

Name: \_\_\_\_\_  
Math 110

Date: \_\_\_\_\_

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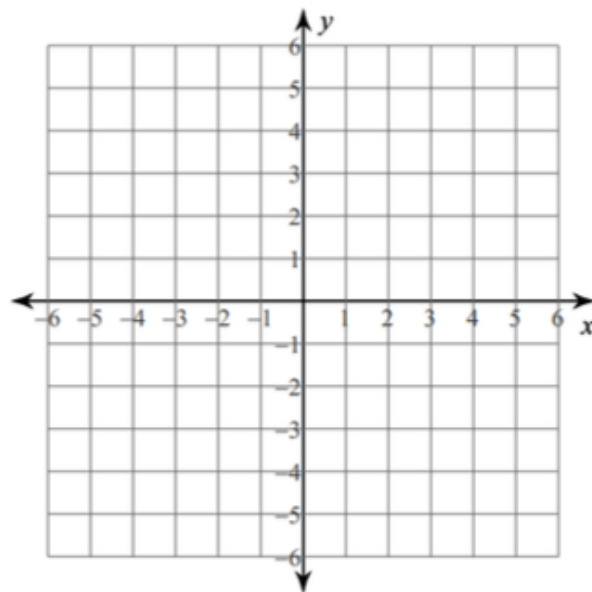
### Quiz 1 – Linear Functions

Show all work for full credit.

1. **(3 pts)** Given  $5x - 6y = 12$

a. Rewrite in slope-intercept form

b. Graph the line



2. **(4 pts)** Find the slope of the line through each pair of points:

a.  $(-8, 5)$  and  $(2, 1)$

b.  $(3, -8)$  and  $(-7, -8)$

$$(q, p) = (\text{quantity, price}) \quad p = mq + b$$

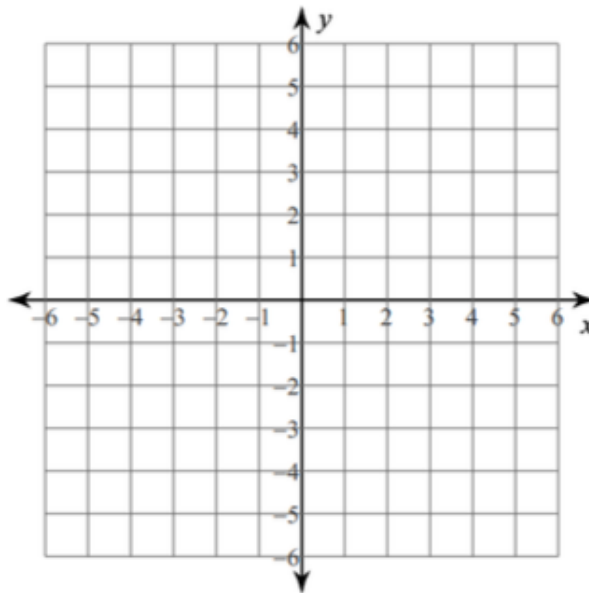
3. **(16 pts)** A fashion company can sell 125 shirts at a price of \$35 each. If the price drops to \$25 apiece, the company can sell 375 shirts. The company's suppliers are willing to supply only 150 shirts if the price per shirt is \$35. However, if the price per shirt increases to \$50 per shirt, the suppliers are willing to provide 400 shirts.
- Write the demand function
  - Write the supply function
- c. Find the equilibrium point. For supply to equal demand, the shirts must be priced at how much apiece?
- d. Graph both the demand and supply function on the same axis. Label each line.
- e. At  $q = 200$ , will the company have a surplus or shortage of shirts? Explain why.

4. **(5 pts)** Given  $8x - 5y = 20$

a. Find the  $x$ -intercept

b. Find the  $y$ -intercept

c. Graph the line



5. **(6 pts)** A machine is now worth \$110,000 and will be depreciated linearly over an 8-year period, at which time it will be worth \$20,000 as scrap.

a. Find the depreciation function that gives the value of the machine in year  $x$ .

b. What will the machine be worth in 3 years?

c. When will the machine be worth half its original value?

6. **(16 pts)** Ink cartridges are produced with a fixed monthly cost of \$24,000 and variable costs of \$15 per ink cartridge produced. The ink cartridges sell for \$31 each.
- Find the cost function
  - Find the revenue function
  - Find the break-even point
  - Graph and label the cost and revenue functions on the same set of axes. Label the break-even point.
  - At a production level of 1000 ink cartridges, is the company making money or losing money? Explain why.
  - Find the profit function
  - How much profit will they make by producing and selling 2000 ink cartridges?
  - How many ink cartridges must be produced and sold in order to obtain a profit of \$100,000?