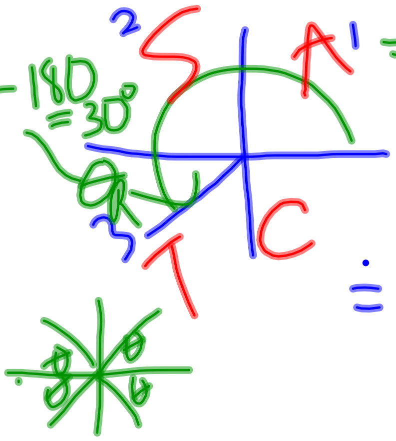
Find exact value of

$\cos 210° \doteq -\cos \theta_R$

$= -\cos 30°$

$210 - 180 = 30°$



$= -\frac{\sqrt{3}}{2}$

$\doteq -0.8$

$= \frac{\sqrt{3}\cdot 2\cdot 3 + \sqrt{2}\cdot 2\cdot 3}{6}$

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

1.1 determine the exact values of the sine, cosine, and tangent of the special angles: 0°, 30°, 45°, 60°, and 90° (5.2)

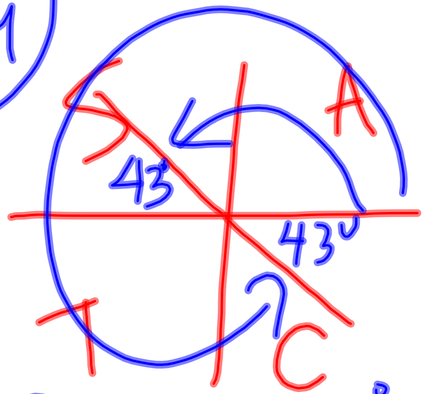
5.4 **1.2** determine the values of the sine, cosine, and tangent of angles from 0° to 360°, through investigation using a variety of tools (e.g., dynamic geometry software, graphing tools) and strategies (e.g., applying the unit circle; examining angles related to special angles)

1.3 determine the measures of two angles from 0° to 360° for which the value of a given trigonometric ratio is the same 5.4

$\tan\theta_R = +0.93$

$\theta_R \doteq 43°$

$\tan\theta = -0.93$



$\theta_1 = 180° - 43°$

$= 137°$

$\theta_2 = 360 - 43°$

$= 317°$

1.4 define the secant, cosecant, and cotangent ratios for angles in a right triangle in terms of the sides of the triangle (e.g., $\sec A = \frac{hypotenuse}{adjacent}$), and relate these ratios to the cosine, sine, and tangent ratios (e.g., $\sec A = \frac{1}{\cos A}$)

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-3

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Sample problem: Prove that $1 - \cos^2 x = \sin x \cos x \tan x$.

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$\cos\theta = \frac{4}{7}$

$\sec\theta = \frac{7}{4}$

$\cot\theta = \frac{3}{9}$ $\frac{x}{y}$

write the 3 primary trig ratios if θ is in Q3

$\sin\theta = \frac{y}{r} = \frac{-\cancel{9}3}{3\sqrt{10}} = -3/\sqrt{10}$

$\cos\theta = \frac{x}{r} = \frac{-3}{3\sqrt{10}} = \frac{-1}{\sqrt{10}}$

$\tan\theta = \frac{y}{x} = \frac{9}{3}$

$x^2 + y^2 = r^2$

$(-3)^2 + (-9)^2 = r^2$

$9 + 81 = r^2$

$\sqrt{90} = r$

$\sqrt{2\cdot5\cdot3\cdot3} = r$

$3\sqrt{10} = r$

$= \frac{-1}{\sqrt{10}}\cdot\frac{\sqrt{10}}{\sqrt{10}} = \frac{-\sqrt{10}}{10}$

90

2 45

3 15

3 5

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5.1, 5.4

$s^2 + c^2 = 1$

$s^2 = 1 - c^2$

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Sample problem: Prove that $1 - \cos^2 x = \sin x \cos x \tan x$.

$1 - \cos^2\theta = \sin\theta\cos\theta\tan\theta$

$LS = 1 - \cos^2\theta$

$= \sin^2\theta$

$RS = \sin\theta\cos\theta\tan\theta$

$= \sin\theta \cancel{\cos\theta} \frac{\sin\theta}{\cancel{\cos\theta}}$

$= \sin^2\theta$

$= LS$

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90

2 45

3 15

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$9 + 81 = r^2$

$\sqrt{90} = r$

$\sqrt{2 \cdot 5 \cdot 3 \cdot 3} = r$

$3\sqrt{10} = r$

$= \frac{-1}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}}$

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$1-\cos^2\theta = \sin\theta\cos\theta\tan\theta$

$LS = 1-\left(\frac{x}{r}\right)^2$

$= 1 - \frac{x^2}{r^2}$

$= \frac{r^2}{r^2} - \frac{x^2}{r^2}$

$= \frac{r^2-x^2}{r^2} = \frac{y^2}{r^2}$

$RS = \frac{y}{r}\cdot\frac{\cancel{x}}{r}\cdot\frac{y}{\cancel{x}}$

$= \frac{y^2}{r^2}$

($\sin\frac{y}{r}$ $x^2+y^2=r^2$)

=

(-3, 9)

$9+81 = r^2$

$\sqrt{90} = r$

$\sqrt{2\cdot5\cdot\cancel{3}\cdot\cancel{3}} = r$

$3\sqrt{10} = r$

$= \frac{-1}{\sqrt{10}}\cdot\frac{\sqrt{10}}{\sqrt{10}}$

$= \frac{-\sqrt{10}}{10}$

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*

3 5

$\sqrt{2\cdot 5\cdot \cancel{3}\cdot\cancel{3}} = r$

$3\sqrt{10} = r$

$= -\dfrac{\sqrt{10}}{10}$ $\sqrt{10}\sqrt{10}$