MTH 150 Chapter 5

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1 Reflection

When it came to this chapter i needed a lot of help because i was never proficient in working with circles. I had to book many tutoring appointments to help me out throughout the exercises

I had a little bit of trouble in section 5.1 at first because i had forgotten what equations i had to use in order to figure out the radius as well as distance between points. Once i remembered $(x-h)^2+(y-k)^2=r^2$ i was able to complete most of the exercises.

I found section 5.2 really troubling since we were working with distance over time, i got help from tutors but still find it hard to understand all the inputs.

As for section 5.3 ,5.4 and 5.5 i found to be most simple since we were mainly working with sin,cos,tan. Once i figured out the variables putting in the inputs and solving out the equation was pretty straight forward.
I could say i still need more practice in this chapter as I'm still not pretty confident in circles.

2 Section 5.1 Circles

2.1 1,3,5,7,9,11,13

Find the distance between the points (5,3) and (-1,-5).

$$(5,3)(-1,-5)$$

$$\frac{x^2 - x^1}{y^2 - x^1}$$

$$output - 6and - 8pluginPT$$

$$a^2 + b^2 = c^2$$

$$10$$

.Write an equation of the circle centered at (8 , -10) with radius 8.

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(x-8)^2 + (y-10)^2 = 8^2$$

5 **W**rite an equation of the circle centered at (7, -2) that passes through (-10, 0).

$$(x-7)^2 + (y-(-2))^2 = r^2$$

$$(x-7)^2 + (y+2)^2 = r^2$$

7 *Write an equation for a circle where the points (2, 6) and (8, 10) lie along a diameter.*

$$d = \sqrt{(8-2)^+10 - 6^2}$$

$$\sqrt{6^2 + 4^2} = \sqrt{52}$$

$$2\sqrt{13}$$

$$h = \frac{8+2}{2} = \frac{10}{2} = 5$$

$$k = \frac{10+6}{2} = 8$$

$$(x-5)^2 + (y-8)^2 = 13$$

9 *Sketch a graph of*$(x2)^2 + (y+3)^2 = 9$.

11 *Find the y intercept(s) of the circle with center (2, 3) with radius 3.*

$$(x-2)^2 + y - 3^2 = 3^2$$

$$4 + (y-3)^2 = 9$$

$$(y-3)^2 = 5$$

$$y - 3 = +- \sqrt{5}$$

$$yintis(0,3) + /- \sqrt{5}$$

13 *At what point in the first quadrant does the line with equation* $y = 2x+5$ *intersect a circle with radius 3 and center (0,5)*

$$(x-0)^2 + (y-5)^2 = 3^2$$

$$x^2 + ((2x+5)-5)^2 = 9$$

$$x^2 + 2x^2 = 9$$

$$5x^2 = 9$$

$$x^2 = \frac{9}{5}$$

$$x = +/- \frac{9}{5}$$

$$\sqrt{\frac{9}{5}}, 2x+5$$

Comments

This was pretty simple, after having a refresher on the subject this section i found to be very easy.

3 Section 5.2 Angles

3.1 5,11,15,25,26

5 *Convert the angle*

$$\frac{5\pi}{6}$$

from radians to degrees.

$$(\frac{5\pi}{6})\frac{270}{37/2} = 150$$

11 *Find the angle between 0 and* 2π *in radians that is coterminal with the angle*

$$\frac{26\pi}{9}$$

.

$$\frac{26\pi}{9} - 2\pi = 2.79$$

$$2.79/\pi = \frac{8}{9}\pi$$

15 *On a circle of radius 7 miles, find the length of the arc that subtends a central angle of 5 radians.*

$$length = \theta/360$$

$$5(\frac{350}{2\pi} = 2.86$$

$$\frac{2.86}{360}(2\pi(7)$$

$$.007(2\pi) = .049 = 34.94$$

$$length = 35$$

25 *A truck with 32-in.-diameter wheels is traveling at 60 mi/h. Find the angular speed of the wheels in rad/min. How many revolutions per minute do the wheels make?*

$$r = 32/2 = 16$$

$$v = rw$$

$$\frac{60mph}{16in}$$

$$\frac{60(63360)}{16}$$

$$v = 237600(\frac{1}{60} = 3960sp$$

$$speed\frac{1}{2\pi} = revs$$

$$3960(\frac{1}{2\pi} = revs$$

26 *A bicycle with 24-in.-diameter wheels is traveling at 15 mi/h. Find the angular speed of the wheels in rad/min. How many revolutions per minute do the wheels make?*

$$r = 24/2 = 12$$

$$v = rw$$

$$\frac{15mph}{12in}$$

$$\frac{15(63360)}{12}$$

$$v = 237600(\frac{1}{15} = 3960sp$$

$$speed\frac{1}{2\pi} = revs$$

$$3960(\frac{1}{2\pi} = revs$$

Comments

4 Section 5.3 Points on Circles Using Sine and Cosine

4.1 1,3,5,7

1 Find the quadrant in which the terminal point determined by t lies if a. sin(t)¡0 and cos(t)¡0 b. sin(t)¿0 and cos(t)¡0

$$lieiquadrant3and4$$

3 The point P is on the unit circle. If the y-coordinate of P is $\frac{3}{5}$, and P is in quadrant II, find the x coordinate..

$$x^2 + y^2 = r^2$$

$$x^2 + \frac{3}{5}^2 + 1^2$$

$$x^2 + \frac{9}{25} = 1$$

$$x^2 = \sqrt{\frac{9}{25}}$$

$$+/- \frac{4}{5}$$

5 $If cos(\theta) = \frac{1}{7} and \theta is in the 4th quadrant, find sin(\theta)..$

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

$$cos \frac{1}{7}$$

$$\frac{4\sqrt{3}}{7}$$

$$.98$$

7 *If* $sin(\theta) = \frac{3}{8}$ *and*

$$\theta$$

is in the 2nd quadrant, find $cos(\theta)$.

$$\frac{9}{64} + cos\theta = 1$$

$$cos = \frac{55}{64} = \sqrt{\frac{55}{8}}$$

$$-\sqrt{\frac{55}{8}}$$

11 *For each of the following angles, find the reference angle and which quadrant the angle lies in. Then compute sine and cosine of the angle.*

A.quadrant III(negative)

$$Sin\frac{5\pi}{4} = -sin\frac{\pi}{4} = -\sqrt{\frac{2}{2}}$$

$$Cos\frac{5\pi}{4} = -Cos\frac{\pi}{4} = -\sqrt{\frac{2}{2}}$$

B.quadrant III(negative)

$$sin\frac{7\pi}{6} = -sin\frac{\pi}{6} = -\frac{1}{2}$$

$$cos\frac{7\pi}{6} = -cos\frac{\pi}{6} = -\sqrt{\frac{3}{2}}$$

C. Quadrant IV (sin-, cos+)

$$sin\frac{5\pi}{3} = -sin\frac{\pi}{3} = -\sqrt{\frac{3}{2}}$$

$$cos\frac{5\pi}{3} = -cos\frac{\pi}{3} = -\sqrt{\frac{1}{2}}$$

D.Quadrant II (sin +, cos-)

$$sin\frac{3\pi}{4} = sin\frac{\pi}{4} = \sqrt{\frac{2}{2}}$$

$$cos\frac{3\pi}{4} = cos\frac{\pi}{4} = -\sqrt{\frac{2}{2}}$$

13 *Give exact values for sin(θ)and cos (θ) for each of these angles.*

$$Sin\frac{5\pi}{4} = -sin\frac{\pi}{4} = -\sqrt{\frac{2}{2}}$$

$$Cos\frac{5\pi}{4} = -Cos\frac{\pi}{4} = -\sqrt{\frac{2}{2}}$$

$$sin\frac{7\pi}{6} = -sin\frac{\pi}{6} = -\frac{1}{2}$$

$$cos\frac{7\pi}{6} = -cos\frac{\pi}{6} = -\sqrt{\frac{3}{2}}$$

$$sin\frac{5\pi}{3} = -sin\frac{\pi}{3} = -\sqrt{\frac{3}{2}}$$

$$cos\frac{5\pi}{3} = -cos\frac{\pi}{3} = -\sqrt{\frac{1}{2}}$$

$$sin\frac{3\pi}{4} = sin\frac{\pi}{4} = \sqrt{\frac{2}{2}}$$

$$cos\frac{3\pi}{4} = cos\frac{\pi}{4} = -\sqrt{\frac{2}{2}}$$

Comments

This was pretty simple, had to be careful when i inputting the right variables

5 Section 5.4 The Other Trigonometric Functions

5.1 1,9,17,27

1 *if*

$$\theta = \frac{\pi}{4}$$

find exact values for sec(),csc(), tan(), cot().

$$sec\frac{\pi}{4} = \frac{1}{cos(\pi/4)} = \frac{2}{\sqrt{2}}$$

$$\sqrt{2}$$

$$csc\frac{\pi}{4} = \frac{1}{sin(\pi/4)} = \frac{2}{\sqrt{2}}$$

$$\sqrt{2}$$

$$tan\frac{\pi}{4} = \frac{sin(\pi/4)}{cos(\pi/4)}$$

$$1$$

$$cot\frac{\pi}{4} = \frac{1}{tan(\pi/4)}$$

$$1$$

9 *If*

$$sin\theta = \frac{3}{4}$$

$$cos\theta == \sqrt{1 - sin^2\theta}$$

17 Simplify each of the following to an expression involving a single trig function with no fractions.

$$csctan$$

$$\frac{1}{sin}(\frac{sin}{cos} = \frac{1}{cos} = sec$$

27 *Prove the identities.*

$$\frac{sin^2\theta}{1+cos\theta} = \frac{1-cos\theta}{1+cos\theta}$$

$$1-cos\theta$$

6 Section 5.5 Right Triangle Trigonometry

6.1 1,3,17,27

1 *In each of the triangles below, find sin(A),cos(A),tan(A),sec(A),csc(A),cot(A).*

$$h = 10^2 + 8^{=}164$$
$$h = \sqrt{164} = 2\sqrt{41}$$
$$sin = \frac{10}{2\sqrt{41}} = \frac{5}{\sqrt{41}}$$
$$cos = \frac{8}{2\sqrt{41}} = \frac{4}{\sqrt{41}}$$
$$tan = \frac{5}{4}$$
$$sec = \frac{1}{\frac{4}{\sqrt{41}}}$$
$$\frac{\sqrt{41}}{4}$$
$$csc\frac{1}{\frac{5}{\sqrt{41}}}$$
$$\frac{\sqrt{41}}{5}$$
$$\frac{1}{\frac{5}{41}}$$
$$\frac{4}{5}$$

3 *In each of the following triangles, solve for the unknown sides and angles.*

$$\frac{7}{c} = \frac{7}{\frac{1}{2}}$$

$$\frac{7}{\frac{1}{\sqrt{3}}} = 7\sqrt{3}$$

9 *A 33-ft ladder leans against a building so that the angle between the ground and the ladder is 80°. How high does the ladder reach up the side of the building?*

$$sin(80) = \frac{x}{33}$$
$$x = 32.49$$

19 *Find the length x.*

$$sin(80) = \frac{x}{33}$$
$$x = 32.49$$

This was fairly simple, got a little lost when trying to find the asymtope points as its been a while but the work was easy