

Math 120 HW #5

Due: Nov. 1

Chapter 3.1

Find the slope of the line passing through these points.

1. $(4, 1), (7, 10)$
4. $(2, -4), (3, -4)$

Find an equation of the form $Ax + By + C = 0$ that satisfies the properties listed:

10. Passes through $(0, 0)$ and has slope 75.
13. Passes through points $(-6, 1)$ and $(1, 4)$.
18. Has slope 5 and y -intercept -7.
23. Passes through $(2, -3)$ and is vertical.

Determine whether the lines described are parallel, perpendicular or neither

41. $y = 7x + 2, y = 7x - 3$
45. $x + 3y + 5 = 0, y = -3x$

Find an equation of the line satisfying the following properties

52. Passing through $(2, -8)$ and parallel to $x = -4$.
58. Passing through $(4, -5)$ and perpendicular to the line $3y = -2y/5 + 3$.

Chapter 3.2

Find $F(x)$ such that F is a linear function satisfying the following properties.

7. slope=4, $F(2) = 8$
13. $F(-2) = -1, F(-4) = -3$

16. The demand per week for a CD is 26,000 copies when the price is \$12 each, and 10,000 copies when the price is \$18 each. Find the demand equation for the CD, assuming that it is linear.

21. An electric utility company charges residential customers 12.5 cents per kilowatt-hour plus a base charge each month. One customer's monthly bill comes to \$51.65 for 380 kilowatt-hours. Find a linear function that describes the total monthly charges for electricity if x is the number of kilowatt-hours used in a month.

24. A new television depreciates \$120 per year, and it is worth \$340 after four years. Find a function that describes the value of this television, if x is the age of the television in years.

27. A business-copier repair company charges a fixed amount plus an hourly rate for a service call. If a customer is billed \$159 for a one-hour service call and \$287 for a three-hour service call, find a linear function that describes the price of a service call, where x is the number of hours of service.

Chapter 3.3

Graph each function, and give the vertex, intercepts, and state the range.

13. $x^2 - 6x + 5$

16. $y = x^2 - 4$

19. $y = -9 + 8x - 2x^2$

21. $t = x^2 - 8s + 14$

29. The demand function for a manufacturer's product is $p = 200 - 5q$, where p is the price and q is the amount demanded. Find the level of production q that maximizes the manufacturer's total revenue. Also determine what that maximum revenue is.

32. A marketing firm estimates that n months after the introduction of a client's new product, $f(n)$ households will use it, where

$$f(n) = \frac{10}{9}n(12 - n), \quad 0 \leq n \leq 12$$

Estimate the maximum number of households that will use the product.

35. Biologists studied the nutritional effects on rats that were fed a specific diet. The diet consisted of yeast and protein. By varying the amount of protein P , the group noticed that the weight gain followed the equation

$$f(P) = -\frac{1}{50}P^2 + 2P + 20, \quad 0 \leq P \leq 100$$

. Find the maximum weight gain.

37. A boy standing on a hill shoots an arrow straight in the air. The height of the arrow follows the equation

$$h(t) = -16t^2 + 85t + 22$$

. What is the maximum height that this arrow reaches, and at what time does it reach that height?