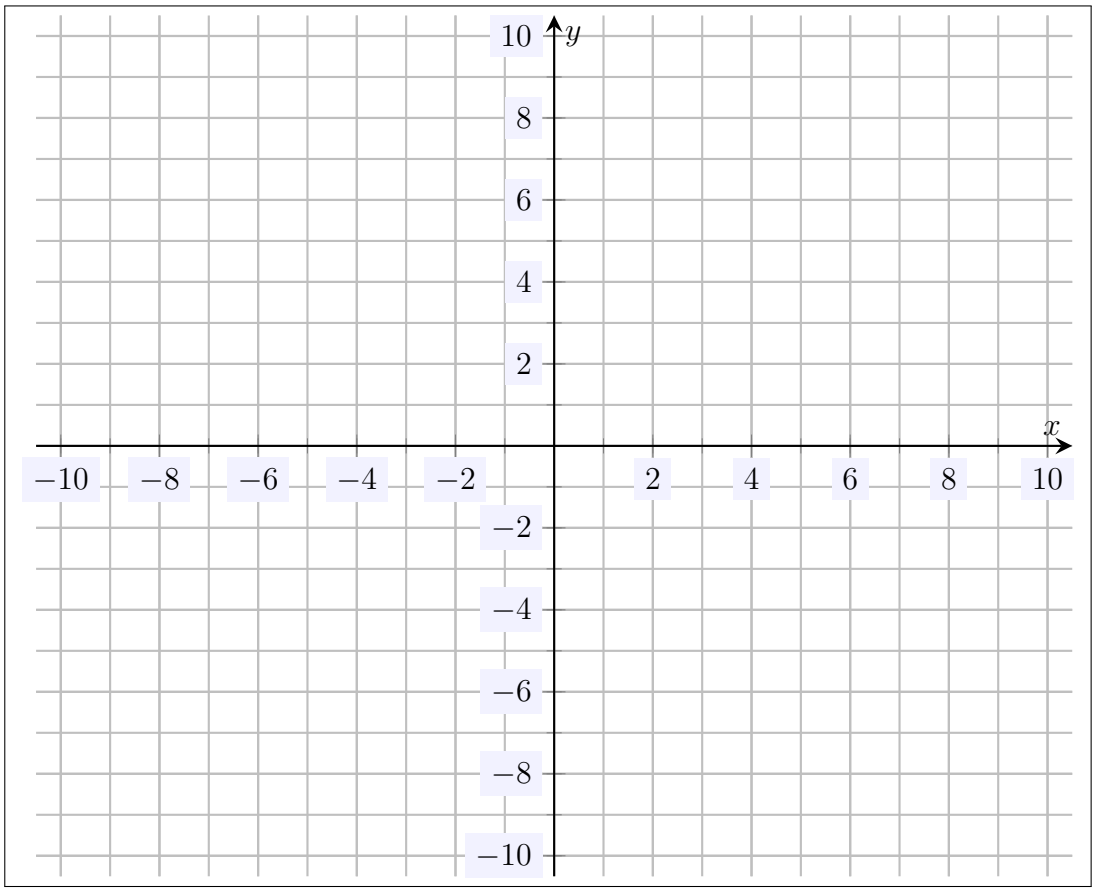
MAT 101: Exam 2 **Name:** _____
Fall – 2022
11/21/2022
85 Minutes

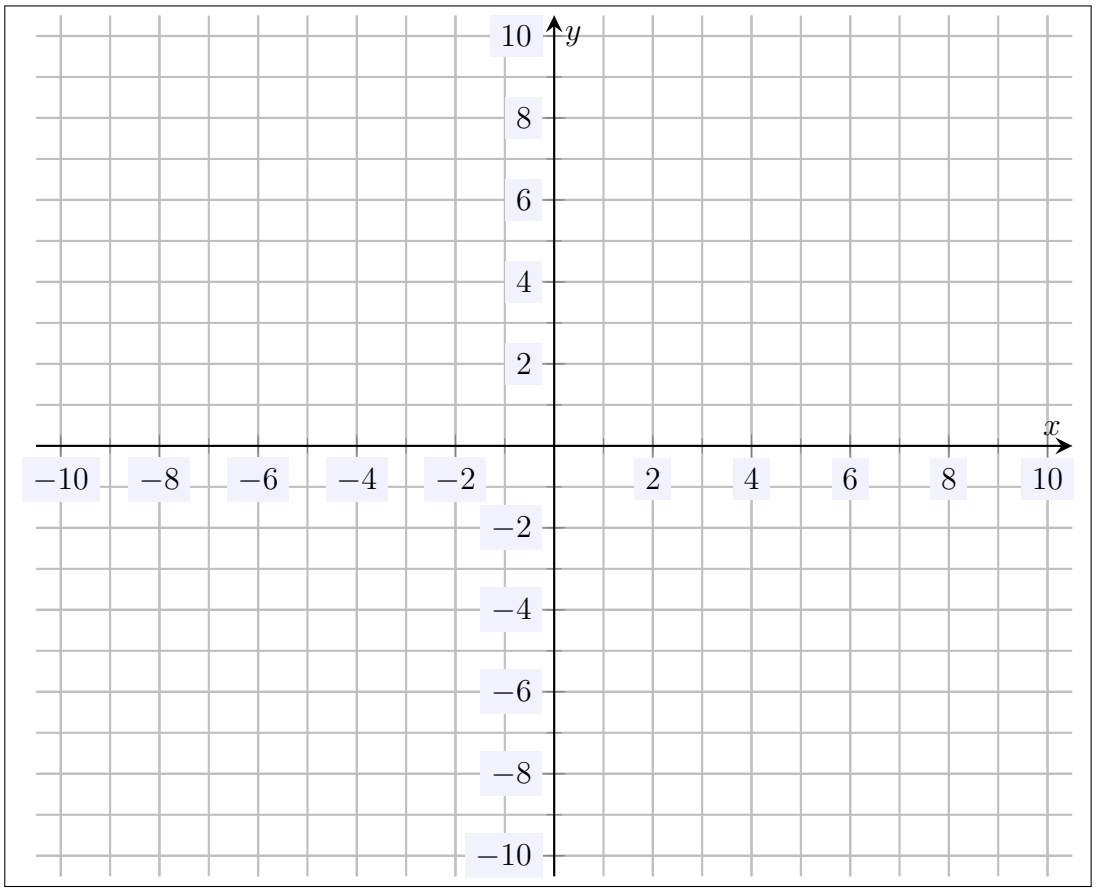
Write your name on the appropriate line on the exam cover sheet. This exam contains 16 pages (including this cover page) and 15 questions. Check that you have every page of the exam. Answer the questions in the spaces provided on the question sheets. Be sure to answer every part of each question and show all your work.

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
11	10	
12	10	
13	10	
14	10	
15	10	
Total:	150	

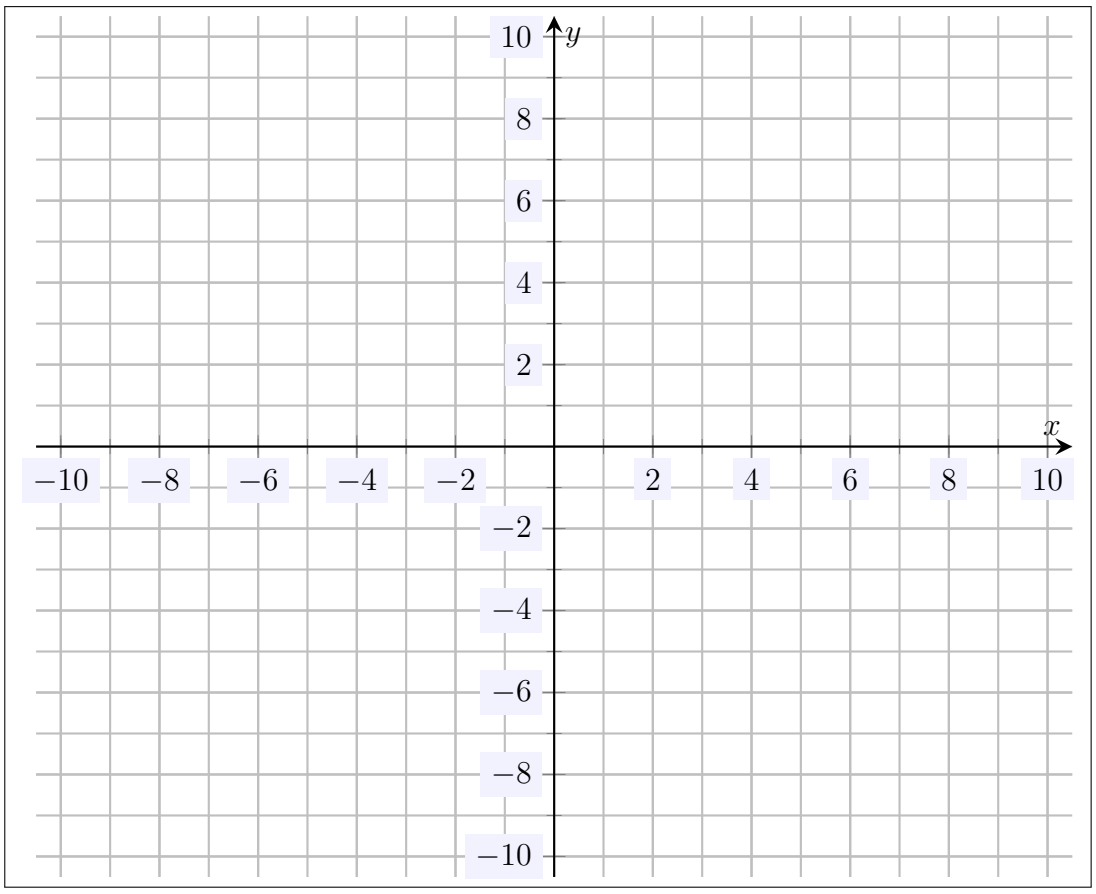
1. (10 points) As accurately as possible, plot the line $x = -\frac{5}{3}$ on the graph below.



2. (10 points) As accurately as possible, plot the line $y = \frac{3}{2}x - 3$ on the graph below.



3. (10 points) As accurately as possible, plot the line $5x + 4y = 10$ on the graph below.



4. (10 points) Consider the line given by $5x - 4y = 7$.

   (a) Showing all your work and without referencing a graph, determine if $(-3, -2)$ is on the line.

   (b) Showing all your work and without referencing a graph, determine if $\left(1, -\frac{1}{2}\right)$ is on the line.

5. (10 points) Showing all your work and being sure to list the points, find at least three distinct points on the line $-7x + 3y = 10$.

6. (10 points) Consider the linear function $f(x) = 7 - \frac{6}{5}\,x$. Showing all your work, answer the following:

   (a) Find the rate of change of $f(x)$.

   (b) Interpret the rate of change of $f(x)$.

   (c) Determine whether $f(x)$ is an increasing or decreasing function.

   (d) Determine the y-intercept of $f(x)$.

   (e) Find the exact value of $f\left(\frac{2}{3}\right)$.

7. (10 points) Consider the linear function $f(x) = -3(2x - 7)$. Showing all your work, answer the following:

   (a) Find the rate of change of $f(x)$.

   (b) Interpret the rate of change of $f(x)$.

   (c) Determine whether $f(x)$ is an increasing or decreasing function.

   (d) Determine the x-intercept of $f(x)$.

   (e) Find an x-value such that $f(x) = 9$.

8. (10 points) Find the equation of the line parallel to the line $y = 6 - x$ that has x-intercept -12.

9. (10 points) Find the equation of the line perpendicular to the line $y = -\frac{\pi}{2}$ that contains the x-intercept of the line $-7x + 5y = -3$.

10. (10 points) Find the equation of the line that contains the y-intercept of $y = \frac{7}{11}\,x - 5$ and the point of intersection of $y = 4 - 3x$ and $y = \frac{1}{2}\,x + 18$.

11. (10 points) Showing all your work, find the solution to the following:

$$2(x-9) = \frac{x}{3} + 7$$

12. (10 points) Showing all your work, find the solution to the following:

$$\frac{5x-3}{1-x} = 13$$

13. (10 points) Without explicitly finding the intersection, explain why the following lines $y = 2(7 - 5x)$ and $y = 5x + 2$ intersect. Showing all your work, find the intersection of the lines.

14. (10 points) Thai Tanic is a new restaurant chain that has been expanding across the Northwest. It is projected that next year, it will have \$800,000 in profits and the following year it will have \$1.2 million in profits.

    (a) Under what assumptions is a linear model to predict the growth rate of this business appropriate?

    (b) Find a linear model for the profit of this company t years from today.

    (c) Interpret the slope of your linear model in (b).

    (d) Interpret the y-intercept of your linear model in (b), if possible.

    (e) How long until the company has a profit of \$5 million?

15. (10 points) Sia Gogh is driving down the highway at 65 mph. She has been driving for 2 hours. Sia determines her total distance traveled t hours from now is approximately $D(t) = 65t + 130$.

    (a) Explain why her distance traveled is approximately linear.

    (b) Interpret the slope of $D(t)$.

    (c) Interpret the y-intercept of $D(t)$.

    (d) How far has she traveled after a total of 10 hours?