Thursday, December 07, 2017
6:32 PM

Precalc Review for Test 4.1 – 4.4, Day 1 Name KEY

Answers should be *exact* (and done *without a calculator*) on all problems marked with an *. When rounding, sides should be rounded to the nearest hundredth and ratios should have 4 decimal places.

*1. Determine the quadrant in which the terminal side of the angle lies:

a) $\theta = \frac{6\pi}{5}$ III

b) $\theta = 395°$ I (90°, 0, 360°)

c) $\theta = -2\pi$ III (0)

*2. Find one positive and one negative coterminal angle for a) $\theta = \frac{11\pi}{4}$ b) $\theta = -423°$

* ADD OR SUBTRACT MULTIPLES OF 360° OR 2π

a) $\frac{19\pi}{4}$, $-\frac{5\pi}{4}$ * WORK ON NEXT PAGE

b) $-423° + 360° = -63°$ $-63° + 360° = 297°$

3. Convert 2.5 radians to degree measure.

$2.5 \text{ radians} \cdot \frac{180°}{\pi \text{ radians}} = 143.2°$

*4. Convert $330°$ to radian measure (in terms of π)

$330° \cdot \frac{\pi \text{ radians}}{180°} = \frac{33\pi}{18} = \frac{11\pi}{6}$

5. Convert to DD (degree decimal form): $-13°42'15"$

$-13.70°$

6. Convert 12.4762º to DMS form.

$-12°28'34.32"$

*7. The central angle θ of a circle with radius 9 inches subtends an arc of 20 inches. Find θ.

$\theta = \frac{s}{r}$ * θ must be in radians

$\theta = \frac{20}{9} = 2.22$ Radians

8. A circle of radius r has a central angle of 15º which subtends(cuts) an arc of 23 inches. Find r.

* convert to Radians!

$15° \cdot \frac{\pi \text{ radians}}{180°} = \frac{\pi}{12}$ $\boxed{\theta = \frac{s}{r}}$ $\frac{\pi}{12} = \frac{23}{r}$ $\frac{12(23)}{\pi} = \frac{\pi r}{\pi}$

$r = \frac{276}{\pi} = 87.9$ inches

*9. Find the point (x, y) on the unit circle that corresponds to the real number:

a) $t = \frac{3\pi}{2}$

$(0, -1)$

b) $t = \frac{4\pi}{3}$

$\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ $-\frac{1}{2}$ $-\frac{\sqrt{3}}{2}$ $\frac{2}{2}$ $\theta' = \frac{\pi}{3} = 60°$

*10. Find the values of the 6 trigonometric functions/ratios (if defined) for

a) $t = -\frac{5\pi}{6}$ $\theta' = \frac{\pi}{6} = 30°$ ($-\sqrt{3}$, -1, 2)

$\frac{y}{r}$ $\sin\theta = -\frac{1}{2}$ $\csc\theta = -2$

$\frac{x}{r}$ $\cos\theta = -\frac{\sqrt{3}}{2}$ $\sec\theta = -\frac{2\sqrt{3}}{3}$

$\frac{y}{x}$ $\tan\theta = \frac{\sqrt{3}}{3}$ $\cot\theta = \sqrt{3}$

b) $t = 5\pi$ $(-1, 0)$

y $\sin\theta = 0$ $\csc\theta =$ undef.

x $\cos\theta = -1$ $\sec\theta = -1$

$\frac{y}{x}$ $\tan\theta = 0$ $\cot\theta =$ undef.

11. Evaluate: a) $\sin(-4.1)$ b) $\sec(-1.42)$ c) $\csc 14°$ d) $\cot(1.14)$

a) * radian mode .82

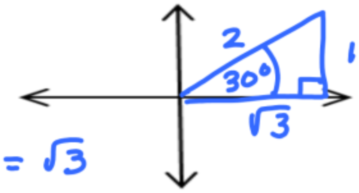
b) * Radian mode $\frac{1}{\cos(-1.42)} = 6.66$

c) degrees $\frac{1}{\sin 14°} = 4.13$

d) Radians $\frac{1}{\tan(1.14)} = .46$

$\frac{9}{0}$

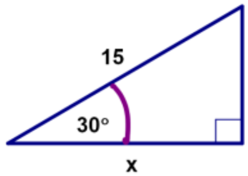
*12. Evaluate $\cot\frac{\pi}{6}$



$= \frac{\sqrt{3}}{1} = \sqrt{3}$

13. Find the value of x in each of the triangles shown:

*a)

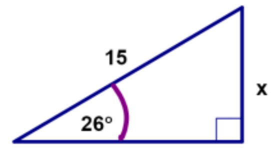


$\cos 30° = \frac{x}{15}$

$x = 15\cos 30°$

$x = 12.99$

b)



$\sin 26° = \frac{x}{15}$

$15\sin 26° = x$

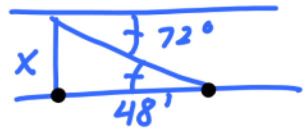
$x = 6.58$

14. The angle of depression from the top of a building to the base of a statue 48 feet from the base of the building is 72°. Determine the height of the building.

$\tan 72° = \frac{x}{48}$

$48\tan 72° = x$

$x = 147.2'$



15. Given that θ is acute and $\cos\theta = \frac{5}{6}$, find a) $\sec\theta$ b) $\sin(90° - \theta)$ c) $\tan\theta$

a) $\sec\theta = \frac{1}{\cos\theta} = \frac{6}{5}$

b) $\sin(90° - \theta) = \cos\theta$

$= \frac{5}{6}$

c) $1 + \tan^2\theta = \sec^2\theta$

$\tan^2\theta = \sec^2\theta - 1$

$\tan^2\theta = \left(\frac{6}{5}\right)^2 - 1$

$\tan^2\theta = \frac{36}{25} - 1$

$\tan^2\theta = \frac{11}{25}$

$\tan\theta = \frac{\sqrt{11}}{5}$

*16. Determine the quadrant in which θ lies if $\tan\theta < 0$ and $\cos\theta < 0$.

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Quadrant II

*17. Given $\sin\theta = -\frac{1}{5}$ and $\tan\theta < 0$, find $\cos\theta$.

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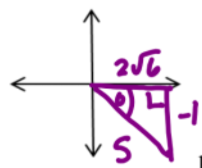
$(-1)^2 + b^2 = 5^2$

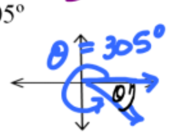
$b^2 = 24 \quad b = \sqrt{24} = 2\sqrt{6}$

$\cos\theta = \frac{2\sqrt{6}}{5}$

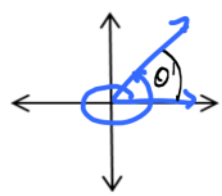


18. Find the reference angle for a) $\theta = 305°$ b) $\theta = \frac{7\pi}{3}$

$\theta' = 360 - 305° = 55°$

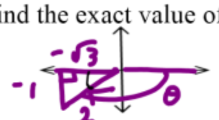


$\theta' = \frac{\pi}{3}$



*19. Find the exact value of $\cot(-150°)$

$\theta' = 30°$



$\frac{x}{y} = \frac{-\sqrt{3}}{-1} = \sqrt{3}$

*20. Find two values of θ ($0 \le \theta < 2\pi$) such that $\cos\theta = -\frac{\sqrt{2}}{2}$

* work on next pg. $\theta = \frac{3\pi}{4}, \frac{5\pi}{4}$

*21. Find two values of θ ($0° \le \theta < 360°$) where $\cot\theta = \sqrt{3}$

* work on next pg. $\theta = 30°, 210°$

*22. Given that $\sin\theta = -\frac{4}{7}$ and $\frac{3\pi}{2} \le \theta < 2\pi$, find $\sec\theta$.

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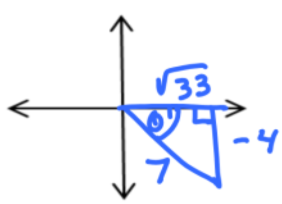
$\frac{y}{r}$

$(-4)^2 + b^2 = 7^2$

$b^2 = 33$

$b = \sqrt{33}$



$\sec\theta = \frac{r}{x}$

$= \frac{7}{\sqrt{33}} \cdot \frac{\sqrt{33}}{\sqrt{33}}$

$= \boxed{\frac{7\sqrt{33}}{33}}$

* Add or subtract multiples of 2π

2a) $\frac{11\pi}{4} + 2\pi = \frac{11\pi}{4} + \frac{8\pi}{4} = \boxed{\frac{19\pi}{4}}$

$\frac{11\pi}{4} - 2\pi = \frac{11\pi}{4} - \frac{8\pi}{4} = \frac{3\pi}{4}$ * NOT Negative, subtract another 2π

$\frac{3\pi}{4} - \frac{8\pi}{4} = \boxed{\frac{-5\pi}{4}}$

*20. Find two values of θ ($0 \le \theta < 2\pi$) such that $\cos\theta = -\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-2}{2\sqrt{2}} = -\frac{1}{\sqrt{2}}$ $\frac{x}{r}$

neg

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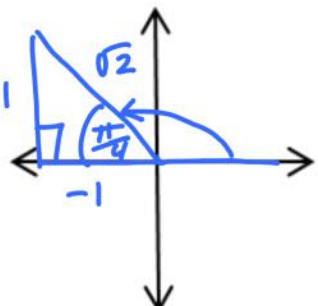

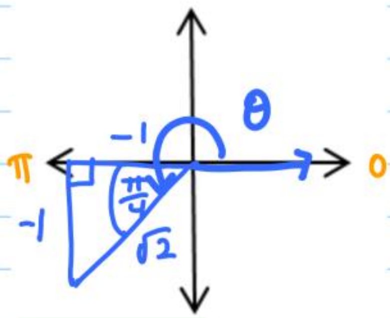

$\boxed{\theta = \frac{3\pi}{4}}$ $\boxed{\theta = \frac{5\pi}{4}}$

*21. Find two values of θ ($0° \le \theta < 360°$) where $\cot\theta = \sqrt{3}$ $\frac{x}{y}$

pos.

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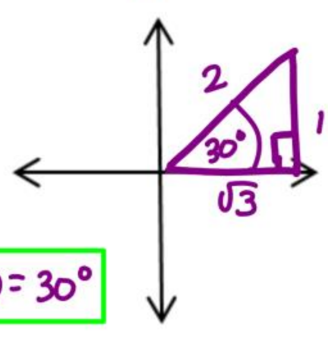
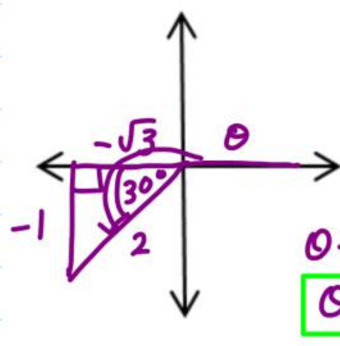
T | ~~C~~





$\boxed{\theta = 30°}$

$\theta = 180° + 30°$

$\boxed{\theta = 210°}$