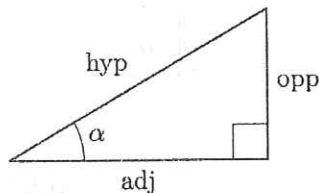Name: __Answer Key__

Math 1316: Mastery Quiz 1 (Version A)

Please show all your work for computations, and write your final answers in the boxes.

1. A right triangle with angle α has the following sides: hyp for hypotenuse, opp for the opposite side, and adj for the adjacent side. Give all six trig functions of α in terms of ratios of these side lengths.

hyp   opp
α
adj

$\sin \alpha =$
$$\frac{opp}{hyp}$$

$\cos \alpha =$
$$\frac{adj}{hyp}$$

$\tan \alpha =$
$$\frac{opp}{adj}$$

$\csc \alpha =$
$$\frac{hyp}{opp}$$
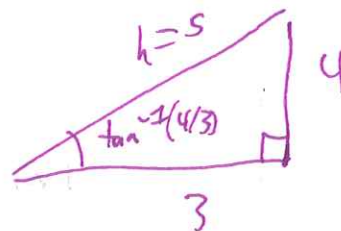
$\sec \alpha =$
$$\frac{hyp}{adj}$$

$\cot \alpha =$
$$\frac{adj}{opp}$$

2. Simplify fully the following expression. Give an exact answer, and show all your work.

$$\cos(\tan^{-1}(4/3))$$

$\cos(\tan^{-1}(4/3)) =$
$$3/5$$

$h = 5$

$\tan^{-1}(4/3)$ 4

3

$3^2 + 4^2 = h^2$
$9 + 16 = h^2$
$25 = h^2$
$h = 5$

Important! You can get an exact answer by going through this right triangle setup, whereas punching buttons on your calculator only gives an approximation.

3. Consider the following diagram of two right triangles sharing a side. Find the lengths x, y, and z and the angles α, β, and γ. For all answers, round to two digits past the decimal point, and give angles in degrees.

$x =$

2.83 or $2\sqrt{2}$

$y =$

2

$z =$

4.47 or $2\sqrt{5}$

$\alpha =$

$45°$

$\beta =$

$63.43°$

$\gamma =$
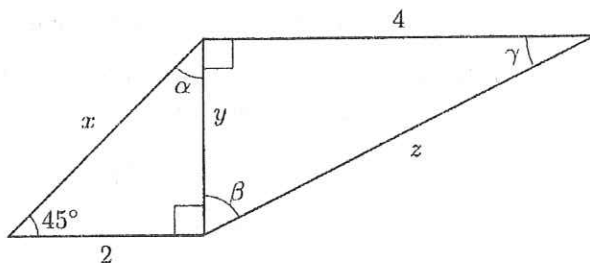
$26.57°$

$\tan 45° = \frac{y}{2} \Rightarrow y = 2 \cdot \tan 45° = 2 \cdot 1 = 2$

$\cos 45° = \frac{2}{x} \Rightarrow x = \frac{2}{\cos 45°} = \frac{2}{\sqrt{2}/2} = 2\sqrt{2}$

≈ 2.83

$z^2 = 4^2 + 2^2 = 16 + 4 = 20$

$z = \sqrt{20} = 2\sqrt{5}$

≈ 4.47

$\alpha = 90° - 45° = 45°$

$\tan \beta = \frac{4}{2} = 2$

$\beta = \tan^{-1}(2)$

$\approx 63.43°$

$\tan \gamma = \frac{2}{4} = \frac{1}{2}$

$\gamma = \tan^{-1}(1/2)$

≈ 26.57

Name: *Answer Key*

Math 1316: Mastery Quiz 2 (Version A)

Please show all your work for computations, and write your final answers in the boxes.

1. How many radians are in a half circle? How many degrees are in a half circle?

π radians $= 180° =$ one half circle.

2. Explain in your own words what it means for two angles to be coterminal. If you are given degree measures for two angles, how do you check whether they are coterminal?

Two angles are coterminal if they face the same direction. To check, check whether their difference is a multiple of 360°.

3. Consider the two angles $\alpha = 40°$ and $\beta = \pi/5$. Convert α to radians, and then determine which angle is larger.

$\alpha =$ (in radians)
$\dfrac{2\pi}{9}$

$40 \cdot \dfrac{\pi}{180} = \dfrac{4\pi}{18} = \dfrac{2\pi}{9}$

$\dfrac{2\pi}{9}$ vs $\dfrac{\pi}{5}$

the larger angle is
$\alpha = \dfrac{2\pi}{9}$

$\dfrac{10\pi}{45} > \dfrac{9\pi}{45}$

4. Consider the angles $\alpha = -100°$ and $\beta = 7\pi/5$. Determine what quadrant each is in in and find its reference angle. Give all answers in exact form, with the same units as you started with.
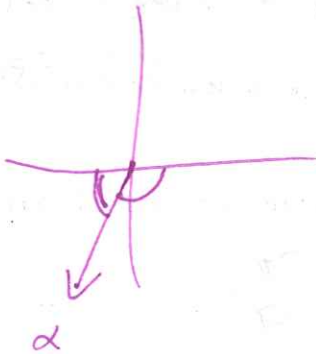
α in quadrant	α's reference angle =
3	$80°$

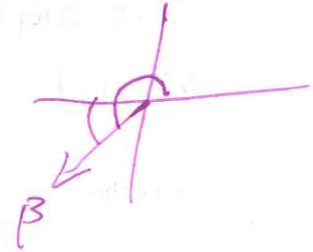| β in quadrant	β's reference angle =
3	$2\pi/5$

Important! Both of these are positive. In general, reference angles are between $0°$ and $90°$ (or 0 & $\frac{\pi}{2}$ radians).

$$\frac{3\pi}{2} > \frac{7\pi}{5} > \pi$$

α

$$180° - 100° = 80°$$

β

$$\beta - \pi = \frac{7\pi}{5} - \pi = \frac{2\pi}{5}$$