MTH 150 Chapter 5

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Contents

1 Reflection

I was rather happy with my work for this project. I was able to completely finish the problems in time without any stress or rushing towards the end. Asking for help this chapter really helped and I don't really understand why I wasn't doing it all too much before. I felt like it really helped me understand what I was learning rather then just getting the answer. As for the work itself, I felt I understood it rather well and the stuff I didn't I was able to figure out using the explanations in the answer key or I just asked about it in class. Overall, I feel as if I had a much easier time with this chapter in comparison to the last one, asking for help and good time management really helps with these projects.

2 Section 5.1: Circles

2.1 Problem 1.

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

Answers:

10

Comments

Not much issues with this problem. Just input the values into the distance formula presented in the chapter and then simplify to get the answer.
To be safe, I checked my answer using the answer key, which showed my answer to be correct.

2.2 Problem 3.

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

Answers:

$r = 8$
$h = 8$
$k = -10$
$(x - 8)^2 + (y - (-10))^2 = 8^2$
$(x - 8)^2 + (y + 10)^2 = 64$

Comments

Similar to the last problem, I didn't have much trouble with this problem. Just putting in the values into equation and then solving said equation.
Of course, to be safe, I checked my answer using the book's answer key, which showed my answer to be correct.

2.3 Problem 5.

Write an equation of the circle centered at (7, -2) that passes through (-10, 0)

Answers:

$(x-7)^2 + (y+2)^2 = 293$

Comments

Like the last two problems, this was rather easy for me. Just putting in the values into the proper equation and then using this equation to get the answer.
Regardless, I checked my answer using the book's answer key just to be safe. Which proved my answer correct.

2.4 Problem 7.

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

Answers:

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

Comments

While a bit more work than the previous problems, I didn't have any issues with it and finished it without problem. Though, as always, I checked my answer using the book's answer key, which showed my answer to be correct.

2.5 Problem 11.

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

Answers:

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

Comments

Like most of section one, I didn't have trouble with this one. Just found the equation, input 0 in for x and then solved to find my answers.
Though, as always, I checked my answer using the book's answer key, which showed my answer to be correct.

2.6 Problem 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)?

Answers:

(1.34164, 7.68328)

Comments

While I did get this problem in the end, it took me some time to complete. The fractions and then the need for those fractions to be a square root made simplifying the problem a bit harder, though I figured it out in the end.
I checked my answer using the book's answer key, which showed my answer to be correct.

2.7 Problem 17.

A small radio transmitter broadcasts in a 53 mile radius. If you drive along a straight line from a city 70 miles north of the transmitter to a second city 74 miles east of the transmitter, during how much of the drive will you pick up a signal from the transmitter?

Answers:

29.87 miles

Comments

Unfortunately, at first, I was quite lost with this problem. This led me to check the answer key to see if it would provide any more insight into the problem. Which, thankfully, it showed a step-by-step process of how to do the problem.

3 Section 5.2: Angles

3.1 Problem 5.

Convert the angle $\frac{5\pi}{6}$ from radians to degrees

Answers:

150 degrees

Comments

I found this problem quite easy. I just used the conversion equations for radians to degrees that I read in the lesson and was able to quickly find my answer.
To be safe, I checked the book's answer key, which seemed to match my graph.

3.2 Problem 11.

Find the angle between 0 and 2π in radians that is coterminal with the angle $\frac{26\pi}{9}$

Answers:

$\frac{8\pi}{9}$

Comments

At first, I was confused on how to solve this problem, which eventually brought me to check the answer key for the process of how to solve the problem, which once I found out, I went back and completed the problem. I checked my answer with the answer key, which confirmed that my answer was correct.

3.3 Problem 15.

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

Answers:

35m

Comments

I had a good bit of trouble with this problem. This pushed me to look up to answer to help me understand how to solve the problem. This did help understand a bit more of how to solve the problem, thankfully.

3.4 Problem 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?

Answers:

630.25 rotations per minute

Comments

Like the last problem I had a good bit of trouble with this one as well. This pushed me to look up to answer to help me understand how to solve the problem. This did help me understand the problem much better.

3.5 Problem 27.

A wheel of radius 8 in. is rotating 15°/sec. What is the linear speed v, the angular speed in RPM, and the angular speed in rad/sec?

Answers:

v=$\frac{2.094in}{sec}$

RPM=2.5

$\frac{\pi}{12}$ rad/sec

Comments

Like the last problem I had a good bit of trouble with this one too. This pushed me to look up to answer to help me understand how to solve the problem. This helped me understand how I was suppose to solve a problem like this.

4 Section 5.3: Points on Circles Using Sine and Cosine

4.1 Problem 1.

Find the quadrant in which the terminal point determined by t lies if

a. sin(t) less than 0 and cos(t) greater than 0
b. sin(t) greater than 0 and cos(t) less than 0

Answers:

a. 3
b. 2

Comments

After reading through the chapter I found this problem pretty easy, just needed to remember what quadrant meant what.
Of course, I checked my answer using the answer key, I found that my answer to be correct.

4.2 Problem 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

Answers:

$-\frac{4}{5}$

Comments

While at first this problem looked very difficult, though after reading through this section of the chapter again, I figured out how I was suppose to solve a problem such as this.
After completing the problem I checked my answer using the answer key, which showed my answer to be correct.

4.3 Problem 5.

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

Answers:

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

Comments

Unfortunately, I had a bit of trouble with this problem. This pushed me to look up the answer in the answer key, which showed the process of the problem and helped me understand what I was confused about.

4.4 Problem 7.

If sin(theta)=$\frac{3}{8}$ and theta is in the 2nd quadrant, find cos(theta)

Answers:

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

Comments

With what I learned in the last problem, I was able to complete this problem with a little bit of effort. It wasn't easy, but I was able to do it on my own without looking up the answer in the answer key.
To be sure, I used checked the answer key after I was done with the problem, it showed that my answer was correct.

4.5 Problem 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

Answers:

a. $\frac{\pi}{4}$, quadrant 3, sin=-$\frac{\sqrt{2}}{2}$, cos=-$\frac{\sqrt{2}}{2}$
b. $\frac{\pi}{6}$, quadrant 3, sin=-$\frac{1}{2}$, cos=-$\frac{\sqrt{3}}{2}$
c. $\frac{\pi}{3}$, quadrant 4, sin=-$\frac{\sqrt{3}}{2}$, cos=$\frac{1}{2}$
d. $\frac{\pi}{4}$, quadrant 2, sin=$\frac{\sqrt{2}}{2}$, cos=-$\frac{\sqrt{2}}{2}$

Comments

Unfortunately, I was a bit lost on how to do this problem. I had to look up the answers in the answer key, which went through the process of solving the problem and showed me what I would have needed to do in order to solve the problem.

4.6 Problem 13.

Give exact values for sin(theta) and cos(theta) for each of these angles

Answers:

a. sin=-$\frac{\sqrt{2}}{2}$, cos=-$\frac{\sqrt{2}}{2}$
b. sin=-$\frac{1}{2}$, cos=$\frac{\sqrt{3}}{2}$
c. sin=$\frac{y}{1}$=-1, cos=$\frac{x}{1}$=0
d. sin=0, cos=-1

Comments

With what I learned after doing the last problem, I was able to complete this problem, though not with ease. It did take me some time, and I noticed a few mistakes as I was working through it.
I checked my answer with the book's answer key, at first my answer was incorrect, to which I realized that I made a few mistakes. Which I went back to correct to get my final and correct answer.

5 Section 5.4: The Other Trigonometric Functions

5.1 Problem 1.

If theta=$\frac{\pi}{4}$, find exact values for sec(theta), csc(theta), tan(theta), cot(theta)

Answers:

sec($\frac{\pi}{4}$)=$\sqrt{2}$
$csc(\pi_{\frac{}{4}})$=$\sqrt{2}$
$tan(\pi_{\frac{}{4}})$=1
cot($\frac{\pi}{4}$)=1

Comments

After reading through this section of the chapter, I found this problem to be simple, in at least what it is asking for. While it did require some work, using the equations presented in this section allowed me to find my answers. While I was confident in my answers, I still checked them. This showed my answers to be correct.

5.2 Problem 9.

If sin=$\frac{3}{4}$, and theta is in quadrant 2, find cos(theta), sec(theta), csc(theta), tan(theta), cot(theta)

Answers:

cos(theta)=-$\frac{\sqrt{7}}{4}$
sec(theta)=-$\frac{4\sqrt{7}}{4}$
csc(theta)=$\frac{4}{3}$
tan(theta)=-$\frac{3\sqrt{7}}{7}$
cot(theta)=-$\frac{\sqrt{7}}{3}$

Comments

Unfortunately, I didn't really get this problem at first. After a bit of trying different things to hopefully solve the problem, I looked up the answer. This did give a step-by-step process of how to solve the problem, though I'm a little unsure how well I could solve another problem like this.

5.3 Problem 17.

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

Answers:

sec(t)

Comments

At the beginning I was lost on how to go about solving this problem. Though after rereading this section of the chapter, I felt I began to have an understanding and tried to solve the problem. When I checked my answer, my answer proved to be incorrect, but the answer key showed me where I went wrong and how to solve problems like this.

5.4 Problem 27.

Prove the identities

Answers:

$\frac{sin^2(theta)}{1+cos(theta)}$=$\frac{1-cos^2(theta)}{1+cos^2(theta)}$ by Pythagorean identity $sin^2(theta)+cos^2(theta) = 1$

=$\frac{(1+cos(theta))(1-cos(theta))}{1+cos(theta)}$ by factoring

=1-cos(theta) by reducing

Comments

Unfortunately, I was confused on how to do this problem. I had to lookup the answers in the answer key, which went through the process of solving the problem and showed me what I would have needed to do in order to solve the problem.

6 Section 5.5: Right Triangle Trigonometry

6.1 Problem 1.

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

Answers:

$\sin(A)=\frac{5}{\sqrt{41}}$

$\cos(A)=\frac{4}{\sqrt{41}}$

$\tan(A)=\frac{5}{4}$

$\sec(A)=\frac{\sqrt{41}}{4}$

$\csc(A)=\frac{\sqrt{41}}{5}$

$\cot(A)=\frac{4}{5}$

Comments

While this problem did take a little bit of thinking and rereading of the chapter, I did figure it out. After some realizations about the problem, I realized how I would solve the problem.
I checked my answers using the answer key in the book, which showed my answers was incorrect, which I then looked back on my work, where I then found my mistake and corrected it. After this fix, I got the correct answers.

6.2 Problem 3.

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

Answers:

c=14
b=$7\sqrt{3}$
B=60 degrees

Comments

This problem took me a bit of time to complete and eventually I needed to look up the answer. The answer key went through the problem step-by-step and showed how to solve a problem similar to this.

6.3 Problem 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?

Answers:

32.4987 ft

Comments

After rereading this section of the chapter and with what I learned from the previous problem, I was able to solve this problem without too many issues.
I checked my answer to be safe, which the answer key showed that my answer was correct.

6.4 Problem 19.

Find the length x

Answers:

143.04265

Comments

Unfortunately, I had a lot of issues with this problem. While I understood the previous problems pretty well, I just didn't understand how to solve this one. I checked the answer key, which helped me understand how to solve it.

6.5 Problem 23.

A plane is flying 2000 feet above sea level toward a mountain. The pilot observes the top of the mountain to be 18o above the horizontal, then immediately flies the plane at an angle of 20o above horizontal. The airspeed of the plane is 100 mph. After 5 minutes, the plane is directly above the top of the mountain. How high is the plane above the top of the mountain (when it passes over)? What is the height of the mountain?

Answers:

15434.2842 ft

Comments

Much like the last problem I some issues with this problem. I didn't understand how to solve this one. I checked the answer key, which helped guide me through how to solve it.