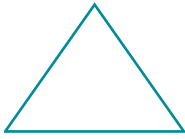# Answers to Course 3 Unit 1 Practice

LESSON 1-1

1. a.

b. The sequence is circle, triangle, circle, triangle … .

2.

3. Answers may vary. Based on the given three figures in the pattern, Aaron is correct. The cube is followed by a square, the shape of the base. The cylinder should be followed by a circle, the shape of its base.

4. C

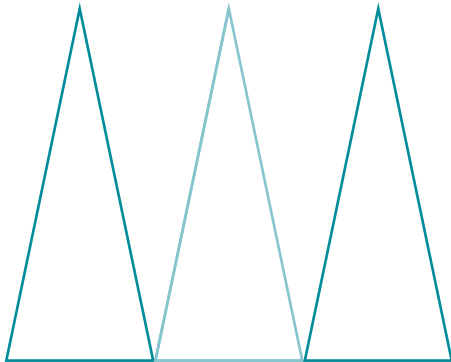**5.** Check students' sequences.

LESSON 1-2

6. a.

Figure 5

b. There are three patterns. The number of triangles in each figure increases by 1 after every second figure, the "new" triangle alternates between red and blue, and the figure rotates 180° each time.

c. India drew the correct number of triangles with the correct colors but the rotation is incorrect. The 9th figure should look like this.
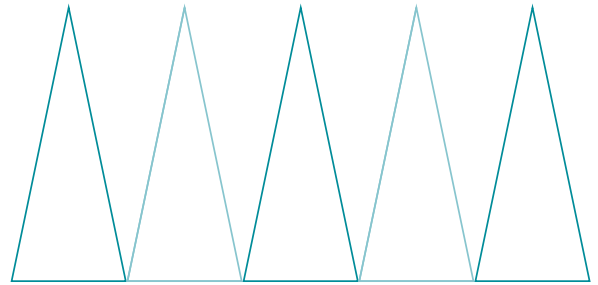

Figure 9

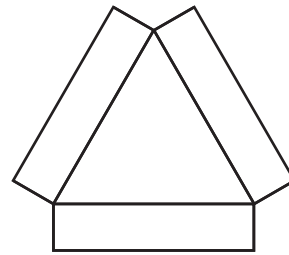**7.** C

8. a.

Figure 4

b. Answers may vary. Sample answers: The pattern repeats.
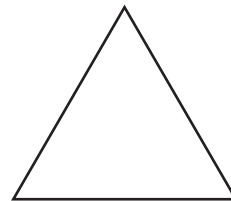

Figure 5

The number of quadrilaterals decrease.
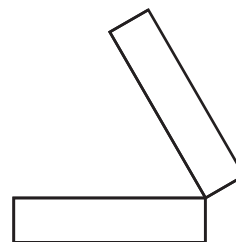

Figure 5

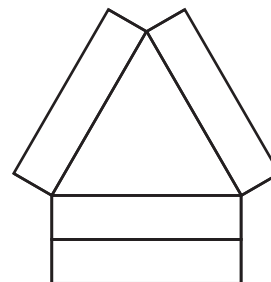The number of quadrilaterals continues to increase.

Figure 5

A1

9.

Figure	Number of Triangles	Number of Quadrilaterals	Sum
1	1	0	1
2	1	1	2
3	1	2	3
4	1	3	4
5	1	4	5
6	1	5	6
7	1	6	7

10. a.

Figure	Number of Circles	Number of Line segments	Sum
1	1	0	1
2	1	1	2
3	2	4	5
4	3	9	12
5	4	16	20
6	5	25	30
7	6	36	42

b. The sequence begins with 1 circle. After Figure 1, the number of circles in the figure is one less than the figure number. Beginning with Figure 2, the number of line segments is the square of the number of circles.

c. Figure 21 will have 20 circles and 400 line segments. The total number of geometric figures in Figure 21 is 420.

LESSON 1-3

11. a. increasing; Starting with $\frac{1}{2}$, the numerators and denominators increase by 1. If you change each fraction to a decimal rounded to the nearest hundredth, you can see that this is an increasing sequence: 0.5, 0.67, 0.75.]

b. decreasing: Starting with $\frac{1}{2}$, the numerators stay the same and the denominators increase by 1. If you change each fraction to a decimal rounded to the nearest hundredth, you can see that this is a decreasing sequence: 0.5, 0.33, 0.25.]

c. increasing; 1 is added to the end of the decimal each time. This increases the value of the decimal.

12. a. $-37 - (-32)$, $-200 \div 20$, -5×3, $-18 + (-2)$, or $-5, -10, -15, -20$

b. Each term in the sequence is decreasing by -5.

13. a. Alternate writing the alphabet forward from A and backward from Z.; C, X, D.

b. The numerator increases by 1 and an additional digit of 3 is added onto the denominator, or the numerator increases by 1 and indicates the number of 3's in the denominator.; $\frac{4}{3333}, \frac{5}{33333}, \frac{6}{333333}$.

c. Multiply the terms in the odd position by -1 and add 2 to the terms in the even positions. $-1, 1, 3$.

14. D

15. Answers may vary. 1, 3, -2, 0, -5 for example.

LESSON 2-1

16. a. 2

b. 4

c. 9; 8

17. a. $\frac{8}{9}$

b. $1\frac{5}{8}$

c. $\frac{1}{2}$

d. $\frac{5}{12}$

e. $\frac{5}{24}$

f. $\frac{3}{4}$

g. 20

h. $1\dfrac{5}{9}$

i. $28\dfrac{3}{8}$

j. $17\dfrac{19}{24}$

18. $6\dfrac{1}{12}$ inches

19. Brian's trail mix is greater than a pound. The $1\dfrac{1}{4}$ cups of granola and the $\dfrac{3}{4}$ cups of raisins is a total of 2 cups. When $1\dfrac{1}{3}$ cups of raisins is added, the total amount of trail mix is over 3 cups. This is greater than a pound.

20. B

21. a. $\dfrac{1}{6}$

b. $4\dfrac{4}{9}$

c. 39

d. 36

e. $1\dfrac{7}{25}$

f. $6\dfrac{2}{7}$

g. $5\dfrac{5}{7}$

h. $2\dfrac{6}{11}$

i. 42

j. $\dfrac{3}{8}$

22. a. less than 1

b. greater than 1

c. less than 1

d. equal to 1

e. greater than 1

23. $436.68; explanations may vary. First change the width of each panel to feet, 42 inches is $3\dfrac{1}{2}$ feet. Next determine the number of panels needed to fence in each side. Each length requires 5 panels and each width requires 3 panels. Subtract 1 panel for the gate. Altogether Mr. Takeuchi will need 15 panels of fencing. Since the fencing comes in packages of 4, he will have to buy 4 packages which will cost $307.68. Add the cost of the gate, $129, for a total or $436.68.

24. D

25. 2 feet 9 inches

LESSON 3-1

26. a. 225

b. 0.04

c. $\dfrac{9}{16}$

d. 25

e. 9

27. a. 30

b. 1.1

c. 14

d. $\dfrac{1}{8}$

e. $\dfrac{3}{5}$

28. C

29. Lucas is not correct. He found the square root of 36, which is 6, when he should have divided 36 by 4.

30. First divide the cost of the carpet by the cost per square foot to find the area of the square, $192 ÷ $3 = 64 square feet. Then find the square root to find the length of the side of the square: $\sqrt{64} = 84$.

LESSON 3-2

31. a. 512

    b. 2

    c. $\dfrac{1}{27}$

    d. 4

    e. 0.1

32. a. 3

    b. 5

    c. 2

    d. 10

    e. 20

33. C

34. $298.80

35. 5 centimeters

LESSON 3-3

36. a. 0.5

    b. 297

    c. 5

    d. $\dfrac{19}{32}$

    e. 10,003

37. a. $>$

    b. $=$

    c. $<$

    d. $=$

    e. $>$

38. B

39. a. Step 1: Evaluate expressions within parentheses.

       Step 2: Evaluate exponential expressions.

       Step 3: Multiply.

       Step 4: Subtract.

    b. 595

40.

2^1	2
2^2	4
2^3	8
2^4	16
2^5	32
2^6	64
2^7	128
2^8	256
2^9	512
2^{10}	1,024

LESSON 4-1

41.

Fraction	Decimal Form	Percent
$\dfrac{3}{10}$	0.3	30%
$\dfrac{1}{3}$	0.33	$33\dfrac{1}{3}\%$
$\dfrac{4}{5}$	0.8	80%
$\dfrac{3}{8}$	0.375	$37\dfrac{1}{2}\%$
$\dfrac{3}{4}$	0.75	75%
$\dfrac{4}{25}$	0.16	16%
$\dfrac{1}{8}$	0.125	$12\dfrac{1}{2}\%$
$\dfrac{7}{10}$	0.7	70%
$\dfrac{1}{2}$	0.5	50%
$\dfrac{3}{5}$	0.6	60%

42. a. $<$

  b. $=$
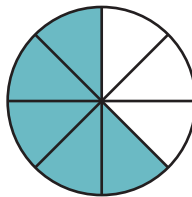
  c. $>$

  d. $>$

  e. $=$

43. B

44. Step 1: Multiply both the numerator and denominator of $\dfrac{8}{25}$ by 4 to get $\dfrac{32}{100}$.

Step 2: Change $\dfrac{32}{100}$ to a decimal, 0.32.

Step 3: Move the decimal point two places to the right and add a % sign, 32%.

45.

LESSON 4-2

46. a. 0.818 . . .

  b. 0.4 . . .

  c. 0.6 . . .

  d. 0.63 . . .

  e. 0.136 . . .

47. a. $\dfrac{5}{9}$

  b. $\dfrac{8}{33}$

  c. $3\dfrac{8}{9}$

  d. $6\dfrac{1}{99}$

  e. $\dfrac{5}{11}$

48. C

49. Check students' answers.

50. 10^3 or 1,000; the repeating part of the digit occurs after the third digit.

LESSON 4-3

51. a. $1.\overline{6}$, $1\dfrac{1}{6}$, 16%

  b. $1\dfrac{4}{5}$, 0.1818 . . ., 18%,

  c. $66\dfrac{2}{3}\%$, 0.5, $\dfrac{4}{9}$

d. $\frac{5}{9}$, 55%, 0.5454...

e. 75%, $\frac{8}{11}$, $\frac{2}{3}$

52. a. $>$

   b. $=$

   c. $<$

   d. $>$

   e. $=$

53. C

54. a. $\frac{7}{8}$

   b. 1.425

   c. $1\frac{3}{8}$ or 1.375

   d. 2

   e. $1\frac{1}{8}$

55. No; Explanations may vary. Sample answer: 20% is equivalent to $\frac{2}{10}$ not $\frac{2}{5}$.

LESSON 5-1

56. a. $\sqrt{27}$

   b. 0.112123...

   c. $\sqrt[3]{12}$

   d. $\sqrt{8}$

   e. $\sqrt{48}$

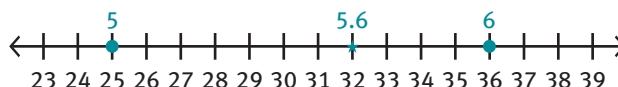**57. a.** 3.6

   b. 2.2

   c. 11.1

   d. 3.7

   e. 8.5

58.

59. B

60. No; Answers may vary. If Mimi were correct, then 4^3 would be 16. But 4^3 is 64, not 16.

LESSON 5-2

61. $\sqrt[3]{3}$, 3.4, $\sqrt{12}$, 4

62. a. $=$

   b. $<$
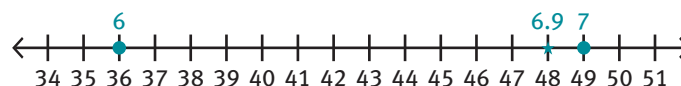
   c. $=$

   d. $>$

   e. $<$

63. Answers may vary. One rational number between 6.2 and 6.3 is 6.25. One irrational number between 6.2 and 6.3 is $\sqrt{39}$

64. D

65.

LESSON 6-1

66. a. 4^9

   b. 11^4

   c. n^{15}

   d. x^8

   e. a^4

67. A

68. No; Explanations may vary. Adam divided the exponents instead of adding them. The correct answer is 5^{18}.

69. a. $=$

  b. $>$

  c. $<$

  d. $=$

  e. $<$

70. a. 1

  b. 216

  c. 48

  d. 8

  e. 75

71. a. $\dfrac{1}{5^4}$

  b. $\dfrac{1}{x}$

  c. $\dfrac{1}{4a^2}$

  d. 2^3

  e. $\dfrac{5y^2}{7}$

72. a. m^5

  b. $\dfrac{1}{8^7}$

  c. $\dfrac{1}{n^5}$

  d. $\dfrac{2}{3}b^3c^3$

  e. $\dfrac{5x^3}{y^6}$

73. D

74. $x = -4$

75. 16

LESSON 6-3

76. a. 7^6

  b. 12^3

  c. a^{-10}

  d. x^2

  e. 3^{-1}

77. a. 1

  b. $\dfrac{1}{10,000}$

  c. 64

  d. $\dfrac{1}{25}$

  e. $\dfrac{1}{3}$

78. a. $<$

  b. $<$

  c. $=$

  d. $>$

  e. $>$

79. No; Paris multiplied the exponents 3 and -1 to get 10^{-3}. He should have added the exponents 3 and -1 to get 10^2.

80. B

LESSON 7-1

81. a. 2,700,000

    b. 1900

    c. 5,200,000

    d. 350,000

    e. 98,000

82. a. 83,000,000,000

    b. 47,600,000

    c. 6,135,000,000

    d. 730,000,000

    e. 589,000,000,000

83. a. 3.15×10^8

    b. 1.2×10^7

    c. 7.65×10^5

    d. 4.8×10^{11}

    e. 6.25×10^3

84. C

85. Answers may vary. Write an estimate of each number. Next, write each estimate in scientific notation. Then, perform the calculations needed.

LESSON 7-2

86. a. 5.8×10^{-3}

    b. 1.39×10^{-5}

    c. 7.49×10^1

    d. 4.2×10^0

    e. 8×10^{-9}

87. a. 0.0000003

    b. 0.00008105

    c. 0.653

    d. 0.0043

    e. 0.0000072

88. 2.3×10^{-1}, 7.8×10^{-2}, 0.0078

89. C

90. Answers may vary. If the exponent of the power of 10 is positive, it is a large number. If the exponent is negative, it is a small number.

LESSON 8-1

91. a. 1×10^{10}

    b. 1.8×10^7

    c. 4×10^{16}

    d. 7×10^6

    e. 9.5×10^{-6}

    f. 4.35×10^4

    g. 1.178×10^9

    h. 2×10^{-9}

    i. 1.8×10^{-2}

    j. 1.92×10^5

92. Answers may vary depending upon the calculator used. Sample answers of calculator display are shown.

    a. 1.872 EE13; 1.872×10^{13}

    b. 3.8 EE^{-8}; 3.8×10^{-8}

    c. 0.00258; 2.58×10^{-3}

    d. 0.5; 5×10^{-1}

    e. 5.053488 EE35; 5.053488×10^{35}

93. 2.669×10^{13}; Explanations will vary. First rewrite each factor in scientific notation. $785 = 7.85 \times 10^2$ $34,000,000,000 = 3.4 \times 10^{10}$ Next multiply $(7.85)(3.4) = 26.69$ and rewrite 26.69 in scientific notation. $26.69 = 2.669 \times 10^1$ Add the exponents $2 + 10 + 1 = 13$ Then put it all together and write the product in scientific notation. 2.669×10^{13}

94. B

95. You can use mental math to find the quotient.
$3.6 \div 3 = 1.2$ Subtract the exponents to find the exponent of the quotient. $6 - 15 = -9$.
The quotient is 1.2×10^{-9}.

LESSON 8-2

96. a. 1.2×10^9

   b. 6.5×10^5

   c. 1.5×10^{-12}

   d. 1.1×10^{-8}

   e. 2.11×10^{16}

   f. 7.34×10^6

   g. 2.54×10^{-3}

   h. 6.11×10^9

   i. 7.78×10^7

   j. 9.73×10^{-4}

97. a.

Planet	Minimum Distance from Earth to each Planet	
	In Standard Form	In Scientific Notation
Mercury	48,000,000 miles	4.8×10^7
Venus	25 million miles	2.5×10^7
Mars	35,000,000	3.5×10^7
Jupiter	365,000,000	3.65×10^8
Saturn	746,000,000	7.46×10^8
Uranus	1.6 billion miles	1.6×10^9
Neptune	2,680,000,000	2.68×10^9

   b. 7.11×10^8

   c. Answers may vary. Rewrite the numbers so that the exponents in scientific notation are the same.

   Change 3.5×10^7 to 0.035×10^9. Subtract: $2.68 \times 10^9 - 0.035 \times 10^9 = 2.645 \times 10^9$.

98. a.

Object	Size of object		
	In nanometers	In meters	
		In Standard Form	In Scientific Notation
Diameter of a hydrogen atom	0.1 nm	0.0000000001	1×10^{-10}
Amino Acid	0.8 nm	0.0000000008	8×10^{-10}
Small virus	30 nm	0.00000003	3×10^{-8}
Large virus	120 nm	0.00000012	1.2×10^{-7}

   b. 90 nm, 0.00000009 m, 9×10^{-8} m; Answers may vary. It is easier to use nanometers to calculate differences.

99. B

100. 1.2×10^{-1} m