Review Worksheet 4.7 – 4.8 Precalculus w/ Trig Name Key

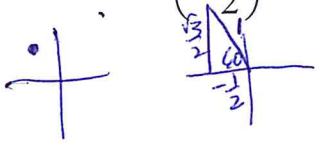
No calculator part

State the **domain** and **range** of each inverse trig function.

1. $y = \sin^{-1} x$ D $[-1, 1]$ R $[-\frac{\pi}{2}, \frac{\pi}{2}]$
2. $y = \cos^{-1} x$ D $[-1, 1]$ R $[0, \pi]$
3. $y = \tan^{-1} x$ D $(-\infty, \infty)$ R $(-\frac{\pi}{2}, \frac{\pi}{2})$
4. $y = \csc^{-1} x$ ~~D $(-\infty, \infty)$~~ R $[-\frac{\pi}{2}, 0) \cup (0, \frac{\pi}{2}]$ D $(-\infty, -1] \cup [1, +\infty)$
5. $y = \sec^{-1} x$ D $(-\infty, -1] \cup [1, \infty)$ R $[0, \frac{\pi}{2}) \cup (\frac{\pi}{2}, \pi]$
6. $y = \cot^{-1} x$ ~~D $(-\infty, \infty)$~~ ~~R $(0, \pi)$~~

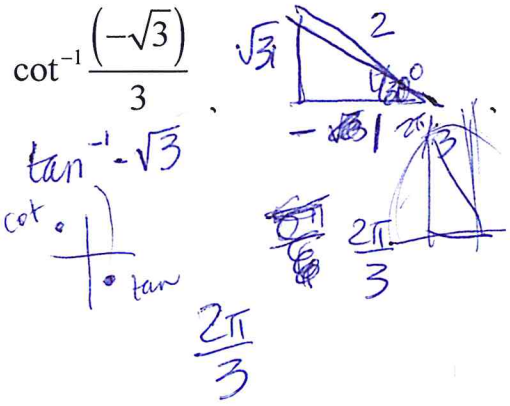
Problems 7-12: Use the restricted ranges from the problems above to evaluate each expression in radians.

7. $\arccos\left(-\frac{1}{2}\right)$ $\frac{2\pi}{3}$

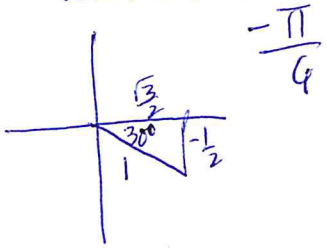


8. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$ $\frac{\pi}{4}$

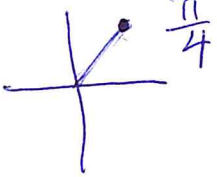
9. $\cot^{-1}\frac{(-\sqrt{3})}{3}$ $\tan^{-1} -\sqrt{3}$ $\frac{2\pi}{3}$



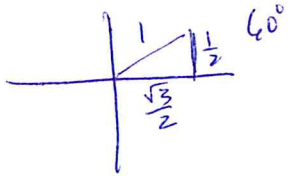
10. arccsc(−2) $\arcsin(\frac{1}{-2})$ $-\frac{\pi}{6}$



11. $\tan^{-1}(1)$ $\frac{\pi}{4}$



12. $\text{arcsec}\left(\frac{2\sqrt{3}}{3}\right) = \frac{2}{\sqrt{3}}$ $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$ $\frac{\pi}{6}$



Problems 13-16: Find the exact value of each expression. Remember to use the restricted ranges from problems 1-6.

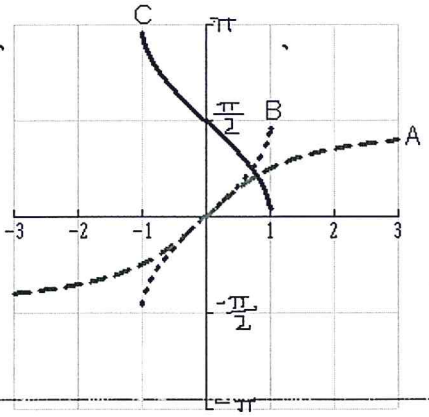
13. $\csc\left[\sec^{-1}(-2)\right]$

14. $\cos\left[\cot^{-1}(-\sqrt{3})\right]$

15. $\sec\left[\tan^{-1}(5)\right]$

16. $\sin^{-1}\left[\cos\frac{5\pi}{4}\right]$

17. Identify each inverse trig function using the letters A, B, or C from the graph below.



__B__ $y = \sin^{-1} x$

__C__ $y = \cos^{-1} x$

__A__ $y = \tan^{-1} x$

Problems 18-19: Find the exact value of each expression.

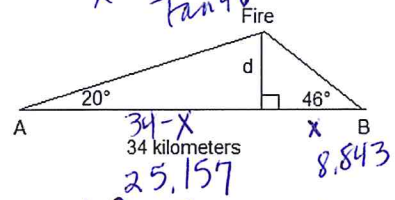
18. tan (arccos x)

19. $\csc\left[\arctan x\right]$

Review Worksheet 4.7-4.8 Precalculus w/ Trig Name_____

Calculator Part

1. Two fire towers are 34 kilometers apart, where tower A is due west of tower B. A fire is spotted from the towers, and the bearings from A and B are E 20° N and W 46° N, respectively. Find the distance *d* of the fire from the line segment AB to the nearest thousandth of a kilometer.



check ✓

$\tan 46 = \frac{9.157}{X}$

$X = \frac{9.157}{\tan 46^\circ} \approx 8.84$

25.157 8.843

$\tan^{-1}\frac{9.157}{25.157} \approx 20^\circ$

$\tan 20^\circ = \frac{d}{34-X}$

$(34-X)(\tan 20^\circ) = d$

$34 - X = \frac{d}{\tan 20^\circ}$

$34 - \frac{d}{\tan 20^\circ} = X$

$d \approx 9.157$ km

$\tan 46^\circ = \frac{d}{X}$

$X \cdot \tan 46^\circ = d$

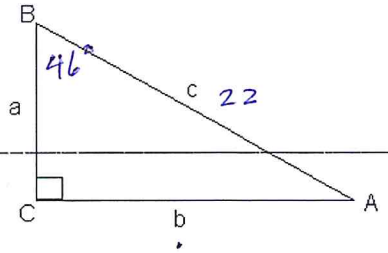
$X = \frac{d}{\tan 46^\circ}$

$34 - \frac{d}{\tan 20^\circ} = \frac{d}{\tan 46^\circ}$

$34 = d\left(\frac{1}{\tan 20^\circ} + \frac{1}{\tan 46^\circ}\right)$

$\frac{34}{3.713} = 2.747 + .9654$

2. Use the triangle shown to solve for the missing sides and angles. Round the sides and the angles to the nearest thousandth.



A) If $\angle B = 46°$ and *side* $c = 22$, find

side $b =$ $\sin 46^\circ = \frac{b}{22}$ 15.825

$22 \cdot \sin 46 \approx$

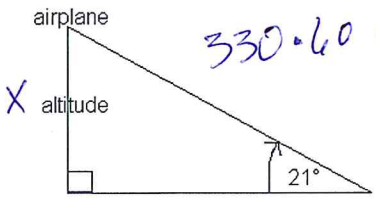
The measurements in part A) are not to be used in part B).

B) If *side* $a = 9$ and *side* $c = 14$, find $\angle B =$ 49.995°

$\cos B = \frac{9}{14}$

$\cos^{-1}\left(\frac{9}{14}\right) = C$

3. When an airplane leaves the runway, its angle of climb is 21° and its speed is 330 feet per second. Find the plane's altitude after 1 minute to the nearest thousandth of a foot. Partial credit will be given for finding the distance the airplane traveled in 1 minute.



$\sin 21^\circ = \frac{x}{330.60}$

$x \approx 7095.685$ ft

4. City hall has a clock on top of the building. From a point 150 feet in front of city hall, the angles of elevation to the base of the clock and the top of the clock are 42° and 50°, respectively. Find the height of the clock to the nearest thousandth of a foot. Partial credit ~~will be given for showing the equations used to solve the problem using B for the height of~~ the building and C for the height of the clock.

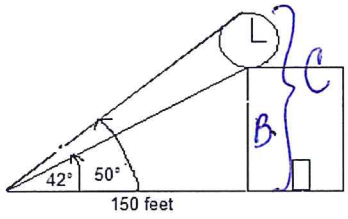
C - B = height of clock

$\tan 42^\circ = \frac{B}{150}$

$\tan 50^\circ = \frac{C}{150}$

$150 \tan 50^\circ - 150 \tan 42^\circ =$

$C - B \approx 43.702$ ft



5. Use a calculator to approximate the value of the expression in radians. Round your answers to the nearest thousandth.

A. arcsec(−12) ~~-4.780~~ 1.654

B. $\sin^{-1}(0.5130)$ .539

C. $\cot^{-1}(-5.4)$ 2.958

D. arccsc(6.2) 0.162

E. arctan(6) 1.406

F. $\cos^{-1}(-1)$ $\pi \approx 3.142$

6. Explain why it is not possible to obtain a value for $\sin^{-1}(2)$.

domain of $\sin^{-1} x$ is $[-1, 1]$, 2 is not in the domain.