MTH 150 Chapter 3

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Contents

1 Reflection

Unfortunately, I know I didn't keep up the same momentum per say, as I had in the Chapter 2 Project. I didn't manage my time well, again, which caused me to be unable to finish a little bit of 3.7 and the entirety of 3.8. I gave myself much more time than I did when working on Chapter 1, but since I didn't ask for help, I was stuck on some questions for much longer than I would have liked. I don't really know why I never asked for help, but its something I'm going to correct for the next project. Overall, I am disappointed with my work this chapter, I feel as I can definitely be better.

2 Section 3.1: Power Functions and Polynomial Functions

2.1 Problem 1.

Find the long run behavior of each function as x $\rightarrow$ infinity and x $\rightarrow$ negative infinity

Answers:

$f(x)$ will approach infinity as x approaches infinity
$f(x)$ will approach infinity as x approaches negative infinity

Comments

At first, I was confused on how to do this problem, which eventually brought me to look up the answer. Though once I did, I immediately understood what I had needed to do.

2.2 Problem 15.

Find the degree and leading coefficient of each polynomial

Answers:

$2x^2 - 8x + 3x - 12$
$(2x^2 - 5x - 12)(3x + 1)$
$6x^3 - 13x^2 - 41x - 12$

the leading coefficient is 6
the degree is 3

Comments

While I didn't really exactly understand the problem at first, after I got the final equation, and after rereading the section a bit, I understood, and found my answer.

Just to be sure, I checked my answer using the book's answer key, which showed my answer was correct.

2.3 Problem 17.

Find the long run behavior of each function as x $\rightarrow$ infinity and x $\rightarrow$ negative infinity

Answers:

$f(x)$ will approach infinity as x approaches negative infinity
$f(x)$ will approach negative infinity as x approaches negative infinity

Comments

This problem was a bit more complicated than the first, instead of being just a singular value, it was now a whole equation. Though using what I had learned from the first problem, I was able to solve with problem, but it took me a bit longer to figure it out.

2.4 Problem 21.

What is the maximum number of x-intercepts and turning points for a polynomial of degree 5?

Answers:

The max number of x-intercepts is 5
The max turning points for a degree of 5 will be 4

Comments

Using my realization from the previous problem, I was able to quickly determine that the answer was decreasing by identifying that the slope was negative. My experience with the previous problem made doing this one much easier.

I checked my answer in the solution manual to be safe.

2.5 Problem 31.

Find the vertical and horizontal intercepts of each function.

Answers:

$2(t-1)(t+2)(t-3)$
$(2t-2)(t+2)(t-3)$
$2t^2+4t-2t-4$
$2t^2+4t-2t-4(t-3)$
$2t^3-6t^2+4t^2-12t-2t^2+6t-4t+12$
$2t^3-4t^2-10t+12$

$2(0-1)(0+2)(0-3)$
$2(-1)(2)(-3)$
12

vertical=(0,12)
horizontal=(-2,0) (1,0) (3,0)

Comments

I had a few issues with this problem. While I had no issue find the vertical intercept, I had trouble finding the horizontal intercepts and had to look up the answers.

3 Section 3.2: Quadratic Functions

3.1 Problem 7.

For each of the follow quadratic functions, find a) the vertex, b) the vertical intercept, and c) the horizontal intercepts.

Answers:

Vertex: $(-10/4, -1/2)$
x-intercepts: (-3,0)(-2,0)
y-intercept: (0,4)

Comments

While I did have some issues when attempting this problem, I was able to find most of the answer without too many problems.
After I was done, I checked my answers in the book's answer key. This showed that I got a few parts of the problem incorrect, and helped me understand what I had done wrong.

3.2 Problem 13.

For each of the follow quadratic functions, find a) the vertex, b) the vertical intercept, and c) the horizontal intercepts.

Answers:

$f(x) = (x-6)^2 - 4$

Comments

Thankfully I had little issues in solving this problem.
After I was done, I checked my answers in the book's answer key. This showed that my answer was correct.

3.3 Problem 19.

Write an equation for a quadratic with the given features

Answers:

$(-2/3x^2) - (4/3x) + 2$

Comments

Unfortunately, I had a lot of issues with this problem, which made me look up the answer in the answer key. After doing this, I figured what I was doing wrong.

3.4 Problem 27.

A rocket is launched in the air. Its height, in meters above sea level, as a function of time, in seconds, is given by $h(t) = -4.9t^2 + 229t + 234$.

Answers:

a.
234
b.
2909.56
c.
47.735

Comments

I didn't have much issues with this problem, until the last part when it came to using the quadratic formula. Though I eventually figured it out.

Like usual, I checked my answers via the answer key. They agreed with most of my answers. I had to redo the final part of the problem, but beyond that, my answers were correct.

3.5 Problem 31.

A box with a square base and no top is to be made from a square piece of cardboard by cutting 6 in. squares out of each corner and folding up the sides. The box needs to hold 1000 in^3

Answers:

620

Comments

After attempting this problem, I saw that I was having trouble with the quadratic equation. Therefore, like the last problem, it took me a good bit of time to figure out and solve. Eventually this forced me to look up the answer in the answer key.

4 Section 3.3: Graphing with Quadratic Functions

4.1 Problem 19.

Solve each inequality

Answers:

$(x-3)(x-2)^2 > 0$ when $x > 3$

Comments

I had a lot of issues with this problem, forcing me to look up the answer in the answer key.

4.2 Problem 31.

Write an equation for a polynomial the given features.

Answers:

$f(x) = -2/3(x+2)(x-1)(x-3)$

Comments

I had a lot of issues with this problem, forcing me to look up the answer in the answer key. After doing this, it helped me understand where I was going wrong.

4.3 Problem 51.

A rectangle is inscribed with its base on the x axis and its upper corners on the parabola $y = 5 - x^2$. What are the dimensions of such a rectangle that has the greatest possible area?

Answers:

x=1.29
y=8.61

Base=2.58
Height=6.67

Comments

While I didn't all that many issues with this problem, I ended up getting stuck about halfway through the problem, which prompted me to look up the answer. After seeing that, I realized how I got stuck and what I was suppose to do.

5 Section 3.4: Factor Theorem and Remainder Theorem

5.1 Problem 21.

Below you are given a polynomial and one of its zeros. Use the techniques in this section to find the rest of the real zeros and factor the polynomial.

Answers:

$y = 7(x-4)(x+6)/(x+4)(x+5)$

Comments

Unfortunately, I had no idea how to solve this problem. I tried to solve it a few different ways, but none were correct. Eventually, I just looked up the answer in the answer key.

5.2 Problem 23.

Below you are given a polynomial and one of its zeros. Use the techniques in this section to find the rest of the real zeros and factor the polynomial.

Answers:

$(x-2)^2$

Comments

Like the last problem, I had a lot of trouble with this problem. For some reason, I just couldn't wrap my head around these types of problems. Eventually, I looked up the answer to this problem as well.

6 Section 3.5: Real Zeros with Polynomials

6.1 Problem 1.

For each of the following polynomials, use Cauchy's Bound to find an interval containing all the real zeros, then use Rational Roots Theorem to make a list of possible rational zeros.

Answers:

Domain: x is greater than or equal to 4

$f^{-}1(y) = -4 + \sqrt{y}$

Comments
For most of this problem, I didn't have all that many issues, but when it came to doing the second part of the problem, I got stuck. I looked up the answer, which showed me how I was suppose to continue.

6.2 Problem 11.

Find the real zeros of each polynomial.

Answers:

$x = f^{-}1(x) = 2 - 8y/7$

Comments

Unfortunately, I didn't really know how to start this problem, which I think really made this problem difficult for me. Eventually after trying to figure out how to start the problem, I just looked up the answer using the answer key.

7 Section 3.6: Complex Zeros

7.1 Problem 5.

Simplify each expression to a single complex number.

Answer:

3.46i

Comments

After seeing the examples done it class from this section, I feel as if I didn't have any issues with this problem.
Unfortunately, the answer key of the book didn't go up to 3.6, or perhaps I just couldn't see it for whatever reason. To check my answer I tried to use mathmatica, but had technical difficulties.

So annoyingly enough, I'm unsure of whether my answer is correct. But even if it isn't, I'm aware that it'd probably just have been a basic math issue, as I feel I've understood how to use i.

7.2 Problem 19.

Simplify each expression to a single complex number.

Answer:

$3/2 + 2i$

Comments At first I was a little lost on how to complete a problem like this, but once we went over it in class, I understood, and found this section rather easy.

7.3 Problem 24.

Simplify each expression to a single complex number.

Answer:

$(2/5) + (11/5i)$

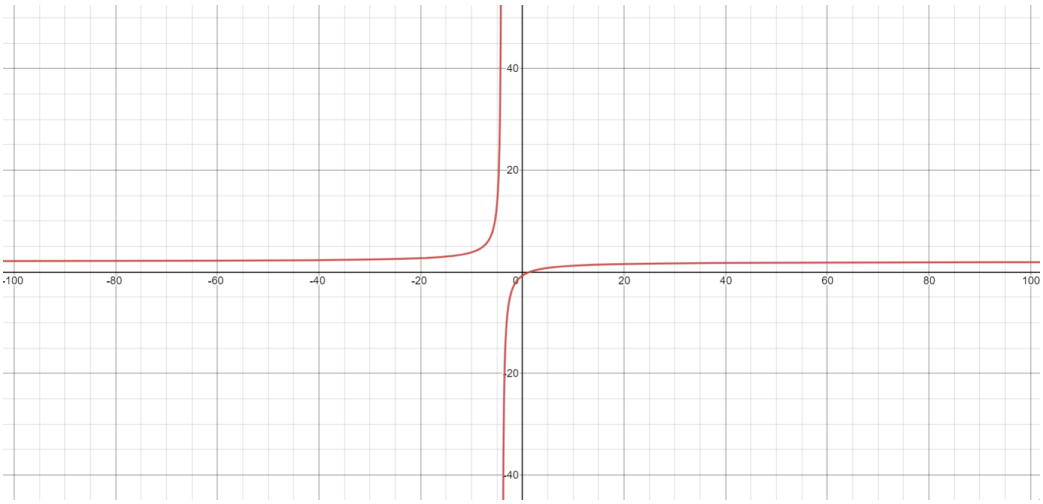
Comments Just like the last problem, at first I didn't really understand, but after it was gone over in class, I understood.

8 Section 3.7: Rational Functions

8.1 Problem 5.

For each function, find the horizontal intercepts, the vertical intercept, the vertical asymptotes, and the horizontal asymptote. Use that information to sketch a graph.

Answers:



8.2 Problem 19.

Write an equation for a rational function with the given characteristics.

Answers:

$f(x) = a\frac{(x-4)}{(x-5)(x+5)}$

Comments

Unfortunately, the answer key of the book didn't go up to 3.7, or perhaps I just couldn't see it for whatever reason. To check my answer I tried to use mathmatica, but had technical difficulties.

So annoyingly enough, I'm unsure of whether my answer is correct.

8.3 Problem 39.

Find the oblique asymptote of each function.

Answers:

$y = 3x - 6$

Comments

Unfortunately, the answer key of the book didn't go up to 3.7, or perhaps I just couldn't see it for whatever reason. To check my answer I tried to use mathmatica, but had technical difficulties.

So annoyingly enough, I'm unsure of whether my answer is correct.