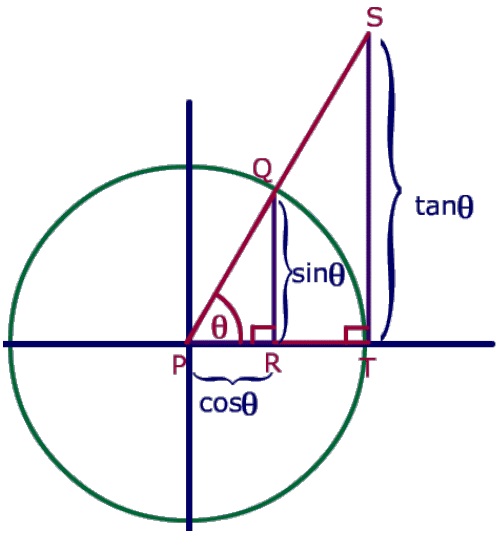
1.13 Off on a Tangent

Practice



I. Rigid and non-rigid transformations of function

The equation of a parent function is given. Write a new equation with the given transformations. Then sketch the new function on the same graph as the parent function. If the function has asymptotes, sketch them in.

1. $y = x^2$

Vertical shift: down 8

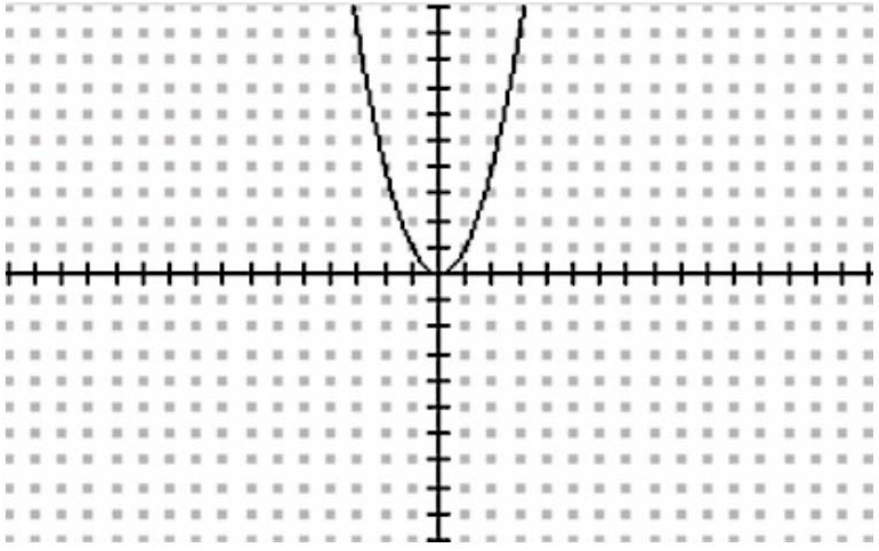
horizontal shift: left 6

dilation: ¼

Eq:

Domain:

Range:



2. $y = \frac{1}{x}$

Vertical shift: up 3

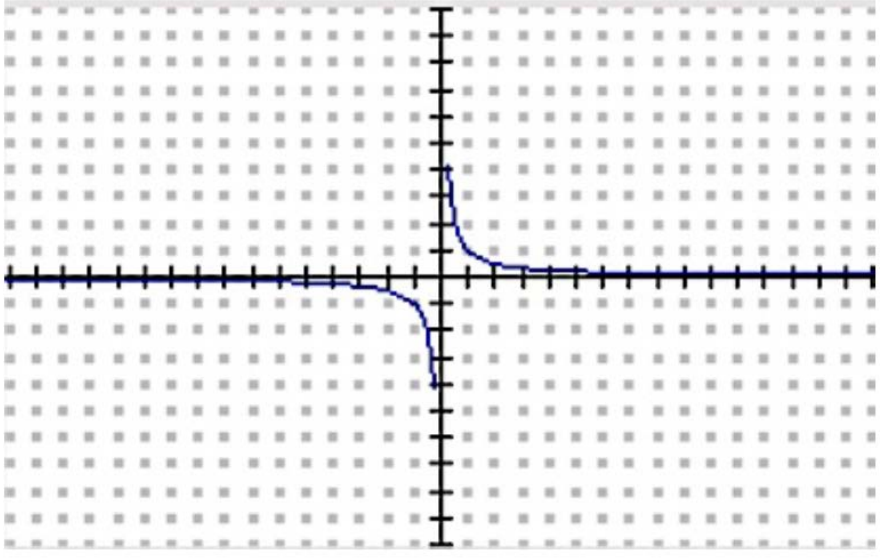
horizontal shift: right 4

dilation: -1

Eq:

Domain:

Range:



3. $y = \sqrt{x}$

Vertical shift: none

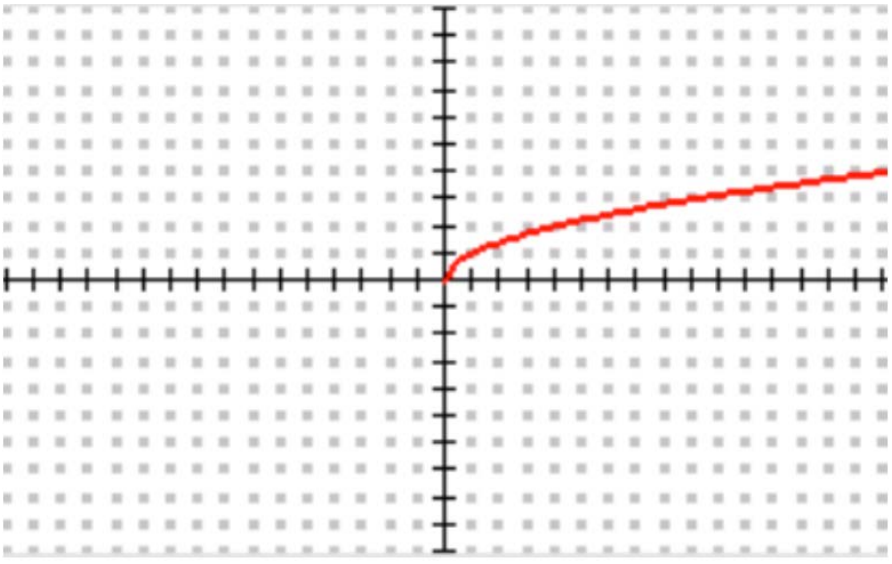
horizontal shift: left 5

dilation: 3

Eq:

Domain:

Range:



4. $y = \sin x$

Vertical shift: down 1

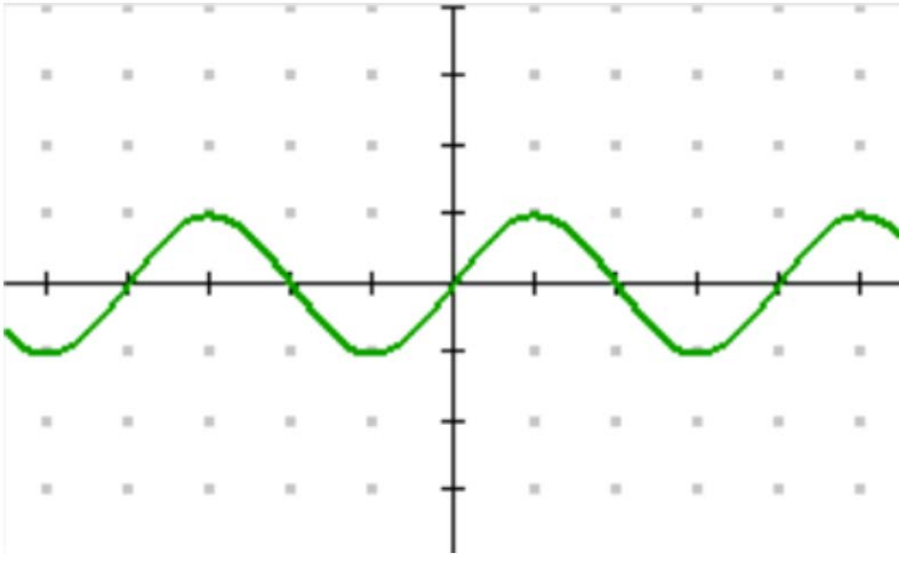
horizontal shift: left $\frac{\pi}{2}$

dilation(amplitude): 3

Eq:

Domain:

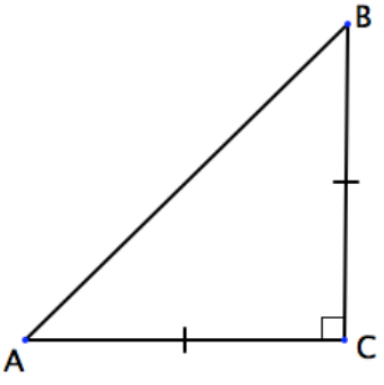
Range:

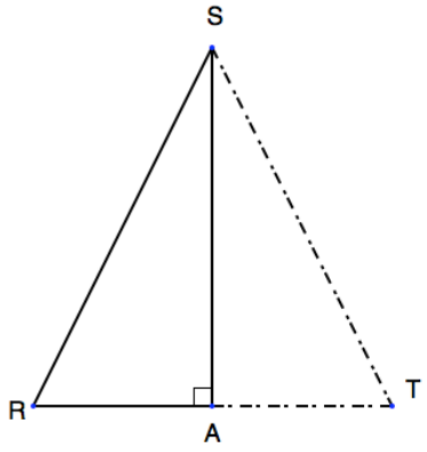


II. Features of the Graphs of the Trig Functions

5. Triangle ABC is a right triangle. AB = 1.

Use the information in the find the length of the sides and measure of the angles.





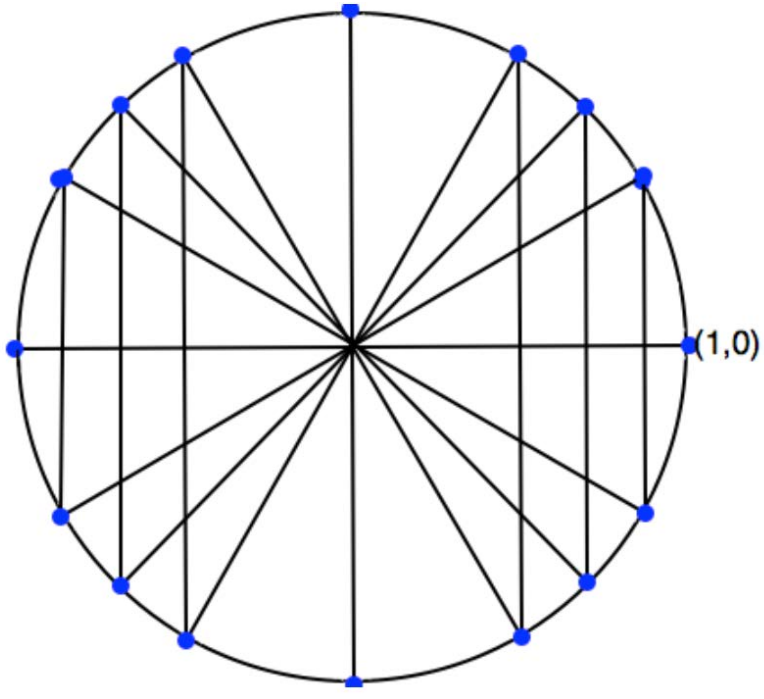
6. Triangle RST is an equilateral triangle. RS = 1 and $\overline{SA}$ is an altitude.

Use the information in the figure to label the length of the sides, RA, and the *exact* length of $\overline{SA}$.

Find the measure of angles RSA and SRA.

8. Use the information from the figures in problems 6 and 7 to fill in the table. Then label all of the points and angles of rotation in the unit circles below.

Function	$\theta = 30°$	$\theta = \frac{\pi}{6}$	$\theta = 45°$	$\theta = \frac{\pi}{4}$	$\theta = 60°$	$\theta = \frac{\pi}{3}$
$\sin\theta$						
$\cos\ \theta$						
$\tan\ \theta$						



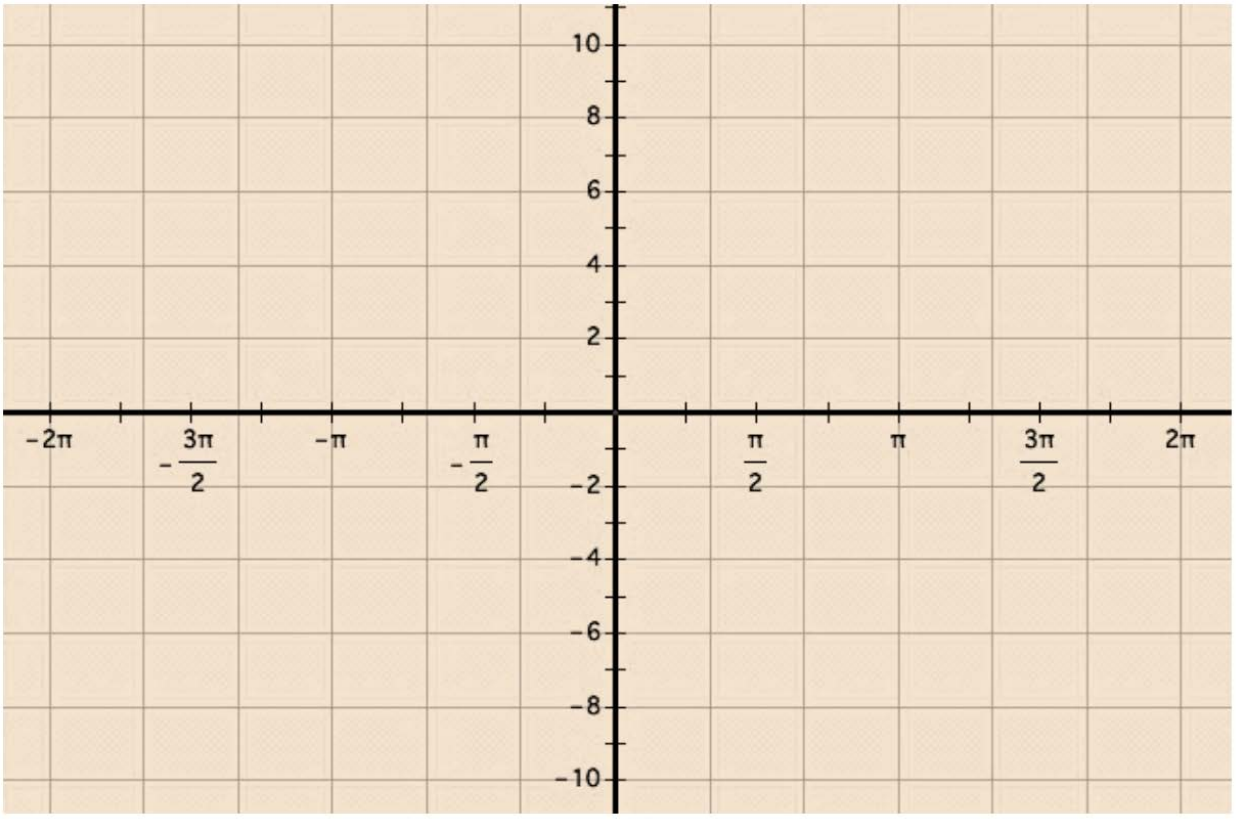
9. Name the angles of rotation in radians where sine equals 0.

10. Name the angles of rotation in radians where cosine equals 0.

11. Name the angles of rotation in radians where tangent equals 0.

12. Name the angles of rotation in radians where tangent is undefined.

13. Graph $f(x) = \tan\theta$ Use your table of values above for $f(x) = \tan\theta$. Sketch your asymptotes with dotted lines. Where do asymptotes always occur?



III. Trigonometric Facts

Answer the questions below. Be sure you can justify your thinking.

14. Given triangle ABC with angle C being the right angle, what is the sum of $m\angle A + m\angle B$?

15. Identify the quadrants in which $\sin\theta$ is positive.

16. Identify the quadrants in which $\cos\theta$ is negative.

17. Identify the quadrants in which $\tan\theta$ is positive.

18. Explain why it is impossible for $\sin\theta > 1$.

19. Name the angles of rotation (in radians) for when $\sin\theta = \cos\theta$.

20. For which trig function do a positive rotation and a negative rotation always give the same value?

21. Explain why $\sin\theta = \cos(90° - \theta)$.

22. Write the Pythagorean Identity and then prove it.

23. Explain why in the unit circle $\tan\theta = \frac{y}{x}$.

24. Which function gives the slope of the hypotenuse in a right triangle?

25. Name the trigonometric function(s) that are odd functions.