

**MAT 104: Exam 1**  
**Spring — 2024**  
**02/22/2024**  
**85 Minutes**

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**Name:** \_\_\_\_\_

Write your name on the appropriate line on the exam cover sheet. This exam contains 11 pages (including this cover page) and 10 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. If you run out of room for an answer, continue on the back of the page — being sure to indicate the problem number.

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
Total:	100	

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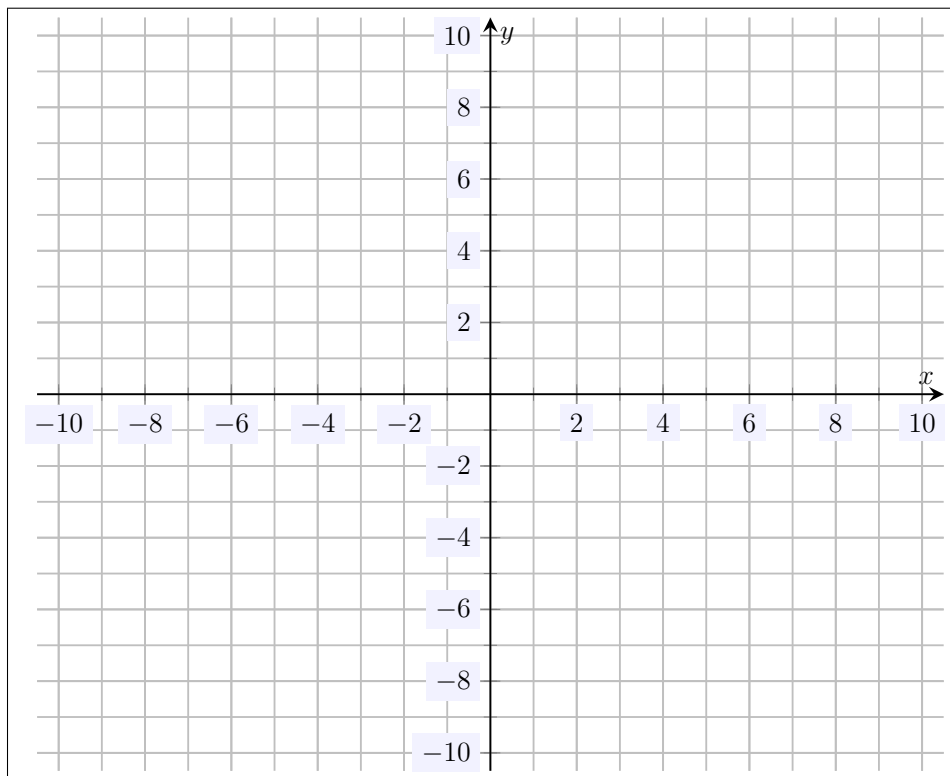
1. (10 points) Showing all your work and simplifying as much as possible, compute the exact values of the following:

(a)  $6 \div 2(1 + 2)$

(b)  $\frac{-3 - 5(-1)^2 + 12}{-6 - (-8)}$

(c)  $(1 - 3)^3 \cdot 4(7 - 2 \cdot 3)$

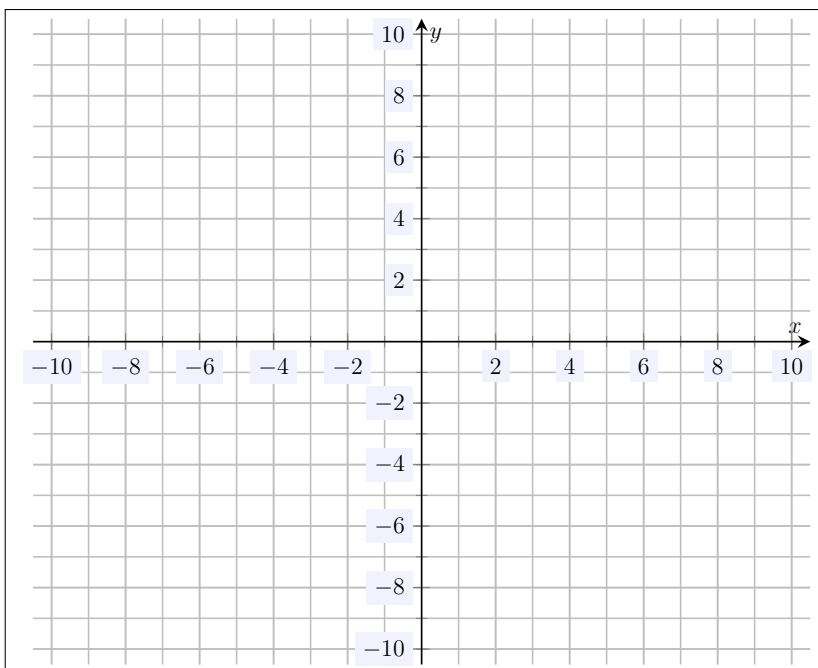
2. (10 points) Consider the points  $A(-7, 6)$ ,  $B(4, -8)$ , and  $C(5, 1)$ .
- (a) Plot the points on the graph below, be sure to label each point.
- (b) Fill in the missing entries to the non-greyed portion of the chart below.



	Quadrant	Distance to $x$ -axis	Distance to $y$ -axis	Distance to origin
Point $A$				
Point $B$				
Point $C$				

3. (10 points) Consider the quadratic function  $f(x) = x^2 - 3x + 4$  and the linear function  $\ell(x) = 7 - 2x$ . Let  $\mathcal{I}$  be the interval  $\mathcal{I} = [-1, 3]$ .
- (a) Find the average rate of change for  $f(x)$  on  $\mathcal{I}$ .
  - (b) What is the slope of the secant line to  $f(x)$  using the points on the graph of  $f(x)$  where  $x = -1$  and  $x = 3$ ?
  - (c) Without explicitly calculating the average rate of change, what is the average rate of change for  $\ell(x)$  on  $\mathcal{I}$ ?

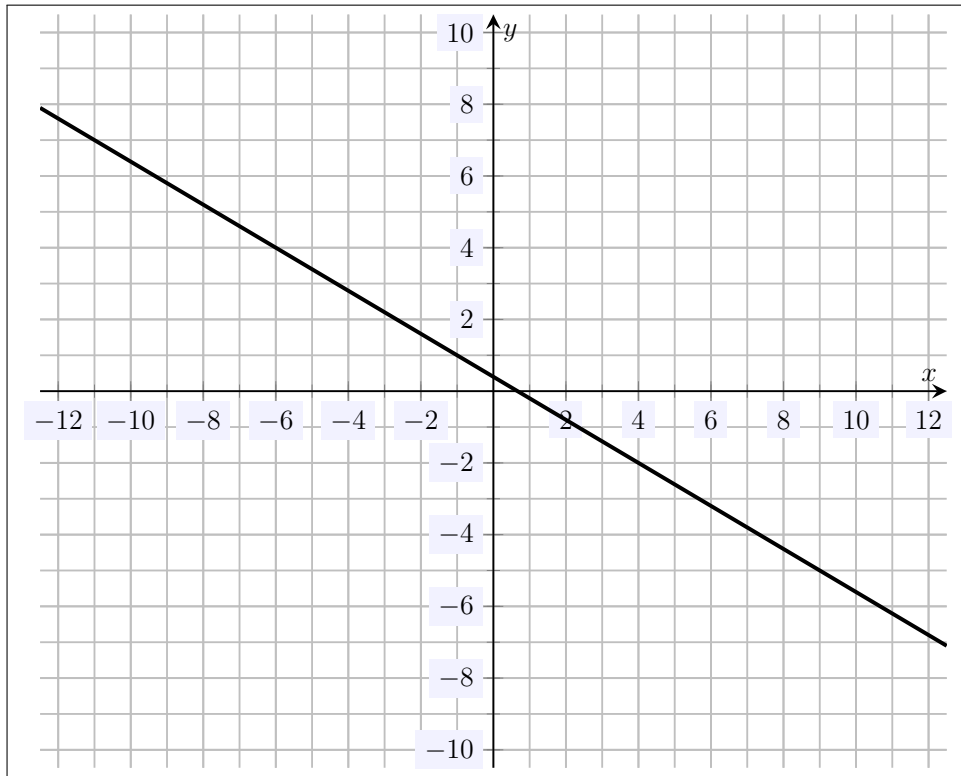
4. (10 points) Consider the linear function  $\ell(x) = \frac{2}{3}x + 4$ .
- (a) Find the slope of  $\ell(x)$ .
  - (b) Find the  $y$ -intercept of  $\ell(x)$ .
  - (c) Sketch  $\ell(x)$  on the graph below as accurately as possible.
  - (d) Find the  $x$ -intercept of  $\ell(x)$ .



5. (10 points) Otto Partze owns an automotive parts and repair shop. When a customer brings in a car for service, the amount Otto charges for service is given by  $C(t) = 81t + 45$ , where  $t$  is the number of hours of work done.
- (a) Find and interpret the slope of  $C(t)$ . Be sure to include any units.
  - (b) Find and interpret the  $y$ -intercept of  $C(t)$ . Be sure to include any units.
  - (c) Find the cost of 90 minutes of service.

6. (10 points) Jenna Rossity purchased a new 85" TV for her nephew. The TV cost \$1,599.99. As with any new electronics, the TV depreciates in value by \$372 per year.
- (a) Find a linear function that gives the resale value of the TV  $t$  years from now.
  - (b) Find how long until the TV has no resale value.

7. (10 points) Showing all your work, find the equation of line given in the graph below. If you use any points on the line, be sure that any points you use are *exactly* on the line.





8. (10 points) Find the exact equation of the line with  $x$ -intercept 7 and  $y$ -intercept  $-4$ . Express your answer in slope-intercept form.

9. (10 points) Find the exact equation of the line parallel to the line  $y = 9x - 16$  that contains the point  $(-1, 7)$ . Express your answer in point-slope form.

10. (10 points) Find the exact equation of the line perpendicular to  $y = \frac{1 - 4x}{2}$  that passes through the  $x$ -intercept of  $f(x) = 4(1 - 3x)$ .