MATH 040 - Midterm

Spring 2020

Last Name: _____

First Name: _____

Signature: _____

Instructions:

- Please put away notes, and turn off and put away phones.
- Basic calculators are permitted.
- Ask me if you have any questions about what a problem is asking.

Question:	1	2	3	4	5	6	7	8	Total
Points:	6	6	10	12	10	12	12	12	80
Score:									

1. (6 points) True or false.

   (a) $\frac{4}{5} > \frac{41}{50}$

   (b) $\frac{3}{4} < 0.8$

   (c) $(-2)^6 > -2^6$

2. (6 points) Evaluate the following expressions

   (a) $a^3 + a^2$ when $a = -2$

   (b) $\left(\frac{1}{2}d\right)^2$ when $d = 6$

   (c) $\left(\frac{1}{x}\right)^3$ when $x = 10$

3. (10 points) Suppose you just got two offers for sales jobs.

   (A) In job A, you will earn a base salary of \$5000 each month, plus 6% of sales in commission.

   (B) In job B, you will earn a base salary of \$4000 each month, plus 10% of sales in commission.

   Set up a linear inequality that describes the amount of sales that you'll have to do each month in order to make more money with the second job than with the first, where the variable x denotes sales in dollars. Solve for x.

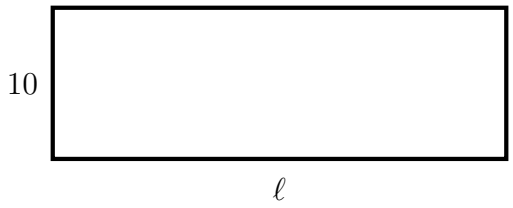
4. (12 points) Suppose that the number of baseball cards that Alex owns is given by $y = 200 + 6x$ where x is the number of months since Alex's 12th birthday.

   (a) What is the value of the slope in this equation, and what does it represent in terms of baseball cards?

   (b) What is the value of the y-intercept, and what does it represent in terms of baseball cards?

   (c) How many baseball cards does Alex own on her 13th birthday? (Hint: recall that x represents the number of *months* since her 12th birthday.)

5. (10 points) Suppose you are a farmer with 100 meters of fencing that you plan to use to enclose a 10 meter by ℓ meter section of your grass lot. The enclosed area needs to have at least 350 square meters of space for your animals. Find **all** values of ℓ such that the perimeter no more than 100 meters while the area of the lot is at least 350 square meters?



6. (12 points) Consider the function $f(x) = |2x| - 1$.

(a) Compute

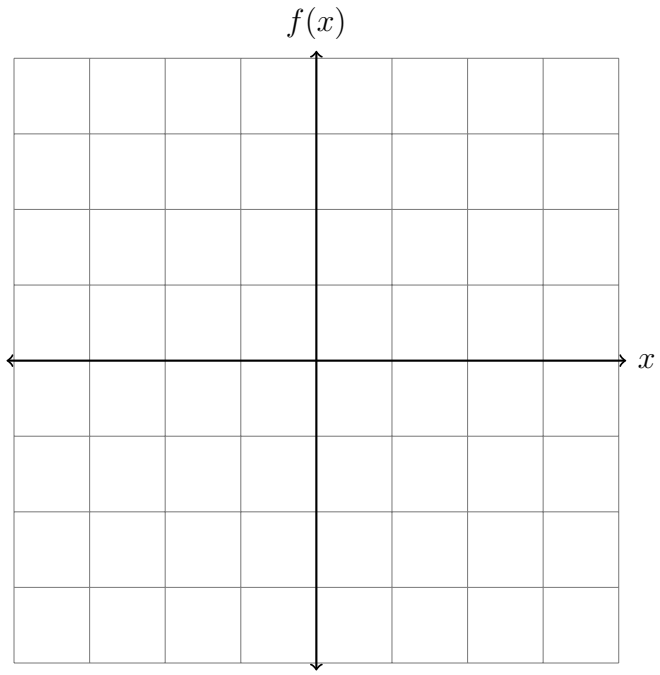
(i) $f(-1)$

(ii) $f(-\frac{1}{2})$

(iii) $f(0)$

(iv) $f(2)$

(b) Graph the function f including the four points above.



(c) What is the domain of the function f?

(d) What is the range of the function f?

7. (12 points) At a 2018 basketball tournament, tickets cost \$10 for adults and \$5 for children. Suppose 300 people came to the game, and ticket sales totaled \$2400. Set up a system of equations and use it to determine how many of the attendees were children.

8. (12 points) Suppose that a toy company has learned that if they price a toy at \$3, they will sell 1000 units, and if they price a toy at \$4, they will sell 700 units.

   (a) Assuming that the price-sales relationship is linear, write a linear equation describing the number of units sold as a function of price.

   (b) If the company gives away toys for free, how many will they give away according to this linear model?