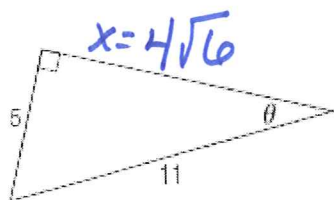Name: **Key**

Date: _____

Accelerated Geometry 13.1-13.3

13.1 Right Triangle Trigonometry

Find the following 6 trigonometric values for the following triangle.

$x = 4\sqrt{6}$

$x = \sqrt{96}$

$\sin\theta = \dfrac{5}{11}$

$\cos\theta = \dfrac{4\sqrt{6}}{11}$

$\tan\theta = \dfrac{5\sqrt{6}}{24}$

$\csc\theta = \dfrac{11}{5}$

$\sec\theta = \dfrac{11\sqrt{6}}{24}$

$\cot\theta = \dfrac{4\sqrt{6}}{5}$

13.2 Angles and Angle Measures

1. Match each degree measure with the corresponding radian measure on the right.

   a. 30° V

   b. 90° II

   c. 120° I

   d. 135° VI

   e. 180° IV

   f. 210° III

   i. $\dfrac{2\pi}{3}$ C

   ii. $\dfrac{\pi}{2}$ B

   iii. $\dfrac{7\pi}{6}$ F

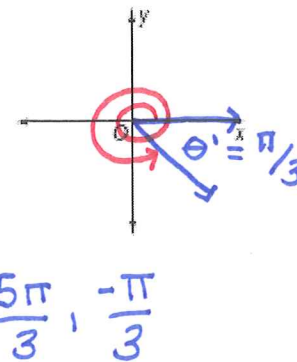   iv. π E

   v. $\dfrac{\pi}{6}$ A
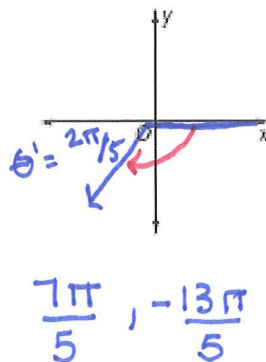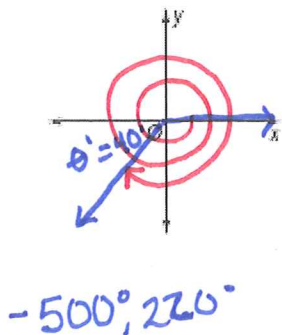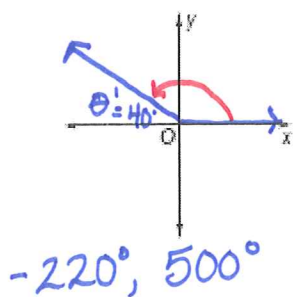
   vi. $\dfrac{3\pi}{4}$ D

(a.) Draw the angle with the given measure in standard position, (b) find θ' as the reference angle and (c) find one positive and one negative conterminal angle with the given angles.

2. 140°

$\theta' = 40°$

$-220°, 500°$

3. −860°

$\theta' = 140°$

$-500°, 220°$

4. $-\dfrac{3\pi}{5}$

$\theta' = \dfrac{2\pi}{5}$

$\dfrac{7\pi}{5}, -\dfrac{13\pi}{5}$

5. $\dfrac{11\pi}{3}$

$\theta' = \pi/3$

$\dfrac{5\pi}{3}, \dfrac{-\pi}{3}$

13-3 Trigonometric Functions of General Angles
Show all work on separate paper.

Find the exact values of the six trigonometric functions of θ if the terminal side of θ in standard position contains the given point.

1. $(6, 8)$ 2. $(-20, 21)$ 3. $(-2, -5)$

Find the reference angle for the angle with the given measure.

4. $236°$ 5. $\frac{13\pi}{8}$ 6. $-210°$ 7. $-\frac{7\pi}{4}$

$\theta' = 56°$ $\theta' = \frac{3\pi}{8}$ $\theta' = 30°$ $\theta' = \pi/4$

Find the exact value of each trigonometric function.

8. $\tan 135°$ 9. $\cot 210°$ 10. $\cot(-90°)$ 11. $\cos 405°$

12. $\tan \frac{5\pi}{3}$ 13. $\csc\left(-\frac{3\pi}{4}\right)$ 14. $\cot 2\pi$ 15. $\tan \frac{13\pi}{6}$
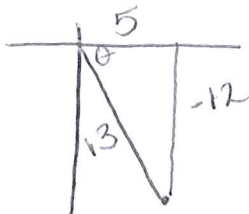
Find the exact value of each trigonometric function.

22. $\sin 240°$ $-\frac{\sqrt{3}}{2}$ 23. $\sec 120°$ -2 24. $\tan 300°$ $-\sqrt{3}$ 25. $\cot 510°$ $-\sqrt{3}$

26. $\csc 5400°$ und.   27. $\cos \frac{11\pi}{3}$ $\frac{1}{2}$ 28. $\cot\left(-\frac{5\pi}{6}\right)$ $\sqrt{3}$ 29. $\sin \frac{3\pi}{4}$ $\frac{\sqrt{2}}{2}$

30. $\sec \frac{3\pi}{2}$ und.   31. $\csc \frac{17\pi}{6}$ 2 32. $\cos(-30°)$ $\frac{\sqrt{3}}{2}$ 33. $\tan\left(-\frac{5\pi}{4}\right)$ -1

Suppose θ is an angle in standard position whose terminal side is in the given quadrant. For each function, find the exact values of the remaining five trigonometric functions of θ.

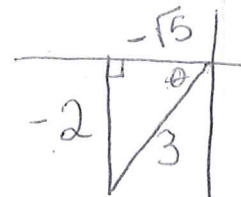16. $\tan \theta = -\frac{12}{5}$, Quadrant IV   17. $\sin \theta = \frac{2}{3}$, Quadrant III

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

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

$\cot\theta = -\frac{5}{12}$
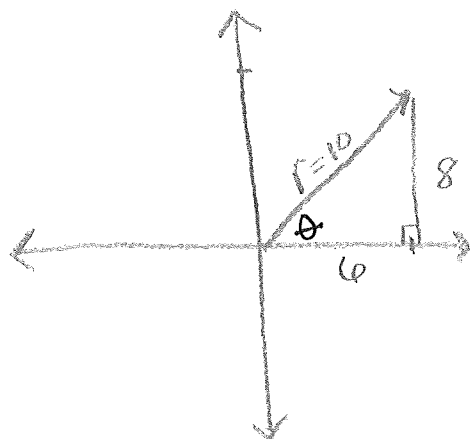
$\sin\theta = \frac{2}{3}$

$\cos\theta = \frac{-\sqrt{5}}{3}$

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

$\csc\theta = \frac{3}{2}$

$\sec\theta = -\frac{3\sqrt{5}}{5}$

$\cot\theta = \frac{\sqrt{5}}{2}$

1.) $(6, 8)$

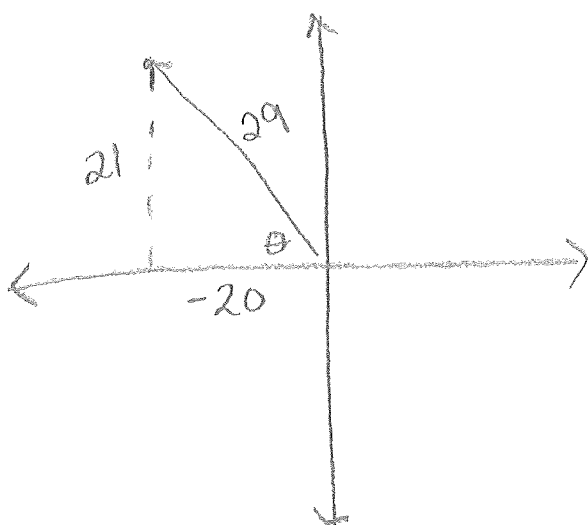$\sin\theta = \dfrac{8}{10} = \dfrac{4}{5}$ $\csc\theta = \dfrac{5}{4}$

$\cos\theta = \dfrac{6}{10} = \dfrac{3}{5}$ $\sec\theta = \dfrac{5}{3}$

$\tan\theta = \dfrac{8}{6} = \dfrac{4}{3}$ $\cot\theta = \dfrac{3}{4}$

2.) $(-20, 21)$

$\sin\theta = \dfrac{21}{29}$ $\csc\theta = \dfrac{29}{21}$
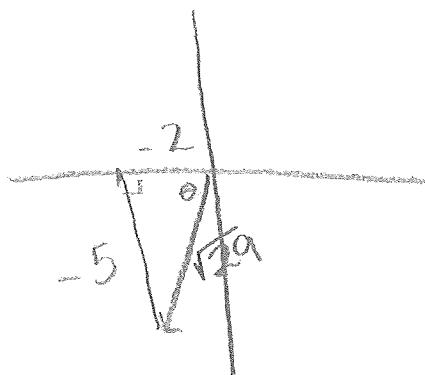
$\cos\theta = \dfrac{-20}{29}$ $\sec\theta = \dfrac{29}{20}$

$\tan\theta = -\dfrac{21}{20}$ $\cot\theta = -\dfrac{20}{21}$

3.) $(-2, -5)$

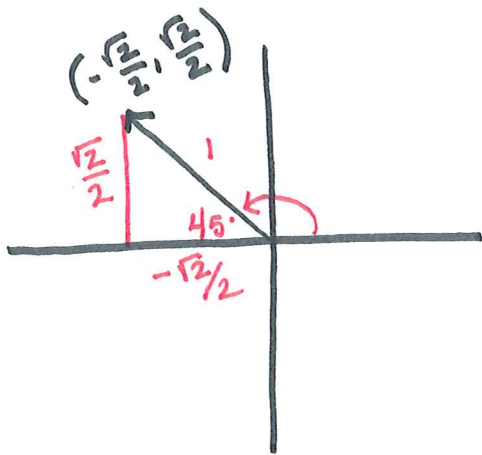$\sin\theta = \dfrac{-5\sqrt{29}}{29}$ $\csc\theta = \dfrac{\sqrt{29}}{-5}$

$\cos\theta = \dfrac{-2\sqrt{29}}{29}$ $\sec\theta = \dfrac{\sqrt{29}}{-2}$

$\tan\theta = \dfrac{5}{2}$ ~~$\tan\theta$~~ $\cot\theta = \dfrac{2}{5}$

8.) $\tan 135°$

$\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
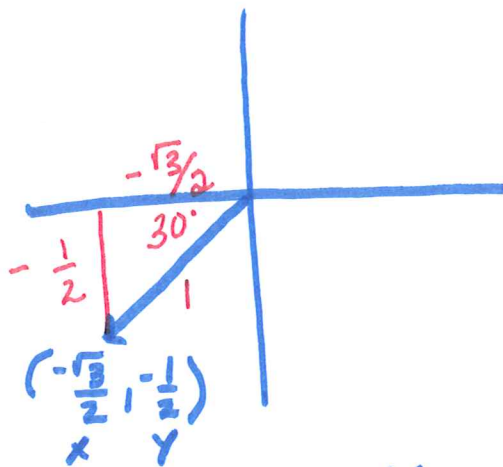
$\tan 135° = \frac{y}{x}$

$\tan 135° = \left(\frac{\sqrt{2}}{2}\right) / \left(-\frac{\sqrt{2}}{2}\right) = -1$

$$\boxed{\tan 135° = -1}$$

9.) $\cot 210°$

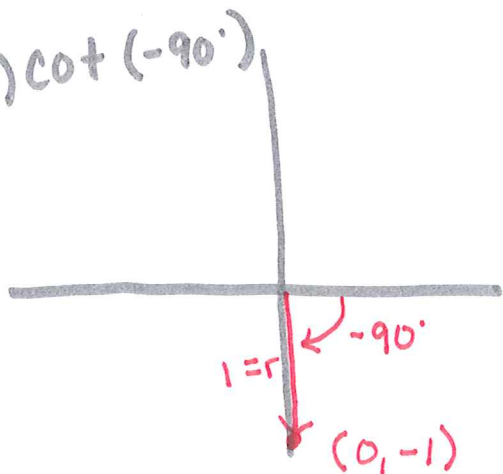$\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

$\cot 210° = \frac{x}{y}$

$\cot 210° = \frac{\left(-\frac{\sqrt{3}}{2}\right)}{\left(-\frac{1}{2}\right)}$

$-\frac{\sqrt{3}}{2} \cdot \frac{-2}{1} = \sqrt{3}$
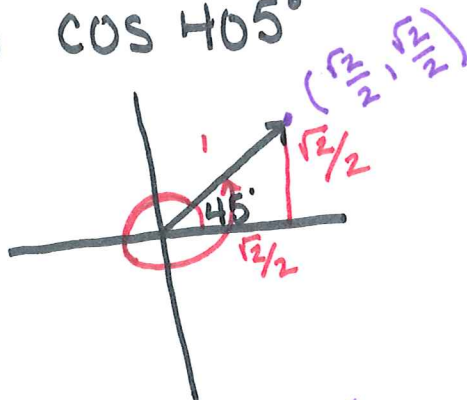
$$\boxed{\cot 210° = \sqrt{3}}$$

10.) $\cot(-90°)$

$1 = r$

$(0, -1)$

$\cot -90° = \frac{x}{y}$

$\cot -90° = \frac{0}{-1} = 0$

$$\boxed{\cot -90° = 0}$$

11.) $\cos 405°$
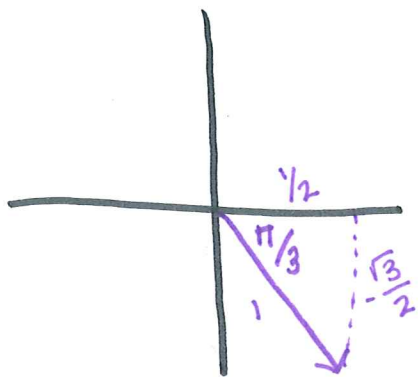

$\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

$\cos 405° = \frac{x}{r}$

$\cos 405° = \frac{\left(\frac{\sqrt{2}}{2}\right)}{1} = \frac{\sqrt{2}}{2}$
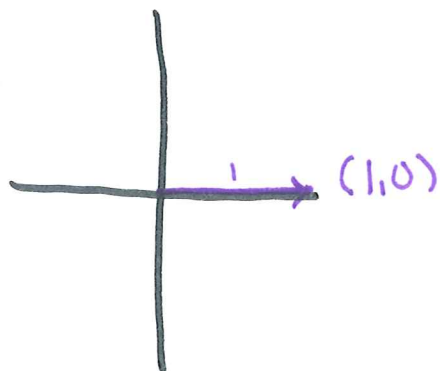
$$\boxed{\cos 405° = \frac{\sqrt{2}}{2}}$$

12.) $\tan \dfrac{5\pi}{3}$

$\tan \dfrac{5\pi}{3} = \dfrac{\left(-\dfrac{\sqrt{3}}{2}\right)}{\left(\dfrac{1}{2}\right)} = \dfrac{\sqrt{3}}{2} \cdot \dfrac{2}{1} = \dfrac{-\sqrt{3}}{1}$

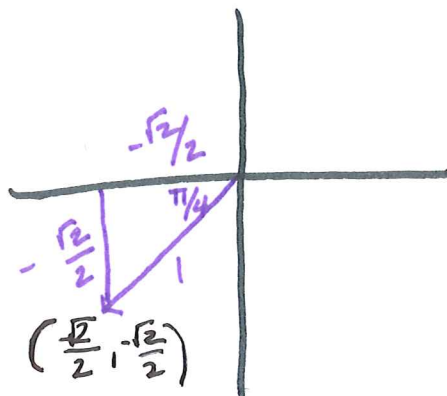$\boxed{\tan \dfrac{5\pi}{3} = -\sqrt{3}}$

13.) $\csc\left(\dfrac{-3\pi}{4}\right)$

$\left(\dfrac{\sqrt{2}}{2}, \dfrac{\sqrt{2}}{2}\right)$

$\csc \dfrac{-3\pi}{4} = \dfrac{-2\sqrt{2}}{2} = -\sqrt{2}$

$\boxed{\csc \dfrac{-3\pi}{4} = -\sqrt{2}}$

14.) $\cot 2\pi$

$(1,0)$

$\cot 2\pi = \dfrac{x}{y}$

$\boxed{\cot 2\pi = \dfrac{1}{0} = \text{undefined}}$
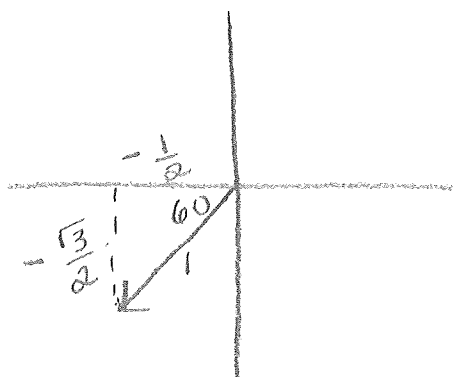
15.) $\tan \dfrac{13\pi}{6}$

$\left(\dfrac{\sqrt{3}}{2}, \dfrac{1}{2}\right)$

$\tan \dfrac{13\pi}{6} = \dfrac{\left(\dfrac{1}{2}\right)}{\left(\dfrac{\sqrt{3}}{2}\right)} = \dfrac{1}{2} \cdot \dfrac{2}{\sqrt{3}} = \dfrac{1}{\sqrt{3}}$

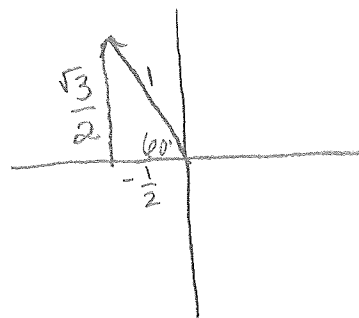$\boxed{\tan \dfrac{13\pi}{6} = \dfrac{\sqrt{3}}{3}}$

22.) $\sin 240°$

$\sin 240° = -\dfrac{\left(\frac{\sqrt{3}}{2}\right)}{1}$
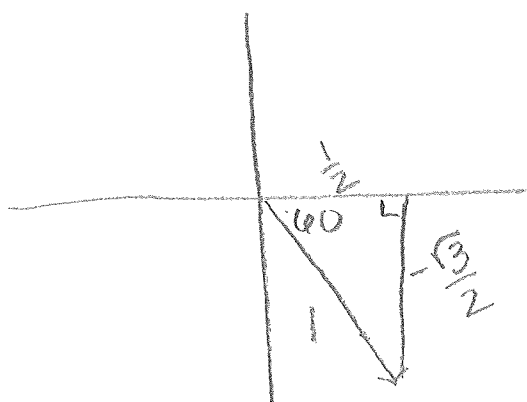
$$\boxed{\sin 240° = -\dfrac{\sqrt{3}}{2}}$$

23.) $\sec 120°$

$\sec 120 = \dfrac{r}{x}$

$\sec 120 = \dfrac{1}{\left(-\frac{1}{2}\right)} = 1 \cdot -\dfrac{2}{1}$
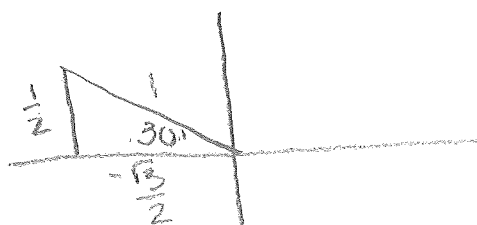
$$\boxed{\sec 120° = -2}$$

24.) $\tan 300°$

$\tan 300 = \dfrac{\left(-\frac{\sqrt{3}}{2}\right)}{\left(\frac{1}{2}\right)}$

$= -\dfrac{\sqrt{3}}{2} \cdot \dfrac{2}{1} = -\sqrt{3}$
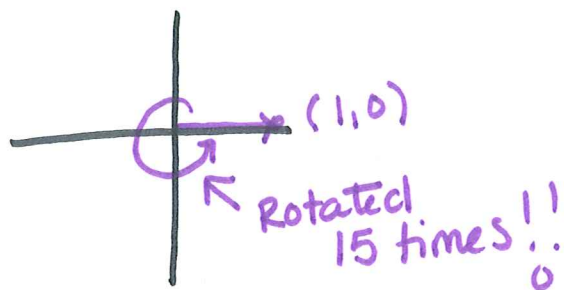
$$\boxed{\tan 300° = -\sqrt{3}}$$

25.) $\cot 510°$

$= \dfrac{-\left(\frac{\sqrt{3}}{2}\right)}{}$

$\cot 510° = \dfrac{\left(\frac{1}{2}\right)}{}$

$-\dfrac{\sqrt{3}}{2} \cdot \dfrac{2}{1} = -\sqrt{3}$

$$\boxed{\cot 510° = -\sqrt{3}}$$

26.) $\csc 5400°$

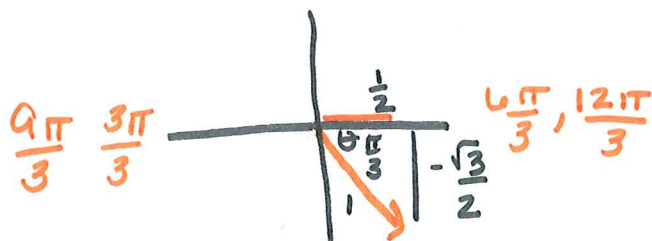Rotated 15 times!!

$\csc 5400° = \frac{r}{y}$

$\csc 5400° = \frac{1}{0}$

$\boxed{\csc 5400° = \text{undefined}}$
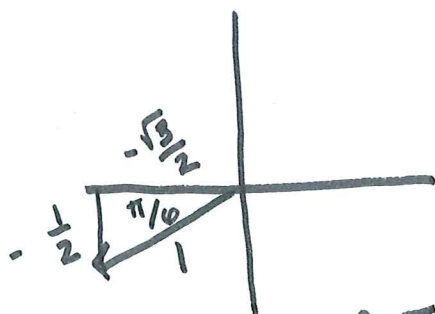
27.) $\cos \frac{11\pi}{3}$

$\cos \frac{11\pi}{3} = \frac{\left(\frac{1}{2}\right)}{1}$

$\boxed{\cos \frac{11\pi}{3} = \frac{1}{2}}$
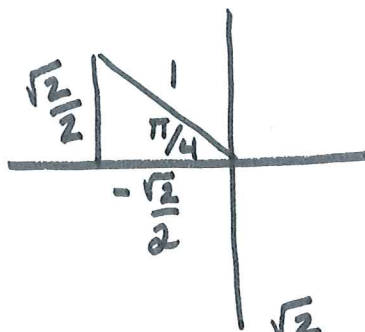
28.) $\cot \left(-\frac{5\pi}{6}\right)$

$\cot \frac{-5\pi}{6} = \frac{\left(-\frac{\sqrt{3}}{2}\right)}{\left(-\frac{1}{2}\right)}$

$-\frac{\sqrt{3}}{2} \cdot -\frac{2}{1} = \sqrt{3}$
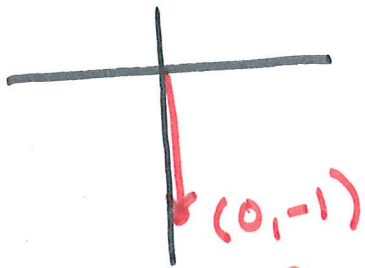
$\boxed{\cot \frac{-5\pi}{6} = \sqrt{3}}$

29.) $\sin \frac{3\pi}{4}$

$\sin \frac{3\pi}{4} = \frac{\frac{\sqrt{2}}{2}}{1}$

$\boxed{\sin \frac{3\pi}{4} = \frac{\sqrt{2}}{2}}$
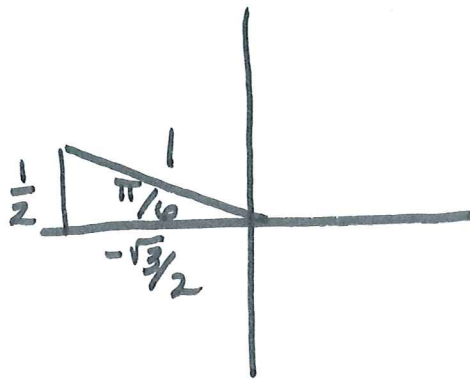
30.) $\sec \frac{3\pi}{2}$

$(0, -1)$

$$\sec \frac{3\pi}{2} = \frac{r}{x}$$

$$\sec \frac{3\pi}{2} = \frac{1}{0}$$

$$\boxed{\sec \frac{3\pi}{2} = \text{undefined}}$$
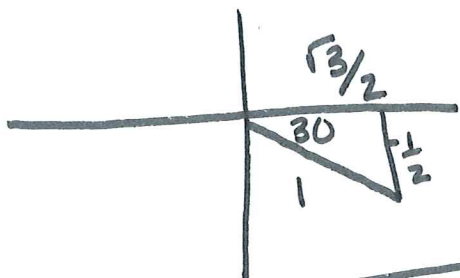
31.) $\csc \frac{17\pi}{6}$

$\frac{1}{2}$ $\frac{1}{\pi/6}$ $-\frac{\sqrt{3}}{2}$

$$\csc \frac{17\pi}{6} = \frac{1}{\frac{1}{2}}$$

$$\csc \frac{17\pi}{6} = \frac{1}{1} \cdot \frac{2}{1}$$

$$\boxed{\csc \frac{17\pi}{6} = 2}$$

32.) $\cos -30°$

$\frac{\sqrt{3}}{2}$ 30 $-\frac{1}{2}$ 1

$$\boxed{\cos -30 = \frac{\sqrt{3}}{2}}$$

33.) $\tan -\frac{5\pi}{4}$

$\frac{\sqrt{2}}{2}$ $\pi/4$ $-\frac{\sqrt{2}}{2}$

$$\tan -\frac{5\pi}{4} = \frac{\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}}$$

$$\boxed{\tan -\frac{5\pi}{4} = -1}$$