

Solutions Manual to Accompany

FUNDAMENTALS OF CALCULUS

CARLA C. MORRIS
ROBERT M. STARK

WILEY

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CONTENTS

1	LINEAR EQUATIONS AND FUNCTIONS	1
2	THE DERIVATIVE	16
3	USING THE DERIVATIVE	26
4	EXPONENTIAL AND LOGARITHMIC FUNCTIONS	39
5	TECHNIQUES OF DIFFERENTIATION	46
6	INTEGRAL CALCULUS	56
7	INTEGRATION TECHNIQUES	66
8	FUNCTIONS OF SEVERAL VARIABLES	79
9	SERIES AND SUMMATIONS	94
10	APPLICATIONS TO PROBABILITY	110

CHAPTER 1

LINEAR EQUATIONS AND FUNCTIONS

EXERCISES 1.1

1. $3x + 1 = 4x - 5$

$$1 = x - 5$$

conditional equation

$$x = 6$$

3. $5(x + 1) + 2(x - 1) = 7x + 6$

$$5x + 5 + 2x - 2 = 7x + 6$$

$$7x + 3 = 7x + 6$$

contradiction

5. $4(x + 3) = 2(2x + 5)$

$$4x + 12 = 4x + 10$$

contradiction

7. $5x - 3 = 17$

$$5x = 20$$

$$x = 4$$

2 LINEAR EQUATIONS AND FUNCTIONS

9. $2x = 4x - 10$

$$2x - 4x = -10$$

$$-2x = -10$$

$$x = 5$$

11. $4x - 5 = 6x - 7$

$$-5 + 7 = 6x - 4x$$

$$2 = 2x$$

$$1 = x$$

13. $0.6x = 30$

$$x = \frac{30}{0.60} = 50$$

15. $\frac{2}{3} = \left(\frac{4}{5}\right)x - \frac{1}{3}$

$$15\left(\frac{2}{3}\right) = 15\left\{\left(\frac{4}{5}\right)x - \frac{1}{3}\right\}$$

$$10 = 12x - 5$$

$$15 = 12x$$

$$\frac{5}{4} = x$$

17. $5(x - 4) = 2x + 3(x - 7)$

$$5x - 20 = 2x + 3x - 21$$

$$5x - 20 = 5x - 2 \quad \text{No solution}$$

19. $3s - 4 = 2s + 6$

$$s - 4 = 6$$

$$s = 10$$

21. $7t + 2 = 4t + 11$

$$7t - 4t = 11 - 2$$

$$3t = 9$$

$$t = 3$$

$$23. 4(x + 1) + 2(x - 3) = 7(x - 1)$$

$$4x + 4 + 2x - 6 = 7x - 7$$

$$6x - 2 = 7x - 7$$

$$6x - 7x = -7 + 2$$

$$-x = -5$$

$$x = 5$$

$$25. \frac{x + 8}{2x - 5} = 2$$

$$(x + 8) = 2(2x - 5)$$

$$x + 8 = 4x - 10$$

$$8 + 10 = 4x - x$$

$$18 = 3x$$

$$6 = x$$

$$27. 8 - \{4[x - (3x - 4) - x] + 4\} = 3(x + 2)$$

$$8 - \{4[x - 3x + 4 - x] + 4\} = 3x + 6$$

$$8 - \{4[-3x + 4] + 4\} = 3x + 6$$

$$8 - \{-12x + 16 + 4\} = 3x + 6$$

$$8 - \{-12x + 20\} = 3x + 6$$

$$8 + 12x - 20 = 3x + 6$$

$$12x - 12 = 3x + 6$$

$$9x = 18$$

$$x = 2$$

$$29. 6x - 3y = 9 \text{ for } x$$

$$6x = 3y + 9$$

$$x = \frac{3y + 9}{6} = \frac{1}{2}y + \frac{3}{2}$$

$$31. 3x + 5y = 15$$

$$5y = 15 - 3x$$



$$y = \frac{(15 - 3x)}{5}$$

$$y = 3 - \left(\frac{3}{5}\right)x$$

33. $V = LWH$

$$\frac{V}{LH} = W$$

35. $Z = \frac{(x - \mu)}{\sigma}$

$$Z\sigma = x - \mu$$

$$x = Z\sigma + \mu$$

37. Let x = monthly installment (\$). Since Sally paid \$300, she owes \$1300 - \$300 = \$1000. Therefore, $5x = 1000$ or $x = \$200$ monthly installment.

39. The consumption function is $C(x) = mx + b$. The slope is the “marginal propensity to consume.” Therefore, $C(x) = 0.75x + b$. The disposable income $x = 2$ for a consumption $y = 11$ yields $11 = (0.75)(2) + b$, so $b = 9.5$ and consumption is $C(x) = 0.75x + 9.5$.

41. a) $d = 4.5(2) = 9$ miles

b) $18 = 4.5t$ and $t = 18/4.5 = 4$ seconds

43. The tax is 6.2%, or 0.062 as a decimal form, so $T = 0.062x$, where $0 \leq x \leq 87,000$.

45. a) $BSA = 1321 + (0.3433)(20,000) = 8187 \text{ cm}^2$

b) $1330 = 1321 + (0.3433)(Wt)$

$$9 = (0.3433)(Wt)$$

$$9/0.3433 = 26.2 \text{ kg} = Wt.$$

EXERCISES 1.2

1. Setting $y = 0$ determines the x -intercept and setting $x = 0$ determines the y -intercept.

a) $5x - 3y = 15$ x -intercept 3, y -intercept -5

b) $y = 4x - 5$ x -intercept $5/4$, y -intercept -5

c) $2x + 3y = 24$ x -intercept 12, y -intercept 8



- d) $9x - y = 18$ x -intercept 2, y -intercept -18
- e) $x = 4$ x -intercept 4, no y -intercept (vertical line)
- f) $y = -2$ no x -intercept (horizontal line), y -intercept -2

3. The slope is $m = \frac{y_2 - y_1}{x_2 - x_1}$

a) (3, 6) and (-1, 4) $m = \frac{4 - 6}{-1 - 3} = \frac{-2}{-4} = \frac{1}{2}$

b) (1, 6) and (2, 11) $m = \frac{11 - 6}{2 - 1} = \frac{5}{1} = 5$

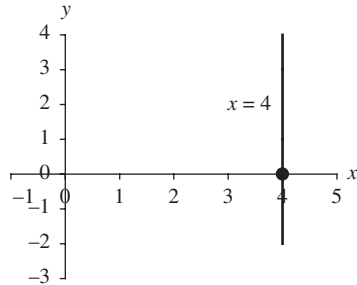
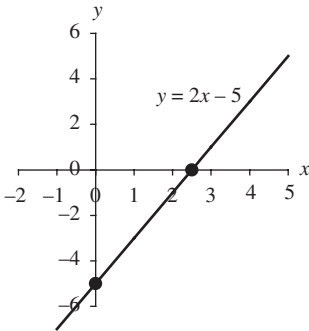
c) (6, 3) and (12, 7) $m = \frac{7 - 3}{12 - 6} = \frac{4}{6} = \frac{2}{3}$

d) (2, 3) and (2, 7) $m = \frac{7 - 3}{2 - 2} = \frac{4}{0}$ undefined

e) (2, 6) and (5, 6) $m = \frac{6 - 6}{5 - 2} = \frac{0}{3} = 0$

f) $(5/3, 2/3)$ and $(10/3, 1)$ $m = \frac{1 - 2/3}{10/3 - 5/3} = \frac{1/3}{5/3} = \frac{1}{5}$

5. a) x -intercept $5/2$ and y -intercept -5 b) x -intercept 4 and no y -intercept



c) x -intercept 5 and y -intercept 3 d) x -intercept 7 and y -intercept 2

