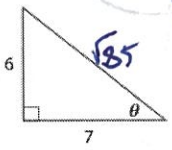
Pre – Calculus
REVIEW 4.1 – 4.3

Name Key

$s = r\theta$ $\quad A = \frac{1}{2}r^2\theta$

Find the **exact values** (no decimals) of the six trigonometric functions of θ.

1.



$49 + 36 = x^2$

$\sqrt{85} = x$

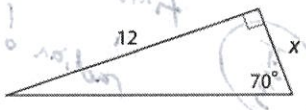
$\sin\theta = \frac{6\sqrt{85}}{85}$ $\quad \cos\theta = \frac{\sqrt{85}}{6}$

$\cos\theta = \frac{7\sqrt{85}}{85}$ $\quad \sec\theta = \frac{\sqrt{85}}{7}$

$\tan\theta = \frac{6}{7}$ $\quad \cot\theta = \frac{7}{6}$

For numbers 2 and 3, find the value of x. Round to the nearest tenth if necessary.

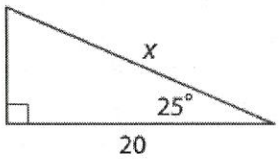
2.



$\tan 70° = \frac{12}{x}$

$x = 4.4$

3.



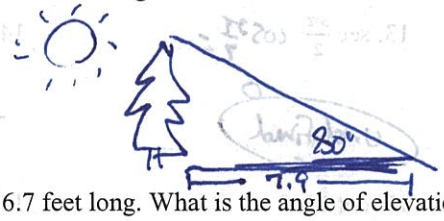
$\cos 25° = \frac{20}{x}$

22.1

4. A pine tree casts a shadow that is 7.9 feet long when the sun is at an angle of elevation of 80°.

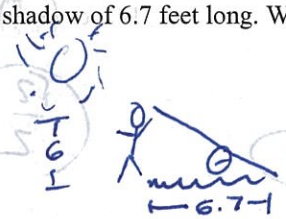
a) Find the height of the tree. Round to the nearest tenth.

$\tan 80° = \frac{x}{7.9}$ $\quad$ 44.8 ft



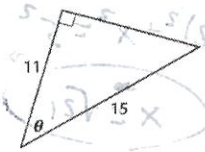
b) Later that same day, a person 6 feet tall casts a shadow of 6.7 feet long. What is the angle of elevation of the sun? Round to the nearest degree.

$\tan^{-1}\left(\frac{6}{6.7}\right) = \theta$ $\quad$ 42°



Find the measure of angle θ. Round to the nearest degree if necessary.

5.



$\cos^{-1}\left(\frac{11}{15}\right) = \theta$

43°

6. Convert the angle measure into degrees or radians.

a) $\frac{2\pi}{9}$ $\quad \left(\frac{180°}{\pi}\right)$ $\quad$ 40°

b) 135° $\quad \left(\frac{\pi}{180°}\right)$ $\quad \frac{3\pi}{4}$

For numbers 7 and 8, find one positive and one negative angle coterminal with the given angle.

7. $\frac{5\pi}{6}$ $\quad + 2\pi\left(\frac{12\pi}{6}\right)$

$-2\pi\left(\frac{12\pi}{6}\right)$

P $\quad$ N

$\frac{17\pi}{6}$ $\quad$ $\frac{-7\pi}{6}$

8. −60° $\quad + 360$

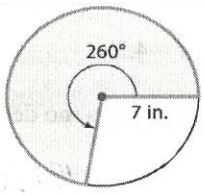
-360

P $\quad$ N

300° $\quad$ −420°

9. a) Find the approximate area of the shaded region that has a central angle of 260°. Round to the nearest tenth.

$A = \frac{1}{2}\left(\frac{13\pi}{9}\right)(7)^2 = 111.2 \text{ units}^2$ $\left(\frac{\pi}{180^\circ}\right) = \frac{13\pi}{9}$

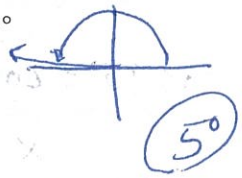


b) Find the length of the of arc of the shaded region that has a central angle of 260°. Round to the nearest tenth.

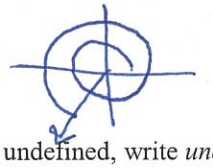
$s = \left(\frac{13\pi}{9}\right)(7) = 31.8 \text{ units}$

For numbers 10 and 11, sketch the angle and determine the reference angle.

10. 175°



11. $\frac{10\pi}{3}\left(\frac{180^\circ}{\pi}\right) = 600^\circ$ start in radian, finish in radian!



$600^\circ = \frac{\pi}{3}$

For numbers 14 – 21, find the **exact value** of the expression. If undefined, write *undefined*. Remember to NOT use your unit circle or calculator. ☺

S | A
T | C

12. $\cos 315^\circ$ $\frac{\sqrt{2}}{2}$

13. $\sec \frac{3\pi}{2}$ $\cos\frac{3\pi}{2} = 0$ undefined

14. $\sin \frac{5\pi}{3}$ $-\frac{\sqrt{3}}{2}$

15. $\tan \frac{5\pi}{6}$ $-\frac{\sqrt{3}}{3}$

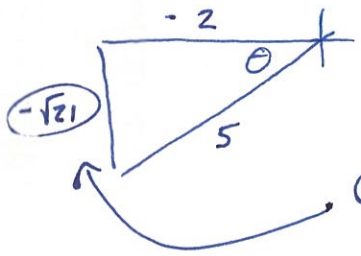
16. $\csc 225^\circ$ $-\sqrt{2}$ $\sin 225 = -\frac{\sqrt{2}}{2}$ $\frac{-2}{-\sqrt{2}}\left(\frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{-2\sqrt{2}}{2}$

17. $\cot 150^\circ$ $\tan 150^\circ = -\frac{\sqrt{3}}{3}$ $-\sqrt{3}$

18. $\cos\left(-\frac{\pi}{4}\right)$ $\frac{\sqrt{2}}{2}$

19. $\sin \pi$ 0

20. Find the exact values of the five remaining trigonometric functions of θ. $\cos\theta = -\frac{2}{5}$, where $\sin\theta < 0$ and $\tan\theta > 0$ so Q3!



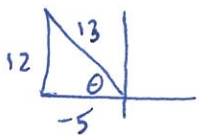
$(-2)^2 + x^2 = (5)^2$

$x = \sqrt{21}$

$\sin\theta = -\frac{\sqrt{21}}{5}$ $\csc\theta = -\frac{5\sqrt{21}}{21}$ $\sec\theta = -\frac{5}{2}$

$\tan\theta = \frac{\sqrt{21}}{2}$ $\cot\theta = \frac{2\sqrt{21}}{21}$

21. Let (–5, 12) be a point on the terminal side of an angle θ in standard position. Find the exact values of the six trigonometric functions of θ.



$\sin\theta = \frac{12}{13}$ $\csc\theta = \frac{13}{12}$

$\cos\theta = \frac{-5}{13}$ $\sec\theta = \frac{13}{-5}$

$\tan\theta = \frac{12}{-5}$ $\cot\theta = \frac{-5}{12}$