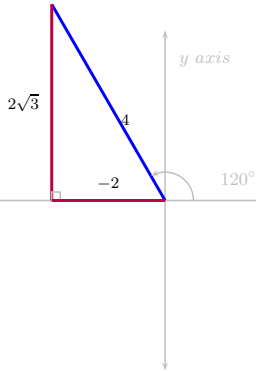


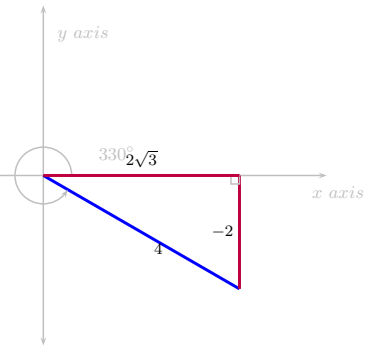
For each angle, draw and label a reference triangle, then determine all 6 trig ratios, sine, cosine, tangent, secant, cosecant, and cotangent. Do not use calculators here.

$$\begin{aligned}\sin(120^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{2\sqrt{3}}{4} \\ \csc(120^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{2\sqrt{3}} \\ \cos(120^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{-2}{4} \\ \sec(120^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{-2} \\ \tan(120^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{2\sqrt{3}}{-2} \\ \cot(120^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{-2}{2\sqrt{3}}\end{aligned}$$



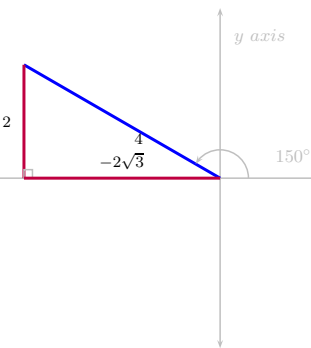
1.

$$\begin{aligned}\sin(330^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{-2}{4} \\ \csc(330^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{-2} \\ \cos(330^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{2\sqrt{3}}{4} \\ \sec(330^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{2\sqrt{3}} \\ \tan(330^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{-2}{2\sqrt{3}} \\ \cot(330^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{2\sqrt{3}}{-2}\end{aligned}$$



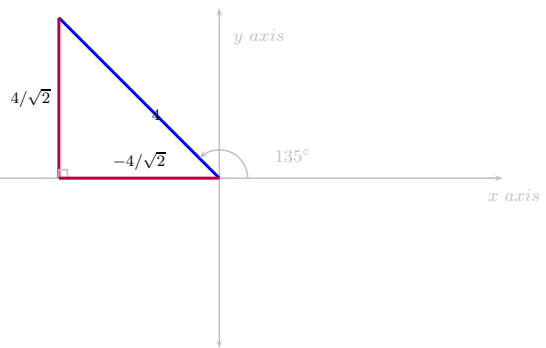
4.

$$\begin{aligned}\sin(150^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{2}{4} \\ \csc(150^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{2} \\ \cos(150^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{-2\sqrt{3}}{4} \\ \sec(150^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{-2\sqrt{3}} \\ \tan(150^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{2}{-2\sqrt{3}} \\ \cot(150^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{-2\sqrt{3}}{2}\end{aligned}$$



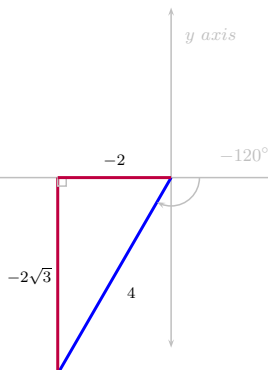
2.

$$\begin{aligned}\sin(135^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{4/\sqrt{2}}{4} \\ \csc(135^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{4/\sqrt{2}} \\ \cos(135^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{-4/\sqrt{2}}{4} \\ \sec(135^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{-4/\sqrt{2}} \\ \tan(135^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{4/\sqrt{2}}{-4/\sqrt{2}} \\ \cot(135^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{-4/\sqrt{2}}{4/\sqrt{2}}\end{aligned}$$



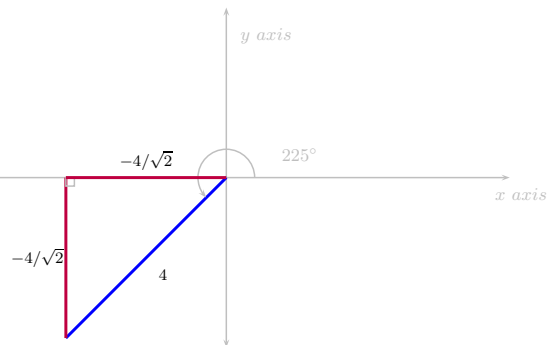
5.

$$\begin{aligned}\sin(-120^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{-2\sqrt{3}}{4} \\ \csc(-120^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{-2\sqrt{3}} \\ \cos(-120^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{-2}{4} \\ \sec(-120^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{-2} \\ \tan(-120^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{-2\sqrt{3}}{-2} \\ \cot(-120^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{-2}{-2\sqrt{3}}\end{aligned}$$



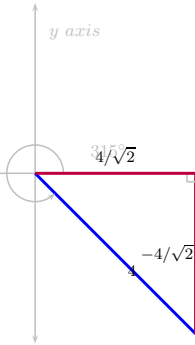
3.

$$\begin{aligned}\sin(225^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{-4/\sqrt{2}}{4} \\ \csc(225^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{-4/\sqrt{2}} \\ \cos(225^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{-4/\sqrt{2}}{4} \\ \sec(225^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{-4/\sqrt{2}} \\ \tan(225^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{-4/\sqrt{2}}{-4/\sqrt{2}} \\ \cot(225^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{-4/\sqrt{2}}{-4/\sqrt{2}}\end{aligned}$$



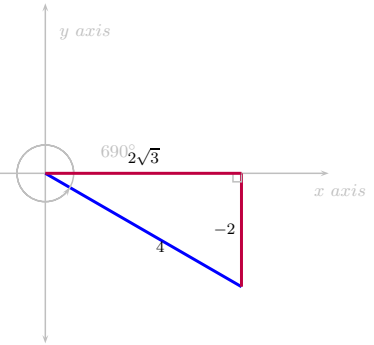
6.

$$\begin{aligned}\sin(315^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{-4/\sqrt{2}}{4} \\ \csc(315^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{-4/\sqrt{2}} \\ \cos(315^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{4/\sqrt{2}}{4} \\ \sec(315^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{4/\sqrt{2}} \\ \tan(315^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{-4/\sqrt{2}}{4/\sqrt{2}} \\ \cot(315^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{4/\sqrt{2}}{-4/\sqrt{2}}\end{aligned}$$



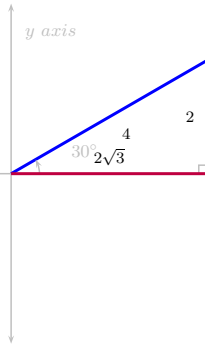
7.

$$\begin{aligned}\sin(690^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{-2}{4} \\ \csc(690^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{-2} \\ \cos(690^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{2\sqrt{3}}{4} \\ \sec(690^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{2\sqrt{3}} \\ \tan(690^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{-2}{2\sqrt{3}} \\ \cot(690^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{2\sqrt{3}}{-2}\end{aligned}$$



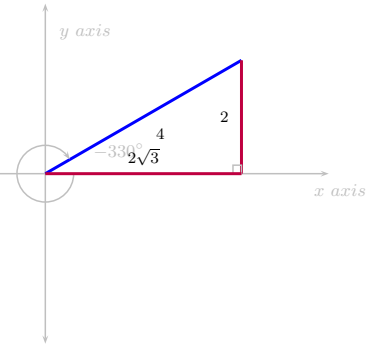
10.

$$\begin{aligned}\sin(30^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{2}{4} \\ \csc(30^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{2} \\ \cos(30^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{2\sqrt{3}}{4} \\ \sec(30^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{2\sqrt{3}} \\ \tan(30^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{2}{2\sqrt{3}} \\ \cot(30^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{2\sqrt{3}}{2}\end{aligned}$$



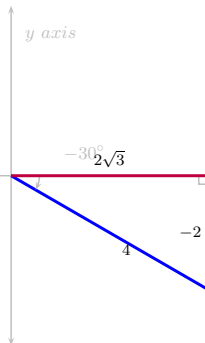
8.

$$\begin{aligned}\sin(-330^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{2}{4} \\ \csc(-330^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{2} \\ \cos(-330^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{2\sqrt{3}}{4} \\ \sec(-330^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{2\sqrt{3}} \\ \tan(-330^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{2}{2\sqrt{3}} \\ \cot(-330^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{2\sqrt{3}}{2}\end{aligned}$$



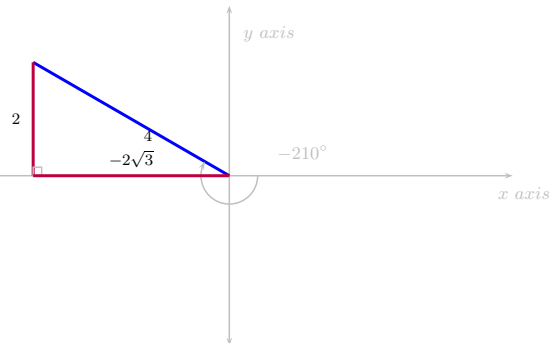
11.

$$\begin{aligned}\sin(-30^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{-2}{4} \\ \csc(-30^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{-2} \\ \cos(-30^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{2\sqrt{3}}{4} \\ \sec(-30^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{2\sqrt{3}} \\ \tan(-30^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{-2}{2\sqrt{3}} \\ \cot(-30^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{2\sqrt{3}}{-2}\end{aligned}$$



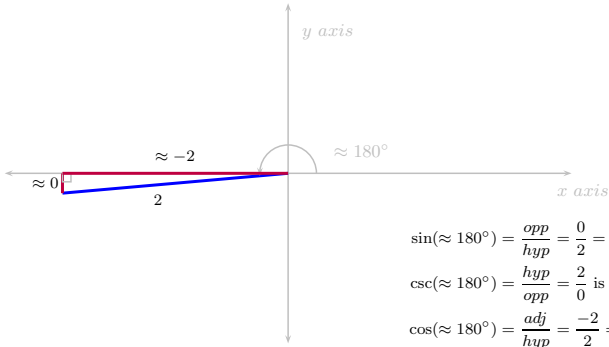
9.

$$\begin{aligned}\sin(-210^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{2}{4} \\ \csc(-210^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{4}{2} \\ \cos(-210^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{-2\sqrt{3}}{4} \\ \sec(-210^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{4}{-2\sqrt{3}} \\ \tan(-210^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{2}{-2\sqrt{3}} \\ \cot(-210^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{-2\sqrt{3}}{2}\end{aligned}$$

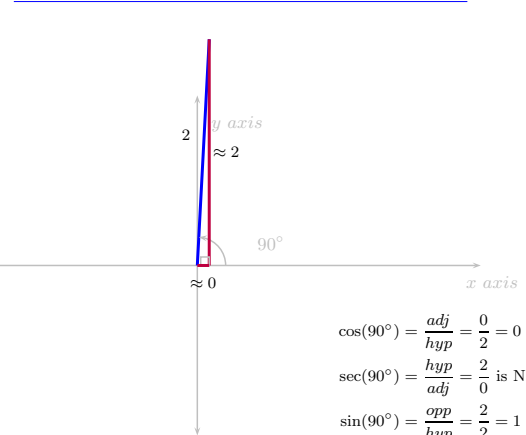


12.

13.

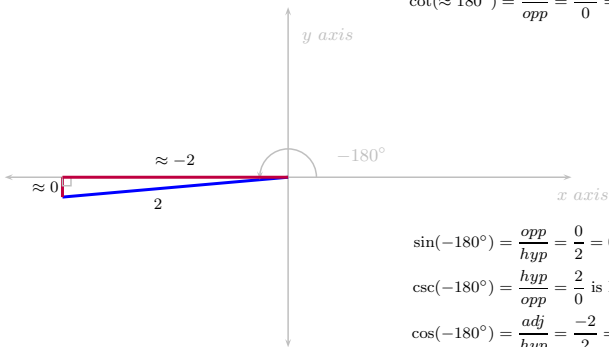


$$\begin{aligned}\sin(\approx 180^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{0}{2} = 0 \\ \csc(\approx 180^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{2}{0} \text{ is NOT REAL} \\ \cos(\approx 180^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{-2}{2} = -1 \\ \sec(\approx 180^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{2}{-2} = -1 \\ \tan(\approx 180^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{0}{-2} = 0 \\ \cot(\approx 180^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{-2}{0} \text{ is NOT REAL}\end{aligned}$$

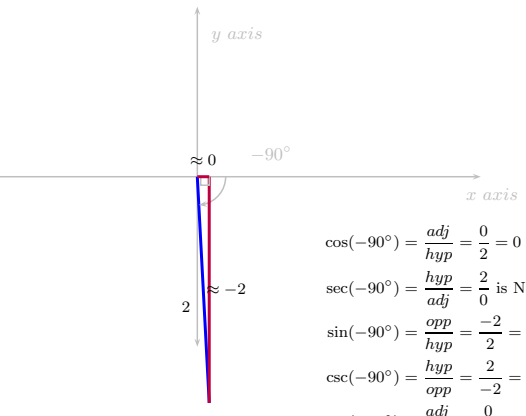


$$\begin{aligned}\cos(90^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{0}{2} = 0 \\ \sec(90^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{2}{0} \text{ is NOT REAL} \\ \sin(90^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{2}{2} = 1 \\ \csc(90^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{2}{2} = 1 \\ \cot(90^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{0}{2} = 0 \\ \tan(90^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{2}{0} \text{ is NOT REAL}\end{aligned}$$

14.



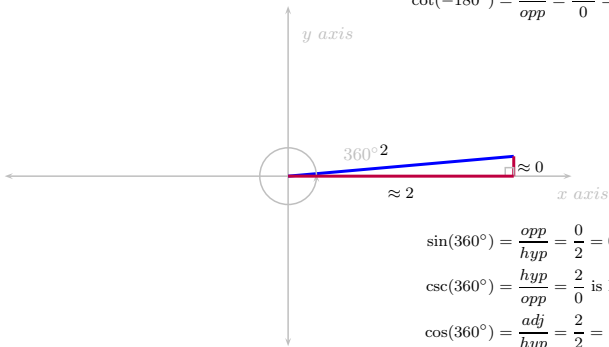
$$\begin{aligned}\sin(-180^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{0}{2} = 0 \\ \csc(-180^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{2}{0} \text{ is NOT REAL} \\ \cos(-180^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{-2}{2} = -1 \\ \sec(-180^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{2}{-2} = -1 \\ \tan(-180^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{0}{-2} = 0 \\ \cot(-180^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{-2}{0} \text{ is NOT REAL}\end{aligned}$$



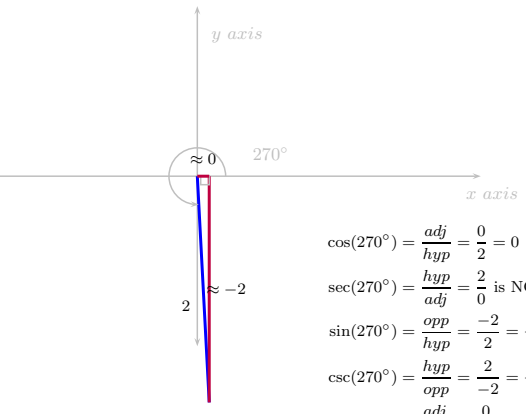
$$\begin{aligned}\cos(-90^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{0}{2} = 0 \\ \sec(-90^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{2}{0} \text{ is NOT REAL} \\ \sin(-90^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{-2}{2} = -1 \\ \csc(-90^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{2}{-2} = -1 \\ \cot(-90^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{0}{-2} = 0 \\ \tan(-90^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{-2}{0} \text{ is NOT REAL}\end{aligned}$$

18.

15.



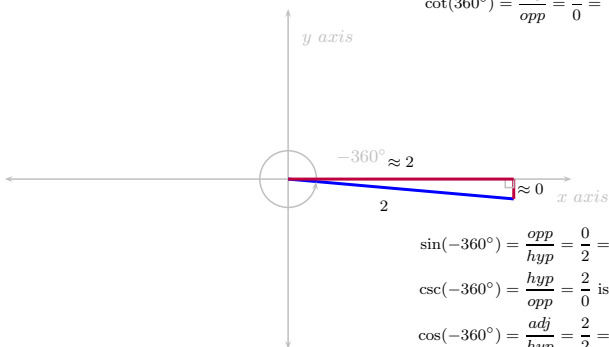
$$\begin{aligned}\sin(360^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{0}{2} = 0 \\ \csc(360^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{2}{0} \text{ is NOT REAL} \\ \cos(360^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{2}{2} = 1 \\ \sec(360^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{2}{2} = 1 \\ \tan(360^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{0}{2} = 0 \\ \cot(360^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{2}{0} \text{ is NOT REAL}\end{aligned}$$



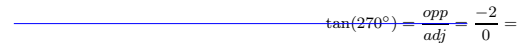
$$\begin{aligned}\cos(270^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{0}{2} = 0 \\ \sec(270^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{2}{0} \text{ is NOT REAL} \\ \sin(270^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{-2}{2} = -1 \\ \csc(270^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{2}{-2} = -1 \\ \cot(270^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{0}{-2} = 0 \\ \tan(270^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{-2}{0} \text{ is NOT REAL}\end{aligned}$$

19.

16.



$$\begin{aligned}\sin(-360^\circ) &= \frac{\text{opp}}{\text{hyp}} = \frac{0}{2} = 0 \\ \csc(-360^\circ) &= \frac{\text{hyp}}{\text{opp}} = \frac{2}{0} \text{ is NOT REAL} \\ \cos(-360^\circ) &= \frac{\text{adj}}{\text{hyp}} = \frac{2}{2} = 1 \\ \sec(-360^\circ) &= \frac{\text{hyp}}{\text{adj}} = \frac{2}{2} = 1 \\ \tan(-360^\circ) &= \frac{\text{opp}}{\text{adj}} = \frac{0}{2} = 0 \\ \cot(-360^\circ) &= \frac{\text{adj}}{\text{opp}} = \frac{2}{0} \text{ is NOT REAL}\end{aligned}$$



$$\tan(270^\circ) = \frac{\text{opp}}{\text{adj}} = \frac{-2}{0} \text{ is NOT REAL}$$