

ROTATIONAL TRIGONOMETRY – journal questions – MCR

Summarize everything you need to know about these topics. Use examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary

1. New Terminology

PRIMARY and SECONDARY Trig Ratios

a. Copy/Paste the definitions of all 6 ratios (3 of them are new)

$$\sin \theta = \frac{opp}{hyp}$$

sine

$$\cos \theta = \frac{adj}{hyp}$$

cosine

$$\tan \theta = \frac{opp}{adj}$$

tangent

$$\csc \theta = \frac{hyp}{opp}$$

cosecant

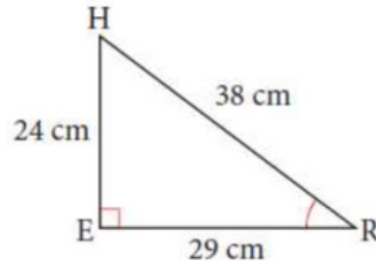
$$\sec \theta = \frac{hyp}{adj}$$

secant

$$\cot \theta = \frac{adj}{opp}$$

cotangent

b. Find the new ratios from a right triangle for angle R.

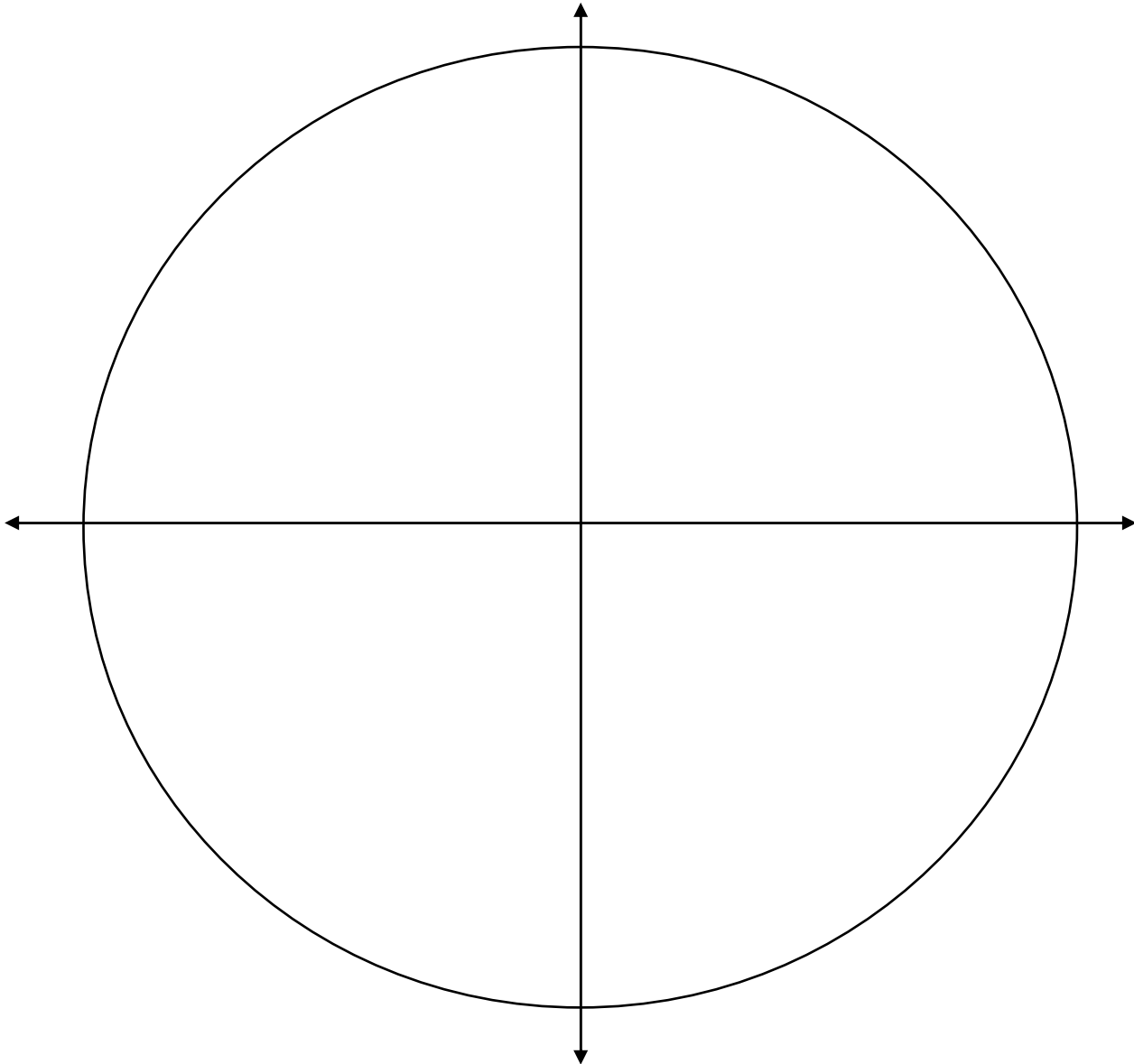


Key DEFINITIONS and DIAGRAMS for rotating angles

c. standard position, initial arm, terminal arm (make a note that the rotation arm must always be attached to the origin), labeling of quadrants, coterminal angles, principal angle, reference/related acute angle, positive/negative rotation angles, quadrantal angles

SIGNS of Trig Ratios

d. Talk about either CAST rule or “All Students Take Calculus” (the 2nd one is better since it starts in quadrant I not IV)

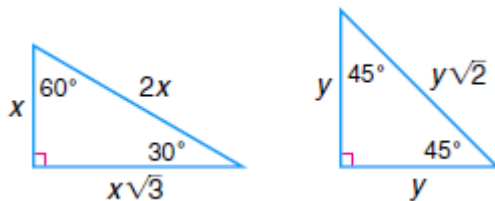


2. NEW TRIG DEFINITIONS

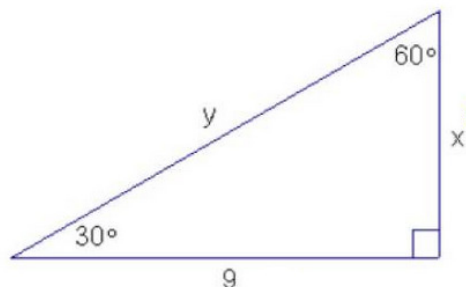
- a. Do the following in your journal:
- Use the given circle on previous page. Draw any rotation angle (but don't pick quadrant 1)
 - Label the radius as size r
 - Beside the circle write "KEY NOTES to remember"
 - Make a note that the triangle drawn must always hug the x -axis. Which means that related acute angle is always near x -axis, not near y -axis
 - Draw a triangle from your chosen rotation angle, use the terminal arm as the hypotenuse
 - Label the endpoint on terminal arm as (x,y) and the triangle sides with x, y, r . (x for horizontal, y for vertical, r for hypotenuse)
 - Make a note that x 's will be negative on the left side of origin, y 's will be negative below the origin and that radius is never negative.
 - In KEY NOTES state the new definitions for the 6 trig ratios using x,y,r
- b. Draw a smaller circle with the same centre as the original and label radius = 1. (make a note that this circle is called the UNIT Circle, since radius is one unit long)
- c. Draw a smaller triangle using the SAME terminal arm with your chosen angle, again triangle must hug x -axis.
- d. Label the sides of this smaller triangle using the scale down factor, (divide x, y, r all by scale factor r).
- e. What these sides on the smaller triangle represent? (see your 6 trig definitions with x,y,r) What are the new coordinates of the point on this unit circle at the terminal arm in terms of trig ratios?
- f. What is a way to rewrite point (x,y) on the circle of radius, r , in trig ratios?

3. SPECIAL TRIANGLES

- a. Copy these two special triangles



- b. Where are the numbers for sides coming from? What's a good way to remember which side is across what angle?
- c. Discuss how to find sides x and y for the following triangle. Show the long way that involves SOH CAH TOA and Pythagorean, then discuss the short way by using a scale factor on a special triangle.



4. ROTATIONAL TRIG – Working in degrees to find RATIOS. Explain all steps without the use of calculator.

Find output ratio values given SPECIAL TRIANGLE ANGLES

a. $\sec 330^\circ$ b. $\sin(-120^\circ)$ c. $\cot 225^\circ$

Find output ratio values given QUADRANTAL ANGLES

d. $\cos 90^\circ$ e. $\csc(-270^\circ)$ f. $\tan 720^\circ$

5. ROTATIONAL TRIG – Working in degrees to find ANGLES. Explain all steps.

Find quadrantal angles – NO calculator
(Find θ_1, θ_2 , then make a list of all angles)

- a. $\sec \theta = \text{undefined}$
b. $\sin \theta = -1$
c. $\tan \theta = 0$

Find special triangle angles – NO calculator
(Find θ_1, θ_2 , then make a list of all angles)

- d. $\cot \theta = -\frac{\sqrt{3}}{3}$
e. $\sin \theta = \frac{1}{2}$
f. $\cos \theta = -\frac{\sqrt{2}}{2}$

Find any angles – WITH calculator
(Find θ_1, θ_2 , then make a list of all angles)

- g. $\csc \theta = -6.5$
h. $\cos \theta = -\frac{\sqrt{2}}{3}$
i. $\tan \theta = \frac{1}{2}$
j. why are the last two not special?