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COMMUNICATION (CO)		

Name:

ANSWERS

TEST #5 TRIGONOMETRIC RATIOS

Knowledge & Understanding (KU)

1. For each primary trigonometric ratio, determine the corresponding reciprocal ratio.

a.) $\cos \theta = \frac{3}{4} \rightarrow \sec \theta = \frac{4}{3}$ ✓

b.) $\tan \theta = \frac{1}{4} \rightarrow \cot \theta = 4$ ✓

Out of 2

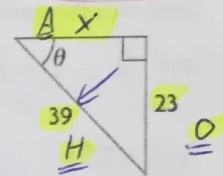
2. Evaluate to the nearest hundredth.

a.) $\cot 75^\circ \rightarrow \frac{1}{\tan 75^\circ}$ ✓
= 0.27 ✓

b.) $\cos 34^\circ = 0.83$ ✓

Out of 3

3. i) For the triangle, state the reciprocal trigonometric ratios for angle θ .
ii) Calculate the value of θ to the nearest degree.



i.) $a^2 + b^2 = c^2$
 $(x)^2 + (23)^2 = (39)^2$ ✓
 $x^2 = 992$ ✓
 $x = \sqrt{992}$ ✓ or
 $x = 4\sqrt{62}$ ✓

$\csc \theta = \frac{39}{23}$ ✓
 $\sec \theta = \frac{39}{4\sqrt{62}}$ ✓
 $\cot \theta = \frac{4\sqrt{62}}{23}$ ✓

ii.) $\sin \theta = \frac{23}{39}$
 $\angle \theta = 36^\circ$ ✓

$\angle \theta = \sin^{-1}\left(\frac{23}{39}\right)$ ✓

Out of 7

4. Determine the exact value of the trigonometric expression. Express your answers in simplified radical form.

$\tan 30^\circ + 2(\sin 45^\circ)(\cos 60^\circ)$
 $= \frac{\sqrt{3}}{3} + 2\left(\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right)$ ✓
 $= \frac{2 \times \sqrt{3}}{2 \times 3} + \frac{\sqrt{2} \times 2}{2 \times 2}$ ✓
 $= \frac{2\sqrt{3} + 3\sqrt{2}}{6}$ ✓

Out of 3

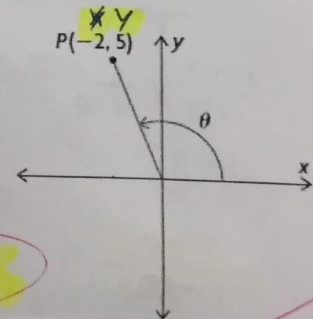
5. For the sketch, state the primary trigonometric ratios associated with angle θ . Express your answers in simplified radical form.

$x^2 + y^2 = r^2$
 $(-2)^2 + (5)^2 = r^2$ ✓
 $\sqrt{29} = r$ ✓

$\sin \theta = \frac{y}{r} = \frac{5}{\sqrt{29}}$ ✓

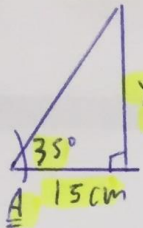
$\cos \theta = \frac{x}{r} = \frac{-2}{\sqrt{29}}$ ✓

$\tan \theta = \frac{y}{x} = \frac{5}{-2}$ ✓



Out of 5

6. Determine the value of x to the nearest centimetre.

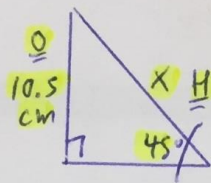


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$$\tan 35^\circ = \frac{y}{15}$$

$$y = 15 \tan 35^\circ$$

$$y = 10.5 \text{ cm}$$



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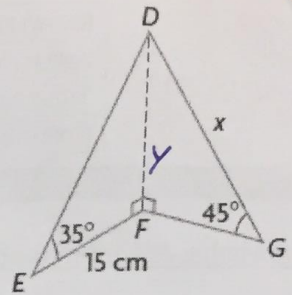
$$\sin 45^\circ = \frac{10.5}{x}$$

$$x = \frac{10.5}{\sin 45^\circ}$$

$$x = 14.8 \text{ cm}$$

or

$$x = 15 \text{ cm}$$



Out of 6

7. Determine the measure of angle θ to the nearest degree.

$$\frac{\sin Q}{q} = \frac{\sin R}{r}$$

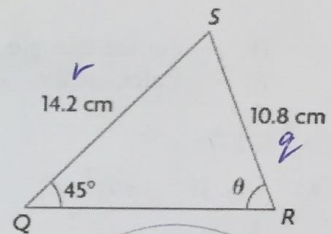
$$\frac{\sin 45^\circ}{10.8} = \frac{\sin \theta}{14.2}$$

$$\sin \theta = \frac{14.2 \sin 45^\circ}{10.8}$$

$$\theta = \sin^{-1} \left(\frac{14.2 \sin 45^\circ}{10.8} \right)$$

$$\theta = 68^\circ$$

Out of 4



SSA
sine law

8. Prove each identity.

a.) $\frac{\tan \theta}{\cos \theta} = \frac{\sin \theta}{1 - \sin^2 \theta}$

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

$$\frac{\sin \theta}{\cos^2 \theta} \times \frac{1}{\cos \theta}$$

$$\frac{\sin \theta}{1 - \sin^2 \theta}$$

LS = RS

b.) $1 - \cos^2 x = \frac{\sin x \cos x}{\cot x}$

$$\frac{\sin x \cos x}{\frac{1}{\sin x}}$$

$$\frac{\sin x \cos x}{1} \times \frac{\sin x}{\cos x}$$

$$\sin^2 x$$

$$1 - \cos^2 x$$

LS = RS

Out of 8

Thinking & Inquiry (TI)

1. Using exact angles, show that $1 + \cot^2 x = \csc^2 x$ for when angle x is 30° .

$$1 + \frac{1}{\tan^2 x} = \frac{1}{\sin^2 x} \checkmark$$

$$1 + \frac{1}{\tan^2(30^\circ)} = \frac{1}{\sin^2(30^\circ)} \checkmark$$

$$1 + \frac{1}{\left(\frac{\sqrt{3}}{3}\right)^2} = \frac{1}{\left(\frac{1}{2}\right)^2} \checkmark$$

$$1 + \frac{9}{3} = 4 \checkmark$$

$1 + 3 = 4$
 $4 = 4 \checkmark$
 $LS = RS \checkmark$
Out of 6

2. Determine the values of θ if $\csc \theta = -\frac{2\sqrt{3}}{3}$ and $0^\circ \leq \theta \leq 360^\circ$.

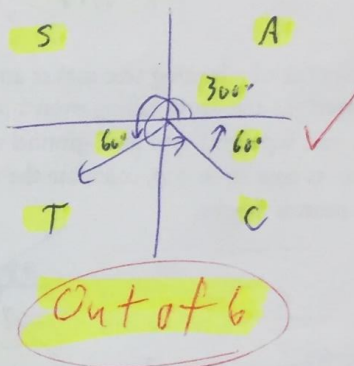
$$\sin \theta = -\frac{3}{2\sqrt{3}} \checkmark$$

$$\therefore -60^\circ + 360^\circ \checkmark$$

$$= 300^\circ$$

$$\angle \theta = \sin^{-1}\left(\frac{-3}{2\sqrt{3}}\right) \checkmark$$

$\therefore \theta = 300^\circ$
 &
 $\theta = 240^\circ \checkmark$



3. Simplify the following trig expression.

$$\frac{\csc^2 \theta - 3 \csc \theta + 2}{\csc^2 \theta - 1}$$

$P = 2$
 $S = -3$
 $-2x - 1$
 $-2 + (-1)$

$$\frac{(\csc \theta - 2)(\csc \theta - 1)}{(\csc \theta + 1)(\csc \theta - 1)} \checkmark$$

$$\frac{(\csc \theta - 2)}{(\csc \theta + 1)} \checkmark$$

4. Prove the identity.

$$\sin^4 \alpha - \cos^4 \alpha = \sin^2 \alpha - \cos^2 \alpha$$

$$(\sin^2 \alpha)^2 - (\cos^2 \alpha)^2 \checkmark$$

$$(\sin^2 \alpha - \cos^2 \alpha)(\sin^2 \alpha + \cos^2 \alpha) \checkmark$$

$$(\sin^2 \alpha - \cos^2 \alpha)(1) \checkmark$$

$$\sin^2 \alpha - \cos^2 \alpha$$

$\therefore LS = RS \checkmark$

Out of 8