

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. $-3-5 \cdot 5=-3-25=-28$
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. $12-3[3(8-8)-2(15-9)]=12-3[2 \cdot 0-2 \cdot 6]=12-3[0-12]=12-3[-12]=12+36$
 $=12+36=48$
69. $3\{5-2[3]-3[-4+4 \cdot 3]\}=3\{5-6-3[-4+12]\}=3\{5-6-3[8]\}=3\{5-6-24\}$
 $=3\{-25\}=-75$
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. $36/2 \rightarrow 18/2 \rightarrow 9/3 \rightarrow 3 \Rightarrow 2 \cdot 2 \cdot 3 \cdot 3=2^2 \cdot 3^2$
3. $100/2 \rightarrow 50/2 \rightarrow 25/5 \rightarrow 5 \Rightarrow 2 \cdot 2 \cdot 5 \cdot 5=2^2 \cdot 5^2$
5. $220/2 \rightarrow 110/2 \rightarrow 55/5 \rightarrow 11 \Rightarrow 2 \cdot 2 \cdot 5 \cdot 11=2^2 \cdot 5 \cdot 11$
7. $18/2 \rightarrow 9/3 \rightarrow 3 \Rightarrow 2 \cdot 3 \cdot 3=2 \cdot 3^2$
 $45/3 \rightarrow 15/3 \rightarrow 5 \Rightarrow 3 \cdot 3 \cdot 5=3^2 \cdot 5$
 least common multiple (LCM) of 18 and 45 is $2 \cdot 3^2 \cdot 5 = 90$
9. $120/2 \rightarrow 60/2 \rightarrow 30/2 \rightarrow 15/3 \rightarrow 5 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5=2^3 \cdot 3 \cdot 5$
 $216/2 \rightarrow 108/2 \rightarrow 54/2 \rightarrow 27/3 \rightarrow 9/3 \rightarrow 3 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3=2^3 \cdot 3^3$
 least common multiple (LCM) of 120 and 216 is $2^3 \cdot 3^3 \cdot 5 = 1080$
11. $84/2 \rightarrow 42/2 \rightarrow 21/3 \rightarrow 7 \Rightarrow 2 \cdot 2 \cdot 3 \cdot 7=2^2 \cdot 3 \cdot 7$
 $108/2 \rightarrow 54/2 \rightarrow 27/3 \rightarrow 9/3 \rightarrow 3 \Rightarrow 2 \cdot 2 \cdot 3 \cdot 3 \cdot 3=2^2 \cdot 3^3$
 $120/2 \rightarrow 60/2 \rightarrow 30/2 \rightarrow 15/3 \rightarrow 5 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5=2^3 \cdot 3 \cdot 5$
 least common multiple (LCM) of 120 and 216 is $2^3 \cdot 3^3 \cdot 5 \cdot 7 = 7560$

13. $18/2 \rightarrow 9/3 \rightarrow 3 \Rightarrow 2 \cdot 3 \cdot 3 = 2 \cdot 3^2$
 $24/2 \rightarrow 12/2 \rightarrow 6/2 \rightarrow 3 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 = 2^3 \cdot 3$
 greatest common factor (GCF) of 18 and 24 is $2 \cdot 3 = 6$
15. $168/2 \rightarrow 84/2 \rightarrow 42/2 \rightarrow 21/3 \rightarrow 7 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 7 = 2^3 \cdot 3 \cdot 7$
 $280/2 \rightarrow 140/2 \rightarrow 70/2 \rightarrow 35/5 \rightarrow 7 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 5 \cdot 7 = 2^3 \cdot 5 \cdot 7$
 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.
 $84/2 \rightarrow 42/2 \rightarrow 21/3 \rightarrow 7 \Rightarrow 2 \cdot 2 \cdot 3 \cdot 7 = 2^2 \cdot 3 \cdot 7$
 $168/2 \rightarrow 84/2 \rightarrow 42/2 \rightarrow 21/3 \rightarrow 7 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 7 = 2^3 \cdot 3 \cdot 7$
 $252/2 \rightarrow 126/2 \rightarrow 63/3 \rightarrow 21/3 \rightarrow 7 \Rightarrow 2 \cdot 2 \cdot 3 \cdot 7 = 2^2 \cdot 3 \cdot 7$
 greatest common factor (GCF) of 84, 168, and 252 = $2^2 \cdot 3 \cdot 7 = 84$
19. $42/2 \rightarrow 21/3 \rightarrow 7 \Rightarrow 2 \cdot 3 \cdot 7$
 $30/2 \rightarrow 15/3 \rightarrow 5 \Rightarrow 2 \cdot 3 \cdot 5$
 $18/2 \rightarrow 9/3 \rightarrow 3 \Rightarrow 2 \cdot 3 \cdot 3 = 2 \cdot 3^2$
 least common multiple (LCM) of 42, 30, and 18 is $2 \cdot 3^2 \cdot 5 \cdot 7 = 630$ students
21. $72/2 \rightarrow 36/2 \rightarrow 18/2 \rightarrow 9/3 \rightarrow 3 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 = 2^3 \cdot 3^2$
 $48/2 \rightarrow 24/2 \rightarrow 12/2 \rightarrow 6/2 \rightarrow 3 \Rightarrow 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 = 2^4 \cdot 3$
 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. $9.333333333333333 = 9.\bar{3}$
21. $-12\frac{3}{16} = -\left(12 + \frac{3}{16}\right) = -12.1875$
25. $32\frac{5}{6} = 32 + \frac{5}{6} = 32.\bar{8}$

29. $5.32 = \frac{532}{100} = \frac{2 \cdot 2 \cdot 133}{2 \cdot 2 \cdot 25} = \frac{133}{25}$
33. $\frac{12}{28} = \frac{2}{2} \cdot \frac{2}{2} \cdot \frac{3}{7} = \frac{3}{7}$
37. $\frac{84}{168} = \frac{2 \cdot 2 \cdot 3 \cdot 7}{2 \cdot 2 \cdot 2 \cdot 3 \cdot 7} = \frac{1}{2}$
41. $\frac{7}{27} \cdot \frac{18}{42} = \frac{7 \cdot 18}{27 \cdot 42} = \frac{1 \cdot 2}{3 \cdot 6} = \frac{2}{18} = \frac{1}{9}$
45. $\left(-\frac{5}{12}\right) \cdot \left(-\frac{8}{25}\right) = \frac{5 \cdot 8}{12 \cdot 25} = \frac{1 \cdot 2}{3 \cdot 5} = \frac{2}{15}$
49. $5\frac{1}{9} \cdot \left(-7\frac{2}{3}\right) = \left(\frac{5 \cdot 9 + 1}{9}\right) \cdot \left(-\frac{7 \cdot 3 + 2}{3}\right) = \left(\frac{46}{9}\right) \cdot \left(-\frac{23}{3}\right) = -\frac{46 \cdot 23}{9 \cdot 3} = -\frac{1058}{27} = -39\frac{5}{27}$
53. $\frac{9}{14} \div \frac{27}{35} = \frac{9}{14} \cdot \frac{35}{27} = \frac{1}{2} \cdot \frac{5}{3} = \frac{5}{6}$
57. $-\frac{16}{25} \div \left(-\frac{15}{8}\right) = -\frac{16}{25} \cdot \left(-\frac{8}{15}\right) = \frac{16}{25} \cdot \frac{8}{15} = \frac{128}{375}$
61. $5\frac{5}{8} \div 3\frac{1}{3} = \frac{5 \cdot 8 + 5}{8} \div \frac{3 \cdot 3 + 1}{3} = \frac{45}{8} \div \frac{10}{3} = \frac{45}{8} \cdot \frac{3}{10} = \frac{9}{8} \cdot \frac{3}{2} = \frac{27}{16} = 1\frac{11}{16}$
65. $-3\frac{5}{6} \div \left(-11\frac{1}{2}\right) = \frac{3 \cdot 6 + 5}{6} \div \left(\frac{11 \cdot 2 + 1}{2}\right) = \frac{23}{6} \cdot \left(\frac{2}{23}\right) = \frac{2}{6} = \frac{1}{3}$
69. $\left(-\frac{5}{7}\right)^2 = \frac{25}{49}$
73. $\frac{3}{7} + \frac{2}{7} = \frac{3+2}{7} = \frac{5}{7}$
77. $\frac{1}{4} + \frac{2}{3} \rightarrow \text{LCD}=12 \rightarrow \frac{3}{3} \cdot \frac{1}{4} + \frac{2}{3} \cdot \frac{4}{4} = \frac{3+8}{12} = \frac{11}{12}$
81. $-\frac{5}{6} - \left(-\frac{3}{10}\right) \rightarrow \text{LCD}=30 \rightarrow -\frac{5}{6} \cdot \left(\frac{5}{5}\right) + \frac{3}{10} \cdot \frac{3}{3} = \frac{-25+9}{30} = \frac{-16}{30} = -\frac{8}{15}$
85. $2\frac{5}{6} + 11\frac{2}{3} \rightarrow \text{Add Wholes then Fractions} \rightarrow 2 + 11 \dots \frac{5}{6} + \frac{2}{3} \cdot \frac{2}{2} = 13\frac{9}{6} = 14\frac{1}{2}$
89. $3\frac{5}{6} + 4\frac{3}{4} = \frac{3 \cdot 6 + 5}{6} + \frac{4 \cdot 4 + 3}{4} = \frac{23}{6} + \frac{19}{4} \rightarrow \text{LCD}=12 \rightarrow \frac{2}{2} \cdot \frac{23}{6} + \frac{19}{4} \cdot \frac{3}{3} = \frac{46+57}{12} = \frac{103}{12} = 8\frac{7}{12}$
93. $\frac{\frac{5}{14} - \frac{4}{7}}{\frac{4}{21} + \frac{11}{3}} = \frac{\frac{5}{14} - \frac{4 \cdot 2}{7 \cdot 2}}{\frac{4}{21} + \frac{11 \cdot 7}{3 \cdot 7}} = \frac{\frac{5-8}{14}}{\frac{4+77}{21}} = \frac{-3}{14} \cdot \frac{21}{81} = -\frac{1}{2} \cdot \frac{3}{27} = -\frac{1}{2} \cdot \frac{1}{9} = -\frac{1}{18}$

$$\begin{aligned}
 97. \quad \frac{1}{2} + \frac{\frac{3}{8}}{\frac{5}{2} - 4} \cdot \frac{2}{3} &= \frac{1}{2} + \frac{\frac{3}{8}}{\left(\frac{5}{2} - \frac{4 \cdot 2}{2}\right)} \cdot \frac{2}{3} = \frac{1}{2} + \frac{\frac{3}{8}}{\left(\frac{5-8}{2}\right)} \cdot \frac{2}{3} \\
 &= \frac{1}{2} + \frac{\frac{3}{8}}{-\frac{3}{2}} \cdot \frac{2}{3} = \frac{1}{2} + \frac{3}{8} \cdot \left(-\frac{2}{3}\right) \cdot \frac{2}{3} = \frac{1}{2} + \left(-\frac{6}{24}\right) \cdot \frac{2}{3} = \frac{1}{2} + \left(-\frac{1}{6}\right) = \frac{3}{6} + \left(-\frac{1}{6}\right) = \frac{3-1}{6} = \frac{1}{3}
 \end{aligned}$$

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

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

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

$$\begin{aligned}
 107. \quad -4\frac{4}{7} - 2\frac{3}{14} &= -\frac{4 \cdot 7 + 4}{7} - \frac{2 \cdot 14 + 3}{14} = -\frac{32}{7} - \frac{31}{14} \rightarrow \text{LCD} = 14 \rightarrow \frac{2}{2} \cdot \left(-\frac{32}{7}\right) - \frac{31}{14} = \frac{-64-31}{14} \\
 &= \frac{-95}{14} = -6\frac{11}{14}
 \end{aligned}$$

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

Unknown = How many Gallons?

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

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

Step 3: Solve equations for relationships

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

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. $9\sqrt{16} = 9 \cdot 4 = 36$

7. $\sqrt{157} = 12.53$

9. $21\sqrt{45,693} = 4488.9434$
11. $\sqrt{32} = \sqrt{16 \cdot 2} = 4\sqrt{2}$ or use paired prime factors $\sqrt{2 \cdot 2 \cdot 2 \cdot 2} = 4\sqrt{2}$
13. $\sqrt{128} = \sqrt{64 \cdot 2} = \sqrt{64} \cdot \sqrt{2} = 8\sqrt{2}$
15. $5\sqrt{27} = 5\sqrt{9 \cdot 3} = 5 \cdot 3\sqrt{3} = 15\sqrt{3}$ or pair prime factors $5\sqrt{3 \cdot 3 \cdot 3} = 5 \cdot 3\sqrt{3} = 15\sqrt{3}$
17. $15\sqrt{242} = 15\sqrt{2 \cdot 121} = 15\sqrt{2} \sqrt{121} = 15 \cdot 11\sqrt{2} = 165\sqrt{2}$
19. $\sqrt{15} \cdot \sqrt{6} = \sqrt{3 \cdot 5} \cdot \sqrt{2 \cdot 3} = \sqrt{2 \cdot 3 \cdot 3 \cdot 5} = 3\sqrt{2 \cdot 5} = 3\sqrt{10}$
21. $\sqrt{30} \cdot \sqrt{70} = \sqrt{3} \cdot \sqrt{10} \cdot \sqrt{7} \cdot \sqrt{10} = 10\sqrt{3 \cdot 7} = 10\sqrt{21}$
23. $\sqrt{30} \cdot \sqrt{70} = \sqrt{3} \cdot \sqrt{10} \cdot \sqrt{7} \cdot \sqrt{10} = 10\sqrt{3 \cdot 7} = 10\sqrt{21}$
25. $7\sqrt{24} \cdot 5\sqrt{36} = 7\sqrt{4 \cdot 6} \cdot 5 \cdot 6 = 7 \cdot 2 \cdot 5 \cdot 6\sqrt{6} = 420\sqrt{6}$
27. $\sqrt{5} \cdot (\sqrt{15} + \sqrt{5}) = \sqrt{5} \cdot \sqrt{3 \cdot 5} + \sqrt{5} \cdot \sqrt{5} = \sqrt{5} \cdot \sqrt{3} \cdot \sqrt{5} + \sqrt{5} \cdot \sqrt{5} = 5\sqrt{3} + 5$
29. $\sqrt{7} \cdot (\sqrt{14} - \sqrt{7}) = \sqrt{7} \cdot (\sqrt{2} \cdot \sqrt{7} - \sqrt{7}) = 7\sqrt{2} - 7$
31. $3\sqrt{5} \cdot (2\sqrt{5} - 3\sqrt{15}) = 3\sqrt{5} \cdot 2\sqrt{5} - 3\sqrt{5} \cdot 3\sqrt{3 \cdot 5} = 6 \cdot 5 - 9 \cdot 5\sqrt{3} = 30 - 45\sqrt{3}$
33. $7\sqrt{2} \cdot (5\sqrt{6} - 4\sqrt{2}) = 7\sqrt{2} \cdot 5\sqrt{2 \cdot 3} - 4\sqrt{2} \cdot 7\sqrt{2} = 35 \cdot 2\sqrt{3} - 4 \cdot 2 \cdot 7 = 70\sqrt{3} - 56$
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. $12\sqrt{12} + 3\sqrt{27} - 4\sqrt{75} = 12\sqrt{3 \cdot 4} + 3\sqrt{3 \cdot 9} - 4\sqrt{3 \cdot 25} = 24\sqrt{3} + 9\sqrt{3} - 20\sqrt{3} = 13\sqrt{3}$
41. $7\sqrt{2 \cdot 16} + 8\sqrt{2 \cdot 25} - 10\sqrt{2 \cdot 36} = 7 \cdot 4\sqrt{2} + 8 \cdot 5\sqrt{2} - 10 \cdot 6\sqrt{2} = 28\sqrt{2} + 40\sqrt{2} - 60\sqrt{2} = 8\sqrt{2}$
- 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. $t = \sqrt{0.204 \times 381} = 8.8 \text{ seconds}$

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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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