MATH 040 - Midterm Exam Preview

Spring 2019

Last Name: _____

First Name: _____

Signature: _____

Instructions:

- Some subset of the questions on this Midterm Exam Preview will be selected (and perhaps slightly modified) to make up your Midterm Exam.
- This Preview will be graded as participation only! I will let everyone know which problems they got right or wrong, but everyone who completes the assignment will receive full credit.
- This Midterm Exam Preview is longer than the actual midterm, so don't worry if you don't complete the whole thing.
- Please spend at least 1 hour attempting the Preview, and you're welcome to stop after 2 hours–even if the exam is not completed. Please record how much time you spent on this front page.
- Feel free to use calculators, books, the internet, your instructors, and any TAs or tutors. However, books, the internet, and instructors will not be available when you take the actual Midterm Exam.
- You are welcome to give feedback on any questions by leaving a note next to the question.

Time Spent: _____(between 1 and 2 hours)

Question:	1	2	3	4	5	6	7	8	9	10	11	Total
Points:	5	4	6	5	6	5	5	8	5	5	6	60
Score:												

1. (5 points) True or false.

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

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

   (c) $-\frac{2}{5} \geq \frac{1}{5}$

   (d) $2.1719 \geq 2.18$

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

2. (4 points) Evaluate the following expressions

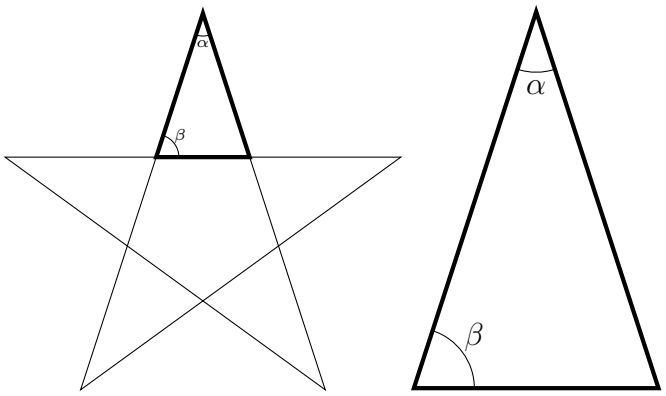
   (a) $a^3 + a^2$ when $a = -2$

   (b) $\sqrt{b^2 + c}$ when $b = -3$ and $c = 8$

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

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

3. (6 points) Suppose you want to draw a "perfect" five-point star on a poster for an event you're going to, and you know that for each of the five triangular arms, the angle at the top, α, is half the angle at the base, β. What is the angle α of the tip of the star? (Recall that the three angles of a triangle add to 180°.)



4. (5 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.

5. (6 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.

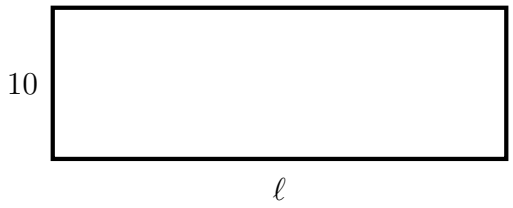
   (a) What is the value of the slope in this equation, and what does it represent in terms of baseball cards?

   (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.)

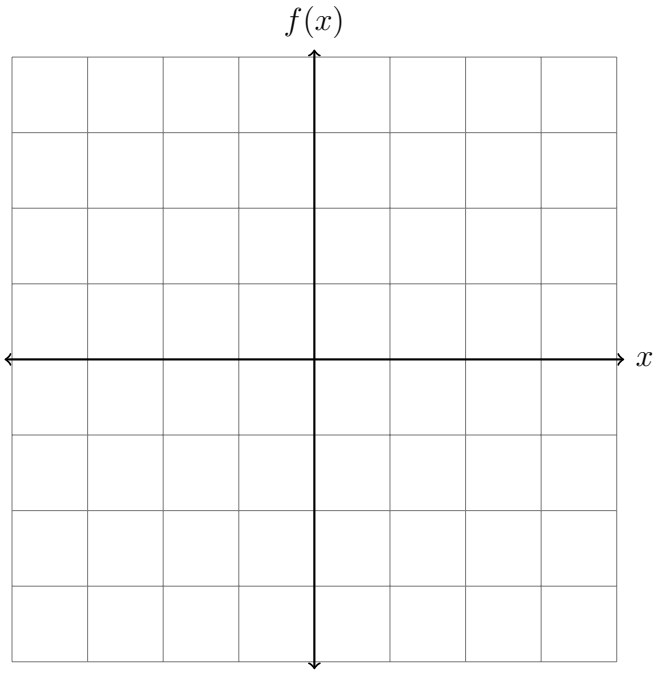
6. (5 points) In 2018, Atlanta was the busiest airport in the world is about 107 000 000 (107 million) air passengers, about 20% more than LAX (the second busiest US airport). Approximately how many air passengers did LAX have in 2018?

7. (5 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?



8. (8 points) Consider the function $f(x) = |2x| - 1$.

(a) Graph the function f including the points when $x = -1$, $x = -\frac{1}{2}$, $x = 0$, $x = 1$, and $x = 2$.



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

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

9. (5 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.

10. (5 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?

11. (6 points) Find all values of x satisfying $1 - 2\,|3 - x| > 4$.