4.3 Trigonometric Ratios

**Trig. Ratios for angles in standard position: Reciprocal Trig. Ratios:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Unit Circle (radius = 1) | Any Circle (radius = r) |  |  | Unit Circle (radius = 1) | Any Circle (radius = r) |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

Ex: 1 Determine the exact values of the six trigonometric ratios for 150

1b. Determine the exact values of the six trigonometric ratios for \_\_\_\_\_\_

1c. Determine the exact values of the six trigonometric ratios for \_\_\_\_\_\_

Ex: 2 Determine the approximate values of the six trigonometric ratios for 144to the nearest thousandth. (Calculator)

2b Determine the approximate values of the six trigonometric ratios for \_\_\_\_\_\_\_\_\_\_\_\_ to the nearest thousandth. (Calculator)

2c Determine the approximate values of the six trigonometric ratios for \_\_\_\_\_\_\_\_\_\_\_\_ to the nearest thousandth. (Calculator)

Ex: 3 P(-2,5) is a terminal point of angle in standard position. Determine the exact values of the six trigonometric ratios for

3b P(\_\_\_\_\_\_\_) is a terminal point of angle in standard position. Determine the exact values of the six trigonometric ratios for

3c P(\_\_\_\_\_\_\_) is a terminal point of angle in standard position. Determine the exact values of the six trigonometric ratios for

Ex: 4 Suppose csc = 3. Determine the exact values of the other trigonometric ratios for 0

4b Suppose \_\_\_\_ = \_\_\_\_. Determine the exact values of the other trigonometric ratios for 0

4c Suppose \_\_\_\_ = \_\_\_\_. Determine the exact values of the other trigonometric ratios for 0

Ex: 5 P (-1, -4) is a terminal point of angle in standard position. Determine the exact values of the six trigonometric ratios for

5b P (\_\_\_\_\_\_\_) is a terminal point of angle in standard position. Determine the exact values of the six trigonometric ratios for

5c P (\_\_\_\_\_\_\_) is a terminal point of angle in standard position. Determine the exact values of the six trigonometric ratios for

Ex: 6 Suppose sec = 4. Determine the exact values of the other trigonometric ratios for 0

6b Suppose \_\_\_\_ = \_\_\_. Determine the exact values of the other trigonometric ratios for 0

6c Suppose \_\_\_\_ = \_\_\_. Determine the exact values of the other trigonometric ratios for 0

Ex: 7 Determine the exact value for each. Draw diagrams to illustrate your answers.

a) b) c) cos 270˚

d) e) g) sin

h) tan 45 i) sin 315 j) cos -45

k) tan 90 l) sin 225 m) cos 240

Ex: 8 Determine the approximate value for each trigonometric ratio. Give you answers to four decimal places. (calculator)

a) radians b) csc(-70˚) c) sin 4.2 radians

d) e) f)

Ex: 9 Determine the measures of all angles that satisfy the following. Use diagrams in your explanation.

a) tan θ= in the domain . Give exact answers.

b) Determine all angles that satisfy sin θ = -0.879 in the domain 0 ≤ θ ≤ 2π. Round answers to the nearest tenth. (calculator)

c) sec θ = in the domain .

4.2 Unit Circle



(x , y)



θ

Opposite (y)

Hypotenuse (1)



Adjacent (x)

 Examples:



y

h

Opposite

Hypotenuse

Sin θ = = sin 450 = ---- = sin 300 = ---- =

1



1

x

h

Adjacent

Hypotenuse

Cos θ = = cos 450 = ---- = cos 300 = ---- =



y

x

Opposite

Adjacent

Tan θ = = tan 450 = ---- = 1 tan 300 = ---- =

Complete the table

|  |  |  |  |
| --- | --- | --- | --- |
| θ | Sin | Cos | tan |
| 00 |  |  |  |
| 300 |  |  |  |
| 450 |  |  |  |
| 600 |  |  |  |
| 900 |  |  |  |
| 1200 |  |  |  |
| 1350 |  |  |  |
| 1500 |  |  |  |
| 1800 |  |  |  |
| 2100 |  |  |  |
| 2250 |  |  |  |
| 2400 |  |  |  |
| 2702 |  |  |  |
| 3000 |  |  |  |
| 3150 |  |  |  |
| 3300 |  |  |  |
| 3600 |  |  |  |