Solutions Manual to Accompany

FUNDAMENTALS OF CALCULUS

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WILEY

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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. $5x - 3 = 17$

$5x = 20$

$x = 4$

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

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

$5x - 20 = 5x - 2$ 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. $\dfrac{x+8}{2x-5}=2$

$$(x+8)=2(2x-5)$$
$$x+8=4x-10$$
$$8+10=4x-x$$
$$18=3x$$
$$6=x$$

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. $6x-3y=9$ 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. $Z = \dfrac{(x - \mu)}{\sigma}$

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

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

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 $0 \le x \le 87{,}000$.

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

b) $1330 = 1321 + (0.3433)(\text{Wt})$

$9 = (0.3433)(\text{Wt})$

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

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 $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

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

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

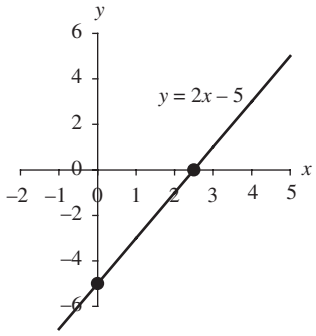
c) (6, 3) and (12, 7) $m = \dfrac{7-3}{12-6} = \dfrac{4}{6} = \dfrac{2}{3}$

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

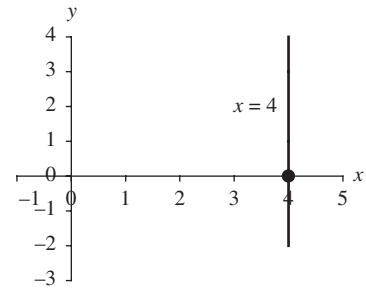
e) (2, 6) and (5, 6) $m = \dfrac{6-6}{5-2} = \dfrac{0}{3} = 0$

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

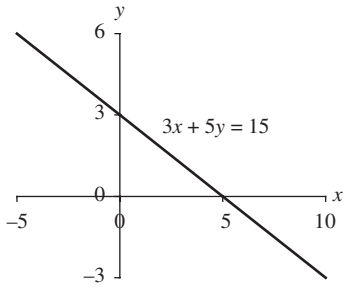
5. a) x-intercept 5/2 and y-intercept -5



b) x-intercept 4 and no y-intercept



c) x-intercept 5 and y-intercept 3



d) x-intercept 7 and y-intercept 2