**6.2 – Radians and Special Angles**: Independent Study

Read 6.2 in your textbook, complete this handout, and complete the homework questions by Wednesday.

**Express all the important angles below in radians and complete the table at the bottom of the page.**



|  |  |
| --- | --- |
|  |  |
|  |  |



|  |  |
| --- | --- |
|  | Special Angles |
| Degrees | specialtriangle | specialtriangle2 |
| Radians | Draw the diagrams with the angles in radians | Draw the diagrams with the angles in radians |

**RECALL:** 

 

r2 = x2 + y2

**Complete the trigonometric ratio table for the 3 special angles.**

|  |  |  |  |
| --- | --- | --- | --- |
| $$θ$$ | $θ$/4 | $θ$/6 | $θ$/3 |
| Sin($θ$) |  |  |  |
| Cos($θ$ ) |  |  |  |
| Tan($θ$) |  |  |  |
| Csc($θ$) |  |  |  |
| Sec($θ$) |  |  |  |
| Cot($θ$) |  |  |  |

**Example 1:** Find the angle in radians of the angle whose terminal arm ends at (4,3).



Since you have x and y, use tan$ θ$ = y/x

tan$ θ$ = ¾

MAKE SURE YOUR CALCULATOR IS IN RADIANS

 $θ$ = tan-1 ¾

 $θ$ = .6435 radians

**You try:** Find the angle in radians of the angle whose terminal arm ends at (3,7) (Ans: 1.17)

**Example 2**: Determine sin (3$ π$ /2).

Sketch where 3$ π$ /2 is on the Cartesian plane.



Pick ANY point on the terminal arm. E.g (0, -2) is on the terminal arm.



Recall sin (3$ π$ /2) = y/r , so you must find **r** using r2 = x2 + y2

r2 = 02 + (-2)2

 = 0 + 4

 = 4

 r = 4 ½

 = 2

Use the formula sin (3$ π$ /2) = y/r

 sin (3$ π$ /2) = -2/2 = -1 (you can now check with your calculator that sin (3$π$/2) = -1)

**You try**: Determine the exact value of cot ($π$ /2)

(The answer should be 0)

**Example 3:** Determine the exact value of sin 4$ π$ /3.

Sketch the angle in standard position.



Related Acute Angle

In Q2 θr= π – θ

In Q3 θr = θ – π

In Q4 θr= 2 π – θ

 =

Determine the related acute angle since we are not in quadrant 1.

 Related Acute Angle = 4$ π$ /3 – $π$

 = $π$/3

Change the question to involve the related acute angle sin $π$ /3

 Sin $π$ /3 = √3 / 2 (USE THE CHART ABOVE)

Use CAST rule to determine if the answer should be positive or negative.

 Sin 4$ π$ /3 = - √3 / 2 since in Q3, sine is negative.

**You TRY:** Determine the exact value of cos (5$ π$ /4) and csc(11$ π$ /6)  **(CHECK SOLUTIONS ON PAGE 326)**

**Example 4:** If cos$ θ$ = - 6 /7, where $θ$ $ϵ$ [0,2$ θ$], evaluate $θ$ to the nearest hundredth.

Draw the two possible locations of $θ$, remembering that cos is negative in 2 quadrants according to CAST. I have drawn one possibility. Can you draw the other?





Ignore all negatives and imagine that the drawing was in Q1 where x and y would both be positive and find the related acute angle.

Calculate cos$ θ$ r = 6/7

 $θ$ r = 0.54

Above you found the related acute angle, find the actual angles in Q2 and Q3.

In Q2: $θ\_{1}$ = π – θr

 = 3.14 – 0.54 = 2.60

Related Acute Angle

In Q2 θ= π – θr

In Q3 θ = π + θr

In Q4 θ= 2 π – θr

 =

In Q3: $θ\_{2}$ = π + θr

 = 3.14 + 0.54 = 3.68

**You try:** Solve for $θ$ if tan $θ$ = - 7/24

(Check your answers on page 328)

**HOMEWORK: pg 330 #5-10 ; 13-16**

 