

Homework

Section 5.3

DO NOT use a calculator on this assignment!

Some Pythagorean Triples: (You don't need to memorize these. They may be helpful for this assignment, though.)

3, 4, 5	5, 12, 13	7, 24, 25	8, 15, 17	9, 40, 41	11, 60, 61	12, 35, 37	13, 84, 85
16, 63, 65	20, 21, 29	28, 45, 53	33, 56, 65	36, 77, 85	39, 80, 89	48, 55, 73	65, 72, 97

Name the quadrant in which angle θ lies.

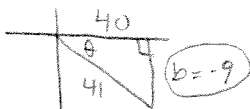
<p>1. $\sin \theta < 0, \cos \theta > 0$</p> <p>QUADRANT IV</p>	<p>2. $\sin \theta > 0, \cos \theta < 0$</p> <p>QUADRANT II</p>	<p>3. $\sec \theta < 0, \tan \theta > 0$</p> <p>QUADRANT III</p>
<p>4. $\cos \theta < 0, \csc \theta < 0$</p> <p>QUADRANT III</p>	<p>5. $\sec \theta > 0, \cot \theta > 0$</p> <p>QUADRANT I</p>	<p>6. $\tan \theta < 0, \sin \theta > 0$</p> <p>QUADRANT II</p>

Given $\sin \theta$ and $\cos \theta$, find the exact values of the remaining trigonometric functions.

<p>7. $\sin \theta = -\frac{24}{25}$ and $\cos \theta = \frac{7}{25}$</p> <p> $25^2 = (-24)^2 + a^2$ $625 = 576 + a^2$ $49 = a^2$ $\pm \sqrt{49} = a$ $7 = a$ </p> <p> $\csc \theta = \frac{-25}{24}$ $\sec \theta = \frac{25}{7}$ $\tan \theta = \frac{-24}{7}$ $\cot \theta = \frac{-7}{24}$ </p>	<p>8. $\sin \theta = \frac{8}{17}$ and $\cos \theta = -\frac{15}{17}$</p> <p> $17^2 = 8^2 + b^2$ $289 = 64 + b^2$ $225 = b^2$ $\pm \sqrt{225} = b$ $-15 = b$ </p> <p> $\csc \theta = \frac{17}{8}$ $\sec \theta = \frac{-17}{15}$ $\tan \theta = \frac{-8}{15}$ $\cot \theta = \frac{-15}{8}$ </p>
<p>9. $\sin \theta = -\frac{\sqrt{7}}{3}$ and $\cos \theta = -\frac{\sqrt{2}}{3}$</p> <p> $\csc \theta = \frac{-3\sqrt{7}}{7}$ $\sec \theta = \frac{-3\sqrt{2}}{3}$ $\tan \theta = \frac{\sqrt{7}}{\sqrt{2}} = \frac{\sqrt{14}}{2}$ $\cot \theta = \frac{\sqrt{14}}{7}$ </p>	<p>10. $\sin \theta = \frac{3\sqrt{2}}{5}$ and $\cos \theta = \frac{\sqrt{7}}{5}$</p> <p> $\csc \theta = \frac{5}{3\sqrt{2}} = \frac{5\sqrt{2}}{6}$ $\sec \theta = \frac{5}{\sqrt{7}} = \frac{5\sqrt{7}}{7}$ $\tan \theta = \frac{3\sqrt{2}}{\sqrt{7}} = \frac{3\sqrt{14}}{7}$ $\cot \theta = \frac{\sqrt{7}}{3\sqrt{2}} = \frac{\sqrt{14}}{6}$ </p>

Find the *exact* values of each trigonometric function using the given information.

11. $\cos \theta = \frac{40}{41}$ and θ is in quadrant IV



$$41^2 = 40^2 + b^2$$

$$1681 = 1600 + b^2$$

$$81 = b^2$$

$$\pm \sqrt{81} = b$$

$$\tan \theta = \frac{-9}{40}$$

$\sin \theta = \frac{-9}{41}$

$\cos \theta = \frac{40}{41}$

$\csc \theta = \frac{-41}{9}$

$\sec \theta = \frac{41}{40}$

$\cot \theta = \frac{-40}{9}$

12. $\csc \theta = -\frac{61}{11}$ and $\pi < \theta < \frac{3\pi}{2}$



$$x^2 + (-11)^2 = 61^2$$

$$x^2 + 121 = 3721$$

$$x^2 = 3600$$

$$x = \pm \sqrt{3600}$$

$$\tan \theta = \frac{11}{60}$$

$\sin \theta = \frac{-11}{61}$

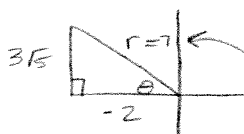
$\cos \theta = \frac{-60}{61}$

$\csc \theta = \frac{-61}{11}$

$\sec \theta = \frac{-61}{60}$

$\cot \theta = \frac{60}{11}$

13. $\tan \theta = -\frac{3\sqrt{5}}{2}$ and $\sin \theta > 0$



$$(-2)^2 + (3\sqrt{5})^2 = r^2$$

$$4 + 45 = r^2$$

$$49 = r^2$$

$$\pm \sqrt{49} = r$$

$$7 = r$$

$$\tan \theta = \frac{-3\sqrt{5}}{2}$$

$\sin \theta = \frac{3\sqrt{5}}{7}$

$\cos \theta = \frac{-2}{7}$

$\csc \theta = \frac{7}{3\sqrt{5}} = \frac{7\sqrt{5}}{15}$

$\sec \theta = \frac{-7}{2}$

$\cot \theta = \frac{-2}{3\sqrt{5}} = \frac{-2\sqrt{5}}{15}$

Fundamental Trig Identities	$\tan \theta = \frac{y}{x} = \frac{\sin \theta}{\cos \theta}$	$\cot \theta = \frac{x}{y} = \frac{\cos \theta}{\sin \theta}$
$\csc \theta = \frac{1}{y} = \frac{1}{\sin \theta}$	$\sec \theta = \frac{1}{x} = \frac{1}{\cos \theta}$	$\cot \theta = \frac{1}{\tan \theta}$
$\sin^2 \theta + \cos^2 \theta = 1$	$\tan^2 \theta + 1 = \sec^2 \theta$	$\cot^2 \theta + 1 = \csc^2 \theta$

Use the Fundamental Trig Identities to find the *exact* value of each expression.

14. $\sin^2 72^\circ + \cos^2 72^\circ$ 	15. $\tan 88^\circ - \frac{\sin 88^\circ}{\cos 88^\circ}$ $\tan 88 - \tan 88$ ○	16. $\cos 65^\circ \sec 65^\circ$ $\cos 65 \left(\frac{1}{\cos 65} \right)$
17. $\cot \frac{\pi}{7} \tan \frac{\pi}{7}$ $\left(\frac{1}{\tan(\frac{\pi}{7})} \right) \left(\tan \frac{\pi}{7} \right)$ 	18. $\sin^2 \frac{5\pi}{12} + \cos^2 \frac{5\pi}{12}$ 	19. $\cot^2 25^\circ - \csc^2 25^\circ$ -