Solutions to Sample Problems 1

1. $x = -3$ and $x = 9$

2. $y - 7 = -1.4x$

3. $y - 2 = -2(x - 7)$

4. $y - 2 = \frac{1}{2}(x - 7)$

5. $y = 2$

6. $y - 15 = \frac{5}{11}(x - 0)$

7. (a) $C(x) = 8x + 48,000$
   (b) $40$
   (c) $R(x) = 40x$
   (d) $P(x) = 32x - 48,000$
   (e) $1500$

8. equilibrium price $6$
   equilibrium quantity $7$

9. $k = \frac{1}{2}$

10. (a) $y = -49.6667x + 911.6667$
    (b) see class notes.
    (c) $564,000$ tons
    (d) $1979$
    (e) $415,000$ tons

11. See Section 2.3 Exercises 4 or 5.

12. See Section 2.3 Exercises 1 or 3.

13. See Section 2.3 Exercises 7 or 8.

14. (a) I) $x =$ the amount invested in high-risk stocks.
     $y =$ the amount invested in medium-risk stocks.
     $z =$ the amount invested in low-risk stocks.
    II) $x + y + z = 300,000$
     $.16x + .10y + .04z = 33,000$
     $2x - y + 2z = 0$
    III) $x = 75,000$, $y = 200,000$, and $z = 25,000$
    (b) I) $x =$ number of tank cars purchased with
     6,000 gallon capacity
     $y =$ number of tank cars purchased with 8,000
     gallon capacity
     $z =$ number of tank cars purchased with 18,000
     gallon capacity

15. $x=1$, $y = -7.5$, and $z = 6.5$

16. $x = 20$, $y = -11$, $u = 5$, and $z = -2$

17. $J = \begin{bmatrix}
-24.5 & 27 & -8.5 \\
105 & -100 & 19
\end{bmatrix}$

18. See section 2.5 example 3.

19. $D + C =$ not possible: not same dim.

20. See solution in the back of the book.

21. (a) $x = -14$, $y = 39$, $z = -9$
    (b) $x = -12$, $y = 37$, $z = -10$

22. eq1: $-x + y \leq 0$
    eq2: $x + y \leq 10$
    eq3: $5x + 15y \leq 75$
23. \(x = \) number of model A radios produced.
\(y = \) number of model B radios produced.
Objective function: \(P = 12x + 10y\)
constraints:
\(15x + 10y \leq 1500\)
\(10x + 12y \leq 1320\)
\(x \geq 0\) and \(y \geq 0\)

24. feasible region

25. max at \((2.5, 7.5)\) maximum value is 25.
26. min at \((4.5, 0)\) minimum value is 4.5.