

Faculty of Business Administration
MAT101-Mathematics I / 2019 Fall

Exercise-1: Linear Equations and Inequalities, Graphs and Lines

1. Solve the following problems and graph:

a) $2m + 9 = 5m - 6$ b) $3y - 4 = 6y - 19$ c) $-4 < 2y - 3 < 9$ d) $2 \leq 3x - 7 < 14$ e) $\frac{u}{2} - \frac{2}{3} < \frac{u}{3} + 2$

2. Mary paid 8.5% sales tax and a \$190 title and license fee when she bought a new car for a total of \$28400. What is the purchase price of the car?

3. How many DVDs would a multimedia company have to make and sell to break even if the fixed costs are \$36000, variable costs are \$10.40 per DVD, and the DVDs are sold to retailers for \$15.20 each?

4. A rock concert brought in \$432500 on the sale of 9500 tickets. If the tickets sold for \$35 and \$55 each, how many of each type of ticket were sold?

5. You have \$500000 in an IRA (Individual Retirement Account) at the time you retire. You have the option of investing this money in two funds: Fund A pays 5.2% annually and Fund B pays 7.7% annually. How should you divide your money between Fund A and Fund B to produce an annual interest income of \$34000?

6. One employee of a computer store is paid a base salary of \$2000 a month plus an 8% commission on all sales over \$7000 during the month. How much must the employee sell in one month to earn a total of \$4000 for the month?

7. The publisher of a new book figures fixed costs at \$92000 and variable costs at \$2.10 for each book produced. If the book is sold to distributors for \$15 each, how many must be sold for the publisher to break even?

8. The publisher in Problem 7 finds that rising prices for paper increase the variable costs to \$2.10 per book.

a) Discuss possible strategies the company might use to deal with this increase in costs.

b) If the company continues to sell the books for \$11, how many books must they sell now to make a profit?

c) If the company wants to start making a profit at the same production level as before the cost increase, how much should they sell the book for now?

9. Sketch a graph of each equation in a rectangular coordinate system.

a) $y = 2x - 3$ b) $2x + 3y = 12$ c) $8x - 3y = 24$

10. Find the slope and y intercept of the graph of each equation.

a) $y = 3x + 2$ b) $y = -\frac{10}{3}x + 4$ c) $3x - 2y = 10$ d) $2x - 3y = 18$

11. Write the slope-intercept form of the equation of the line with the indicated slope that goes through the given point.

a) $m = 5$; (3, 0) b) $m = -10$; (2, -5) c) $m = 0.9$; (2.3, 6.7)

12. Let (2, 5) and (5, 7) be given.

a) Find the slope of the line that passes through the given points.

b) Find the standard form of the equation of the line.

c) Find the slope-intercept form of the equation of the line.

13. At a price of \$12.59 per box of grapefruit, the supply is 595000 boxes and the demand is 650000 boxes. At a price of \$13.19 per box, the supply is 695000 boxes and the demand is 590000 boxes. Assume that the relationship between price and supply is linear and that the relationship between price and demand is linear.

- a) Find a price–supply equation of the form $p = mx + b$.
- b) Find a price–demand equation of the form $p = mx + b$.
- c) Find the equilibrium point.

14. A donut shop has a fixed cost of \$124 per day and a variable cost of \$0.12 per donut. Find the total daily cost of producing x donuts. How many donuts can be produced for a total daily cost of \$250?

15. A small company manufactures picnic tables. The weekly fixed cost is \$1200 and the variable cost is \$45 per table. Find the total weekly cost of producing x picnic tables. How many picnic tables can be produced for a total weekly cost of \$4800?

16. A plant can manufacture 80 golf clubs per day for a total daily cost of \$7647 and 100 golf clubs per day for a total daily cost of \$9147.

- a) Assuming that daily cost and production are linearly related, find the total daily cost of producing x golf clubs.
- b) Graph the total daily cost for $0 \leq x \leq 200$.
- c) Interpret the slope and y intercept of this cost equation.

17. A drugstore sells a drug costing \$85 for \$112 and a drug costing \$175 for \$238.

- a) If the markup policy of the drugstore is assumed to be linear, write an equation that expresses retail price R in terms of cost C (wholesale price).
- b) What does a store pay (to the nearest dollar) for a drug that retails for \$185?