eBook Chapter 1 Odd Problem Assignment

- Section 1.1 all odd problems

- Section 1.2 all odd problems

- Section 1.3 problems: 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, 41, 45, 49, 53, 57, 61, 65, 69, 73, 77, 81, 85, 89, 93, 97, 101, 103, 105, 107, 109

- Section 1.4 all odd problems

- Section 1.5 all odd problems.
  Please refer to eBook Appendix for answers to all odd problems for this section.

My Solutions for some Odd Problems

Section 1.1

1. <

3. >

5. <

7. <

9. >

Order from smallest to largest:

11. −1, |0|, |−2|, 3, 7, |−11|

13. −5, −2, 0, 1, |−6|, |−7|, |11|

Simplify without using a calculator:

15. −2

17. −21

19. 4

21. −42

23. −7

25. −9

27. −12

29. −5

31. −45

33. −40

35. −63

37. −9

39. −9

41. −7

43. −20

45. 125

47. 16

49. 64

51. -16

53. $2+15=17$

55. $3+(-6)=-3$

57. $4-7=-3$

59. $-3-5\cdot5=-3-25=-28$

61. $-10-4\cdot(-4)=-10-(-16)=-10+16=6$

63. $(3-16)-(8-10)=(-13)-(-2)=-11$

65. $3+2[4(2-9)-2(5-16)]=3+2[4(-7)-2(-11)]=3+2[-28+22]=3+2[-6]$

   = 3 -12 = -9

67. $12-3[3(8-8)-2(15-9)]=12-3[2\cdot0-2\cdot6]=12-3[0-12]=12-3[-12]=12+36$

   = 12 + 36 = 48

69. $3\{5-2[3]-3[-4+4\cdot3]\}=3\{5-6-3[-4+12]\}=3\{5-6-3[8]\}=3\{5-6-24\}$

   = 3{-25} = -75

71. $-4\{2[-10]-4[8+4(-8)]\}=-4\{-20-4[8+(-32)]\}=-4\{-20-4[-24]\}$

   $-4\{-20+96\}=-4\{76\}=-304$

73. $\$800-4(\$230)-\$275=\$800-920-\$275=-\$120-\$275=-\$395$

      Maria has to borrow from roommate $395

75. $1776-(-753)-1=2528$ years

Section 1.2

1. $36/2\to18/2\to9/3\to3\Rightarrow2\cdot2\cdot3\cdot3=2^2\cdot3^2$

3. $100/2\to50/2\to25/5\to5\Rightarrow2\cdot2\cdot5\cdot5=2^2\cdot5^2$

5. $220/2\to110/2\to55/5\to11\Rightarrow2\cdot2\cdot5\cdot11=2^2\cdot5\cdot11$

7. $18/2\to9/3\to3\Rightarrow2\cdot3\cdot3=2\cdot3^2$

   $45/3\to15/3\to5\Rightarrow3\cdot3\cdot5=3^2\cdot5$

   least common multiple (LCM) of 18 and 45 is $2\cdot3^2\cdot5$ = 90

9. $120/2\to60/2\to30/2\to15/3\to5\Rightarrow2\cdot2\cdot2\cdot3\cdot5=2^3\cdot3\cdot5$

   $216/2\to108/2\to54/2\to27/3\to9/3\to3\Rightarrow2\cdot2\cdot2\cdot3\cdot3\cdot3=2^3\cdot3^3$

   least common multiple (LCM) of 120 and 216 is $2^3\cdot3^3\cdot5$ = 1080

11. $84/2\to42/2\to21/3\to7\Rightarrow2\cdot2\cdot3\cdot7=2^2\cdot3\cdot7$

   $108/2\to54/2\to27/3\to9/3\to3\Rightarrow2\cdot2\cdot3\cdot3\cdot3=2^2\cdot3^3$

   $120/2\to60/2\to30/2\to15/3\to5\Rightarrow2\cdot2\cdot2\cdot3\cdot5=2^3\cdot3\cdot5$

   least common multiple (LCM) of 120 and 216 is $2^3\cdot3^3\cdot5\cdot7$ = 7560

13. $18/2 \to 9/3 \to 3 \Rightarrow 2 \cdot 3 \cdot 3 = 2 \cdot 3^2$

     $24/2 \to 12/2 \to 6/2 \to 3 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 = 2^3 \cdot 3$

     greatest common factor (GCF) of 18 and 24 is $2 \cdot 3$ = 6

15. $168/2 \to 84/2 \to 42/2 \to 21/3 \to 7 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 7 = 2^3 \cdot 3 \cdot 7$

     $280/2 \to 140/2 \to 70/2 \to 35/5 \to 7 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 5 \cdot 7 = 2^3 \cdot 5 \cdot 7$

     greatest common factor (GCF) of 168 and 280 is $2^3 \cdot 7 = 8 \cdot 7 = 56$

17. Find the greatest common factor (GCF) of 84. 168. and 252.

     $84/2 \to 42/2 \to 21/3 \to 7 \Rightarrow 2 \cdot 2 \cdot 3 \cdot 7 = 2^2 \cdot 3 \cdot 7$

     $168/2 \to 84/2 \to 42/2 \to 21/3 \to 7 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 7 = 2^3 \cdot 3 \cdot 7$

     $252/2 \to 126/2 \to 63/3 \to 21/3 \to 7 \Rightarrow 2 \cdot 2 \cdot 3 \cdot 7 = 2^2 \cdot 3 \cdot 7$

     greatest common factor (GCF) of 84. 168. and 252 = $2^2 \cdot 3 \cdot 7 = 84$

19. $42/2 \to 21/3 \to 7 \Rightarrow 2 \cdot 3 \cdot 7$

     $30/2 \to 15/3 \to 5 \Rightarrow 2 \cdot 3 \cdot 5$

     $18/2 \to 9/3 \to 3 \Rightarrow 2 \cdot 3 \cdot 3 = 2 \cdot 3^2$

     least common multiple (LCM) of 42, 30, and 18 is $2 \cdot 3^2 \cdot 5 \cdot 7$ = 630 students

21. $72/2 \to 36/2 \to 18/2 \to 9/3 \to 3 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 = 2^3 \cdot 3^2$

     $48/2 \to 24/2 \to 12/2 \to 6/2 \to 3 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 = 2^4 \cdot 3$

     greatest common factor (GCF) of 72 and 48 = $2^3 \cdot 3 = 24$ exams

Section 1.3 Rational Numbers

1. $3\frac{1}{2} = \frac{3 \cdot 2 + 1}{2} = \frac{6+1}{2} = \frac{7}{2}$

5. $-5\frac{4}{7} = -\frac{5 \cdot 7 + 4}{7} = -\frac{35+4}{7} = -\frac{39}{7}$

9. $\frac{23}{5} = 23 \div 5 = 4\,R\,3 = 4\frac{3}{5}$

13. $-\frac{57}{12} = -57 \div 12 = -4\,R\,9 = -4\frac{9}{12} = -4\frac{3}{4}$

17. $9.333333333333333 =$ $9.\overline{3}$

21. $-12\frac{3}{16} = -\left(12 + \frac{3}{16}\right) = -12.1875$

25. $32\frac{5}{6} = 32 + \frac{5}{6} = 32.8\overline{3}$

29. $5.32 = \dfrac{532}{100} = \dfrac{2 \cdot 2 \cdot 133}{2 \cdot 2 \cdot 25} = \dfrac{133}{25}$

33. $\dfrac{12}{28} = \dfrac{2}{2} \cdot \dfrac{2}{2} \cdot \dfrac{3}{7} = \dfrac{3}{7}$

37. $\dfrac{84}{168} = \dfrac{2 \cdot 2 \cdot 3 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 7} = \dfrac{1}{2}$

41. $\dfrac{7}{27} \cdot \dfrac{18}{42} = \dfrac{7 \cdot 18}{27 \cdot 42} = \dfrac{1 \cdot 2}{3 \cdot 6} = \dfrac{2}{18} = \dfrac{1}{9}$

45. $\left(-\dfrac{5}{12}\right) \cdot \left(-\dfrac{8}{25}\right) = \dfrac{5 \cdot 8}{12 \cdot 25} = \dfrac{1 \cdot 2}{3 \cdot 5} = \dfrac{2}{15}$

49. $5\dfrac{1}{9} \cdot \left(-7\dfrac{2}{3}\right) = \left(\dfrac{5 \cdot 9 + 1}{9}\right) \cdot \left(-\dfrac{7 \cdot 3 + 2}{3}\right) = \left(\dfrac{46}{9}\right) \cdot \left(-\dfrac{23}{3}\right) = -\dfrac{46 \cdot 23}{9 \cdot 3} = -\dfrac{1058}{27} = -39\dfrac{5}{27}$

53. $\dfrac{9}{14} \div \dfrac{27}{35} = \dfrac{9}{14} \cdot \dfrac{35}{27} = \dfrac{1}{2} \cdot \dfrac{5}{3} = \dfrac{5}{6}$

57. $-\dfrac{16}{25} \div \left(-\dfrac{15}{8}\right) = -\dfrac{16}{25} \cdot \left(-\dfrac{8}{15}\right) = \dfrac{16}{25} \cdot \dfrac{8}{15} = \dfrac{128}{375}$

61. $5\dfrac{5}{8} \div 3\dfrac{1}{3} = \dfrac{5 \cdot 8 + 5}{8} \div \dfrac{3 \cdot 3 + 1}{3} = \dfrac{45}{8} \div \dfrac{10}{3} = \dfrac{45}{8} \cdot \dfrac{3}{10} = \dfrac{9}{8} \cdot \dfrac{3}{2} = \dfrac{27}{16} = 1\dfrac{11}{16}$

65. $-3\dfrac{5}{6} \div \left(-11\dfrac{1}{2}\right) = \dfrac{3 \cdot 6 + 5}{6} \div \left(\dfrac{11 \cdot 2 + 1}{2}\right) = \dfrac{23}{6} \cdot \left(\dfrac{2}{23}\right) = \dfrac{2}{6} = \dfrac{1}{3}$

69. $\left(-\dfrac{5}{7}\right)^2 = \dfrac{25}{49}$

73. $\dfrac{3}{7} + \dfrac{2}{7} = \dfrac{3+2}{7} = \dfrac{5}{7}$

77. $\dfrac{1}{4} + \dfrac{2}{3} \rightarrow \text{LCD} = 12 \rightarrow \dfrac{3}{3} \cdot \dfrac{1}{4} + \dfrac{2}{3} \cdot \dfrac{4}{4} = \dfrac{3+8}{12} = \dfrac{11}{12}$

81. $-\dfrac{5}{6} - \left(-\dfrac{3}{10}\right) \rightarrow \text{LCD} = 30 \rightarrow -\dfrac{5}{6} \cdot \left(\dfrac{5}{5}\right) + \dfrac{3}{10} \cdot \dfrac{3}{3} = \dfrac{-25+9}{30} = \dfrac{-16}{30} = -\dfrac{8}{15}$

85. $2\dfrac{5}{6} + 11\dfrac{2}{3} \rightarrow \text{Add Wholes then Fractions} \rightarrow 2 + 11 \cdots \dfrac{5}{6} + \dfrac{2}{3} \cdot \dfrac{2}{2} = 13\dfrac{9}{6} = 14\dfrac{1}{2}$

89. $3\dfrac{5}{6} + 4\dfrac{3}{4} = \dfrac{3 \cdot 6 + 5}{6} + \dfrac{4 \cdot 4 + 3}{4} = \dfrac{23}{6} + \dfrac{19}{4} \rightarrow \text{LCD} = 12 \rightarrow \dfrac{2}{2} \cdot \dfrac{23}{6} + \dfrac{19}{4} \cdot \dfrac{3}{3} = \dfrac{46+57}{12} = \dfrac{103}{12} = 8\dfrac{7}{12}$

93. $\dfrac{\dfrac{5}{14} - \dfrac{4}{7}}{\dfrac{4}{21} + \dfrac{11}{3}} = \dfrac{\dfrac{5}{14} - \dfrac{4}{7} \cdot \dfrac{2}{2}}{\dfrac{4}{21} + \dfrac{11}{3} \cdot \dfrac{7}{7}} = \dfrac{\dfrac{5-8}{14}}{\dfrac{4+77}{21}} = \dfrac{\dfrac{-3}{14}}{\dfrac{81}{21}} = \dfrac{-3}{14} \cdot \dfrac{21}{81} = -\dfrac{1}{2} \cdot \dfrac{3}{27} = -\dfrac{1}{2} \cdot \dfrac{1}{9} = -\dfrac{1}{18}$

97. $\dfrac{1}{2}+\dfrac{\frac{3}{8}}{\frac{5}{2}-4}\cdot\dfrac{2}{3}=\dfrac{1}{2}+\dfrac{\frac{3}{8}}{\left(\frac{5}{2}-\frac{4\cdot2}{2}\right)}\cdot\dfrac{2}{3}=\dfrac{1}{2}+\dfrac{\frac{3}{8}}{\left(\frac{5-8}{2}\right)}\cdot\dfrac{2}{3}$

$=\dfrac{1}{2}+\dfrac{\frac{3}{8}}{-\frac{3}{2}}\cdot\dfrac{2}{3}=\dfrac{1}{2}+\dfrac{3}{8}\cdot\left(-\dfrac{2}{3}\right)\cdot\dfrac{2}{3}=\dfrac{1}{2}+\left(-\dfrac{6}{24}\right)\cdot\dfrac{2}{3}=\dfrac{1}{2}+\left(-\dfrac{1}{6}\right)=\dfrac{3}{6}+\left(-\dfrac{1}{6}\right)=\dfrac{3-1}{6}=\dfrac{1}{3}$

101. $\left(-\dfrac{5}{6}\right)\cdot\dfrac{7}{15}\cdot\dfrac{9}{10}=\left(-\dfrac{1}{2}\right)\cdot\dfrac{7}{15}\cdot\dfrac{3}{2}=\left(-\dfrac{1}{2}\right)\cdot\dfrac{7}{5}\cdot\dfrac{1}{2}=\left(-\dfrac{7}{20}\right)$

103. $\dfrac{2}{3}+\dfrac{4}{9}+\left(-\dfrac{5}{6}\right)\rightarrow$ LCD$=18\rightarrow\dfrac{2}{3}\cdot\dfrac{6}{6}+\dfrac{4}{9}\cdot\dfrac{2}{2}+\left(-\dfrac{5}{6}\right)\cdot\dfrac{3}{3}=\dfrac{12+8-15}{18}=\dfrac{5}{18}$

105. $\dfrac{11}{27}\div\dfrac{5}{18}=\dfrac{11}{27}\cdot\dfrac{18}{5}=\dfrac{11}{9}\cdot\dfrac{6}{5}=\dfrac{11}{3}\cdot\dfrac{2}{5}=\dfrac{22}{15}=1\dfrac{7}{15}$

107. $-4\dfrac{4}{7}-2\dfrac{3}{14}=-\dfrac{4\cdot7+4}{7}-\dfrac{2\cdot14+3}{14}=-\dfrac{32}{7}-\dfrac{31}{14}\rightarrow$ LCD$=14\rightarrow\dfrac{2}{2}\cdot\left(-\dfrac{32}{7}\right)-\dfrac{31}{14}=\dfrac{-64-31}{14}$

$=\dfrac{-95}{14}=-6\dfrac{11}{14}$

109. *Step 1:* Given Car's tank $=12\dfrac{2}{3}$ gallons and you want to fill $\dfrac{3}{5}$ of tank with gas.

Unknown = How many Gallons?

Step 2: Determine relationship between Known items to find unknown.

How many Gallons are required to fill tank 60% $=12\dfrac{2}{3}\cdot\dfrac{3}{5}$

Step 3: Solve equations for relationships

Gallons $=12\dfrac{2}{3}\cdot\dfrac{3}{5}=\dfrac{12\cdot3+2}{3}\cdot\dfrac{3}{5}=\dfrac{38}{3}\cdot\dfrac{3}{5}=\dfrac{38}{5}=7\dfrac{3}{5}$ gallons of gas

Step 4: Check your answer by stating the word problem with the solved answer

Yes, the answer is correct.

Section 1.4 Irrational Numbers

1. $\sqrt{49}=7$

3. $\sqrt{64}=8$

5. $9\sqrt{16}=9\cdot4=36$

7. $\sqrt{157}=12.53$

9. $21\sqrt{45{,}693}=4488.9434$

11. $\sqrt{32}=\sqrt{16\cdot2}=4\sqrt{2}$ or use paired prime factors $\sqrt{2\cdot2\cdot2\cdot2\cdot2}=4\sqrt{2}$

13. $\sqrt{128}=\sqrt{64\cdot2}=\sqrt{64}\cdot\sqrt{2}=8\sqrt{2}$

15. $5\sqrt{27}=5\sqrt{9\cdot3}=5\cdot3\sqrt{3}=15\sqrt{3}$ or pair prime factors $5\sqrt{3\cdot3\cdot3}=5\cdot3\sqrt{3}=15\sqrt{3}$

17. $15\sqrt{242}=15\sqrt{2\cdot121}=15\sqrt{2}\sqrt{121}=15\cdot11\sqrt{2}=165\sqrt{2}$

19. $\sqrt{15}\cdot\sqrt{6}=\sqrt{3\cdot5}\cdot\sqrt{2\cdot3}=\sqrt{2\cdot3\cdot3\cdot5}=3\sqrt{2\cdot5}=3\sqrt{10}$

21. $\sqrt{30}\cdot\sqrt{70}=\sqrt{3}\cdot\sqrt{10}\cdot\sqrt{7}\cdot\sqrt{10}=10\sqrt{3\cdot7}=10\sqrt{21}$

23. $\sqrt{30}\cdot\sqrt{70}=\sqrt{3}\cdot\sqrt{10}\cdot\sqrt{7}\cdot\sqrt{10}=10\sqrt{3\cdot7}=10\sqrt{21}$

25. $7\sqrt{24}\cdot5\sqrt{36}=7\sqrt{4\cdot6}\cdot5\cdot6=7\cdot2\cdot5\cdot6\sqrt{6}=420\sqrt{6}$

27. $\sqrt{5}\cdot(\sqrt{15}+\sqrt{5})=\sqrt{5}\cdot\sqrt{3\cdot5}+\sqrt{5}\cdot\sqrt{5}=\sqrt{5}\cdot\sqrt{3}\cdot\sqrt{5}+\sqrt{5}\cdot\sqrt{5}=5\sqrt{3}+5$

29. $\sqrt{7}\cdot(\sqrt{14}-\sqrt{7})=\sqrt{7}\cdot(\sqrt{2}\cdot\sqrt{7}-\sqrt{7})=7\sqrt{2}-7$

31. $3\sqrt{5}\cdot(2\sqrt{5}-3\sqrt{15})=3\sqrt{5}\cdot2\sqrt{5}-3\sqrt{5}\cdot3\sqrt{3\cdot5}=6\cdot5-9\cdot5\sqrt{3}=30-45\sqrt{3}$

33. $7\sqrt{2}\cdot(5\sqrt{6}-4\sqrt{2})=7\sqrt{2}\cdot5\sqrt{2\cdot3}-4\sqrt{2}\cdot7\sqrt{2}=35\cdot2\sqrt{3}-4\cdot2\cdot7=70\sqrt{3}-56$

35. $4\sqrt{3}+7\sqrt{3}-2\sqrt{3}=(4+7-2)\sqrt{3}=9\sqrt{3}$

37. $3\sqrt{5}+6\sqrt{5}-7\sqrt{10}=(3+6)\sqrt{5}-7\sqrt{10}=9\sqrt{5}-7\sqrt{10}$

39. $12\sqrt{12}+3\sqrt{27}-4\sqrt{75}=12\sqrt{3\cdot4}+3\sqrt{3\cdot9}-4\sqrt{3\cdot25}=24\sqrt{3}+9\sqrt{3}-20\sqrt{3}=13\sqrt{3}$

41. $7\sqrt{2\cdot16}+8\sqrt{2\cdot25}-10\sqrt{2\cdot36}=7\cdot4\sqrt{2}+8\cdot5\sqrt{2}-10\cdot6\sqrt{2}=28\sqrt{2}+40\sqrt{2}-60\sqrt{2}=8\sqrt{2}$

43a. $v=100+9.8\sqrt{5000}=793\,\text{km/hour}$

  b. $v=100+9.8\sqrt{600}=340\,\text{km/hour}$

  c.   Velocity is a function of depth. As depth decreases so does the velocity.

45. $t=\sqrt{0.204\times381}=8.8$ seconds

Section 1.5 Exponents and Scientific Notation
Please note all odd problems are assigned, but only select solutions are provided.
See eBook Appendix for answers to all odd problems.

1. $9^2 = 9 \cdot 9 = 81$

5. $-2^4 = -(2 \cdot 2 \cdot 2 \cdot 2) = -16$

9. $-15^0 = -(1) = -1$

13. $2^3 \cdot 2^2 = 2^{3+2} = 2^5 = 32$

17. $(4^3)^2 = 4^{3 \cdot 2} = 4^6 = 4096$

23. $(-4)^{-2} = \dfrac{1}{(-4)^2} = \dfrac{1}{16}$

27. $3^5 \cdot 3^{-8} = 3^{5-8} = 3^{-3} = \dfrac{1}{3^3} = \dfrac{1}{27}$

31. $\dfrac{2^5}{2^8} = 2^{5-8} = 2^{-3} = \dfrac{1}{2^3} = \dfrac{1}{8}$

35. $\dfrac{7^9}{7^{11}} = 7^{9-11} = 7^{-2} = \dfrac{1}{7^2} = \dfrac{1}{49}$

43. $\dfrac{x^{10} \cdot y^7}{x^5 \cdot y^3} = x^{10-5} \cdot y^{7-3} = x^5 \cdot y^4$

51. $\dfrac{(x^3 \cdot y^7)^{-2}}{(x^5 \cdot y^6)^{-1}} = \dfrac{(x^5 \cdot y^6)}{(x^6 \cdot y^{14})} = x^{-1} \cdot y^{-8} = \dfrac{1}{x \cdot y^8}$

63. $(2.5 \times 10^9) \cdot (2.34 \times 10^{11}) = (2.5 \times 2.34) \times 10^{9+11} = 5.85 \times 10^{20}$

67. $\dfrac{6.82 \times 10^{-6}}{2.2 \times 10^{10}} = \left(\dfrac{6.82}{2.2}\right) \times 10^{-6-10} = 3.1 \times 10^{-16}$

71. $\dfrac{(1.6 \times 10^6) \cdot (4.5 \times 10^{-4})}{(1.2 \times 10^{-6}) \cdot (3 \times 10^8)} = \dfrac{(1.6 \cdot 4.5) \times (10^{6-4})}{(1.2 \cdot 3) \times 10^{-6+8}} = \dfrac{7.2 \times 10^2}{3.6 \times 10^2} = \left(\dfrac{7.2}{3.6}\right) \times 10^{2-2} = 2 \times 10^0 = 2$

75. Given: 1 light year $= 5.88 \times 10^{12}$ miles AND Andromeda galaxy = 2,500,000 light years
     Unknown: How many miles away is the Andromeda galaxy?

$\dfrac{2.5 \times 10^6 \text{ light years}}{1} \cdot \dfrac{5.88 \times 10^{12} \text{ miles}}{1 \text{ light year}} = (2.5 \cdot 5.88) \times 10^{6+12} \text{ miles} = 14.7 \times 10^{18} \text{ miles} = 1.47 \times 10^{19} \text{ miles}$