Answer Key

1. $4\frac{2}{4}$
2. $2\frac{3}{6}$
3. $2\frac{5}{8}$
4. $1\frac{8}{9}$
5. $1\frac{4}{6}$
6. $3\frac{3}{4}$
7. $2\frac{3}{6}$
8. $1\frac{3}{8}$
9. $2\frac{4}{9}$
10. $2\frac{3}{6}$
11. 27
12. 15
13. 31
14. 25
15. 37
16. 20
17. 44
18. 55
19. 64
20. 68
21. 27,000
22. 12,000
23. 20,000
24. 2,700
25. 120,000
26. 27,000
27. 200,000
28. 80,000
29. 16,000
30. 1,600
31. 1,200
32. 800
33. 2,000
34. 160,000
35. 270,000
36. 20,000
37. 16,000
38. 8,000
39. 12,000
40. 8,000
41. 10
42. 24
43. 16
44. 21
45. 64
46. 49
47. 20
48. 16
49. 14
50. 63
51. 17
52. 168
53. 10
54. 1080
55. 36.8
56. 110
57. 6 & 4 (Remainder)
58. 150
59. 3
60. 11
61. 250
62. 168
63. 152
64. 3
65. 7 & 4 (Remainder)
66. 4900
67. 3
68. 1100
69. 400
70. 10
71. 82 + 78 = 160
    160÷2 = 80
72. 1+2+3+4+5+
    6+7+8+9=45
    45÷3 = 15

1, 5, 9		1, 6, 8
2, 6, 7	or	2, 4, 9
3, 4, 8		3, 5, 7

73. 21÷3 = 7

74. 9 + 5 = 14 (Gerald, older)
    Ans = A
75. 24×2 = 48 days
76. 28÷4 = 7 (cars)
77. \$15 = 60 quarters
    60 days
78. $1\frac{1}{2} + 1\frac{1}{2}$ = 3 lb
79. 300×3 = \$900
80. 180÷5 = 36
81. 1200÷3 = 400
82. 25×25×4
    = 25×100
    = <u>2500</u>
83. 332
84. 56÷8 = 7
85. 7
86. 12
87. C
88. \$16.04
89. $\frac{1}{2}$ = 1/2
90. $\frac{1}{4}$ = 1/4 pizza
91. $\frac{1}{12}$ = 1/12 each
92. $\frac{7}{12}$ = 7/12 pizza
93. C (City Hall)& D (Tim's House)& A (School)
94. 12×8 = 96
95. 12 – 8 = 4 inches
96. C
97. 3×30 – (25 + 35) = <u>30¢</u>
98. B
99. \$16.00 (Josh) & \$18 (Melanie)
100. 1.35 + 2.65 = 4
     4÷2 = <u>\$2.00</u>

Answer Key

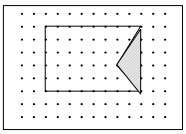
1. $\frac{1}{24}$
2. $\frac{1}{6}$
3. $\frac{11}{24}$
4. $\frac{13}{40}$
5. $\frac{2}{3}$
6. $\frac{3}{4}$
7. $\frac{4}{45}$
8. $\frac{5}{27}$
9. $\frac{7}{12}$
10. $\frac{9}{14}$
11. 5
12. 0.0035
13. 0.4
14. 0.003
15. 9
16. 0.028
17. 8
18. 0.001
19. 6
20. 0.0015
21. 9
22. 0.036
23. 0.5
24. 0.048
25. 9
26. 0.042
27. 400
28. 0.12
29. 3
30. 0.4
31. 3.8
32. 12.5
33. 2.3
34. 4.8
35. 4.3
36. 8.5
37. 7.25
38. 5.75
39. 2.625
40. 4.375
41. 8
42. $\frac{25}{12}$
43. .006
44. .008
45. 0.024
46. 40
47. 0.018
48. 0.6
49. 4
50. 0.1
51. 800
52. 800
53. $1\frac{1}{5}$
54. 6
55. 2
56. 0.3
57. 3.6
58. {1, 5, 25}
59. 10
60. B
    $\frac{48}{36} = \frac{4}{3} < \frac{3}{2} = \frac{12}{8}$
61. 3 + 1 = 4
    12÷4 = 3 apples
62. 5280÷6 = 880 feet
63. 5×125 = 625¢ = \$6.25
64. 63÷7 = 9 colors
65. 40
66. 30 dimes
67. 5 dimes = 2 quarters, 20 dimes = 8 quarters
68. 7 Q & 2 D
69. 3×0.25 + 2×0.10 = 0.95
70. 2 dimes & 8 nickels.
71. 1/4
72. 108÷12 = 9 yrs old
73. 2×0.75 + 0.80 = \$2.30
74. 7 (tickets) ×22 = 154
    160 - 154 = \$6 (change)
75. 15÷3 = 5 hours

76. 126 - 30 = 96
    126 + 96 = $222
77. 10×2 = 20 (cups)
78. 1.50×2 = $3
79. 1.5×2 - 1 = $2
80. 3×3 = $9
81. 175×4 = 700 miles per hour
82. D
    40 – 12 = 28
    18 + 15 – 28 = 5
83. $\frac{1212}{4848} = \frac{1}{4}$ = 25%
84. 2.13 + 3.12 = $5.25
85. 5.25×2 = $10.50
86. D
87. **72**×(1 + $\frac{1}{6}$) = 84
    or
    84÷$\frac{7}{6}$ = 72
88. 84×(1 + $\frac{1}{6}$) = 98
89. $\frac{24{,}000}{30{,}000} = \frac{24}{30}$ = $0.80
90. $1\frac{1}{2}$×10 = 15 miles
91. 15/4 = $3\frac{3}{4}$ hr
    $1\frac{1}{2} + 3\frac{3}{4} = 5\frac{1}{4}$ = 5 1/4 hr
92. 1500÷20 = 75 (ft² per pound)
    2400÷75 = 32 pounds
    or
    $\frac{2400}{1500}$× 20 = $\frac{8}{5}$×20 = 32 pounds
93. The first digit cannot be a 0, so the first digit must be from 1 to 9.
    9×10×10×10 = 9,000 numbers
94. D
95. 35÷5 = 7
    7×7 = 49
96. 35÷7 = 5
    5×5 = 25
97. 5 + 7 = 12
    60 ÷12 = 5
    5×5 = 25 (black)
    5×7 = 35 (red)
98. PACIFIC = 4,658,985
    BALTIC = 260,785
    ARCTIC = 635,785
    ———————
    5,555,555
    (a) 4,658,985 (PACIFIC)
    (b) 260,785 (BALTIC)
    (c) 635,785 (ARCTIC)
99. $\frac{1}{2}$(8×6) = 24
100. 24 = $\frac{1}{2}$(10)(*x*)
     x = 4.8 cm

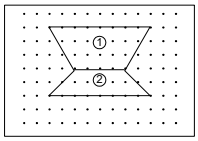
Answer Key

1. $\frac{1}{3}$
2. $\frac{3}{8}$
3. $\frac{11}{36}$
4. $\frac{13}{24}$
5. $\frac{17}{36}$
6. $\frac{22}{35}$
7. $\frac{43}{100}$
8. $\frac{5}{6}$
9. $\frac{7}{18}$
10. $\frac{8}{25}$
11. $4\frac{9}{20}$
12. $5\frac{1}{5}$
13. $5\frac{11}{20}$
14. $2\frac{9}{25}$
15. $2\frac{8}{25}$
16. 12%
17. 120%
18. 252%
19. 257.5%
20. 158.75%
21. 25
22. 12
23. 70
24. 250
25. 20
26. 0.56
27. 8
28. 0.0625
29. 17.5
30. 0.4
31. 0.45
32. 0.016
33. 0.08
34. 0.0075
35. 3000
36. 0.016
37. 0.3
38. 0.32
39. 0.4
40. 0.9
41. 20%
42. 20%
43. 30%
44. 50%
45. 12
46. 160
47. 40
48. 25
49. 84
50. 40
51. 20
52. 80
53. 250
54. 10%
55. 20%
56. 30%
57. 80%
58. 60%
59. 75%
60. 80%
61. 36÷6 = 6
    6 – 4 = 2
    6 + 2 = 8 (cm)
62. 15×4 = 60
63. 60 + 20 = 80
64. 80 ÷ 4= 20
65. 15×15 = 225 in^2
66. 20×20 = 400 in^2
67. 400 - 225 = 175 in^2
68. 54 ÷ 6 = 9 (cm)
69. Partition it into two triangles. The upper one has a base 8 and a height 3, the area is $\frac{1}{2}(8)(3) = 12$. The lower one has a base 8 and a height $5 = \frac{1}{2}(8)(5) = 20$. The total area is 12+20 = 32.
70. The top = 2, the base = 5, the height = 8. The area = $\frac{1}{2}(2+5)(8) = 28$.

71. Enclose the shape by a rectangle. The area of the original shape is (rectangle) – (shaded triangle). The area of the rectangle is 8×5=40. The area of the triangle is $\frac{1}{2}$(5×2)=5. The original (badge) shape has an area of 40-5=35. (Of course, you may partition the original shape into two trapezoids by a horizontal line.)



72. Partition the shape into two trapezoids. The first one has an area of $\frac{1}{2}$×(4+8)×3=18. The second one has an area of $\frac{1}{2}$(4+8)×2=12.
12 + 18 = 30



73. 7 (yd) = 42 ÷6
74. 36÷4 = 9
9^2 = 81 (m^2)
75. Half of the perimeter is 16, the sum of length and width. Since the length is 12, the width is 4. Therefore, the area is

4×12 = 48

76. Half of the perimeter is 12, the sum of length and width. Since the width is 4, the length is 8. Therefore, the area is 4×8=32.
77. 72 ÷ 6 = 12
2(6 + 12) = 36
78. 64÷2 = 32 in^2
79. 64 = 8 × 8
Ans = 8
80. The width of a rectangle is 8÷2 = 4, 2(8+4) = 24 in
81. 1.80÷3 = 0.60 (each eraser)
0.60×12 = $7.20 (a dozen)
82. 20 (outcomes)
Let AB mean that Alex is the chair and Ben is the vice-chair. There are 20 possible outcomes as the previous problem.
83. 1 + 70% = 1.7
5×$1.7 = $8.50
84. 29 – 5 – 4 – 2 = 18
18÷3 = 6
6 + 5 = 11 (first)
6 + 4 = 10 (second)
6 + 2 = 8 (third)
85. 120×80 = 9600 (total area)
100×60 = 6000 (area of inner field)
9600-6000 = 3600 sq. yd. (side walk)
86. 6÷1.5 = 4
3÷1.5=2
4.5÷1.5 = 3
2×3×4 = 24 blocks
87. 10 + 30 + 3 = 43 (to exhaust all whites and blues as the worst case)
88. 30 + 20 + 1 = 51 (to exhaust all blues, reds, then one white)
89. 3 + 3 + 1 = 7 (all different colors)
90. 35- 20 = 15
60×$\frac{15}{20}$ = 60×$\frac{3}{4}$ = 45 (liters more to hold)
60 + 45 = 105 liters (capacity)
91. 96×$7\frac{1}{2}$ = 720
92. $\frac{16}{64}$ = $\frac{1}{4}$ = 25%
93. 8÷4 = 2
2^2 = 4 time larger
94. C
95. 19 – 14 = 5 bean rows
Every 5 bean rows, there are 14 corn rows.
35×$\frac{14}{5}$= 7×14 = 98 corn rows
96. 9.45÷3×5 = $15.75
97. 15 ÷ $\frac{5}{8}$ = 24 mi
98. 15÷$\frac{3}{8}$ = 40 mi
99. 2.25
100. 10/25 = 40%

Answer Key

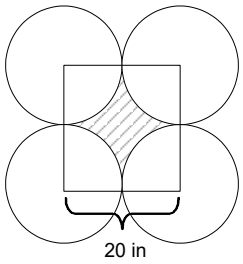
1. $-4x - 6$
2. $-4x^2 - 6x$
3. $-4x + 6$
4. $-4x + 6$
5. $-4x^2 + 6x$
6. $6x - 9$
7. $-6x - 9$
8. $-6x^2 - 9x$
9. $-8x - 12$
10. $10x^3 + 15x^2$
11. $10x^2 + 15x$
12. $10x + 15$
13. $-2x^4 - 4x^3 - 6x^2$
14. $-2x^3 - 4x^2 - 6x$
15. $-2x^2 - 4x - 6$
16. $2x^4 - 4x^3 + 6x^2$
17. $2x^3 - 4x^2 + 6x$
18. $2x^2 - 4x + 6$
19. $3x^4 - 6x^3 - 9x^2$
20. $3x^3 - 6x^2 - 9x$
21. $x^2 + 3x + 2$
22. $x^2 + 4x + 3$
23. $x^2 + 5x + 4$
24. $x^2 + 6x + 5$
25. $x^2 + 10x + 9$
26. $x^2 + 5x + 6$
27. $x^2 + 6x + 8$
28. $x^2 + 7x + 10$
29. $x^2 + 8x + 15$
30. $x^2 + 10x + 21$
31.
$$\begin{array}{r} 3x + 4 \\ +)\ 2x + 5 \\ \hline 5x + 9 \end{array}$$
32.
$$\begin{array}{r} 5x + 4 \\ -)\ 3x + 2 \\ \hline 2x + 2 \end{array}$$
33. $6x + 3 + 2x^2 + 4x + 3$
$= 2x^2 + 10x + 9$
34. $6x^2 + 3x + 2x^2 + 4x + 6$
$= 8x^2 + 7x + 6$
35. $x^5, x^3, x^2, x, 1$
36. 5
37. 36
38. –21
39. $-10 + 3x - 21x^2 + 36x^3 - \frac{1}{4}x^5$
40. $-\frac{1}{4}x^5 + 36x^3 - 21x^2 + 3x - 10$
41. $1 + 80\% = 1.8$
$25 \times 1.8 = \$45$
42. $1 - \frac{3}{8} = \frac{5}{8}$
$15 \div \frac{5}{8} = 24$
43. $4 \times 9 \times 2.5 = 90$
44. Since a cube has 6 identical surfaces, each one has an area of
$\frac{1}{6}(96) = 16$ (ft^2)
$4 = 4 \times 4$
Each side is 4 ft.
$4 \times 4 \times 4 = 64$ ft^3 (volume)
45. 108
46. $12 \div 30\% = 12 \div 0.3 = 40$
47. $40 - 12 = 28$ or $12 \times \frac{7}{3} = 28$
48. 4 possible outcomes
(H, H), (H, T), (T, H) and (T, T).
49. (H, H), (H, T), and (T, H).
50. (T, T).
51. Josh: 1
David: 2
Jennifer: $2 \times 2 = 4$
$1 + 2 + 4 = 7$
$280 \div 7 = 40$
$40 \times 1 = 40$ (Josh)
$40 \times 2 = 80$ (David)
$40 \times 4 = 160$ (Jennifer)
52. $\frac{120}{1\frac{1}{3}} = \frac{120}{\frac{4}{3}} = 90$
53. (a) $2\frac{1}{2} \times 6 = 15$ ft (width)
(b) $3\frac{1}{3} \times 6$ (ft) = 20 ft (length)
54. 1 hr 40 min = $1\frac{2}{3}$ hr
$1\frac{2}{3} \times 45 = 75$ miles
55. $\frac{1}{60} \times 45 \times 5280 = \frac{3}{4} \times 5280 = 3960$ ft
56. $450 \div 50 = 9$
$9 \times 3\frac{1}{3} = 27 + 3 = 30$ (gal)

57. 6 : 9
    = 28 : 42
    Or, $28\times\frac{3}{2}$ = 42 miles
58. $\frac{3}{8}-\frac{1}{4}=\frac{1}{8}$
    $5\div1.25$ = 4 gal
    $4\div\frac{1}{8}$ = 32 gallons
59. 6009
    (Note: 6889 will be the next.)
60. $2^4\times4^{10}=2^4\times2^{20}=2^{24}=(2^3)^{\square}$
    $3\times\square=24$
    $\square=8$
61. 81/256
62. $4\frac{1}{2}$
63. $1\frac{3}{4}$ = 1 3/4
64. 24
65. $264\div12$ = 22 (miles per gallon)
    15×22 = 330 miles
66. D
    A J T SM
67. 1 + 2 + 8 = 11
    $11\times\frac{2}{3}=7\frac{1}{3}$ = 7 1/3
68. D
69. 14,776 feet
70. 1 quart = 32 ounces
    24 ounces = $\frac{24}{32}=\frac{3}{4}$ quart
    10 pints = 5 quarts
    $2\frac{1}{2}+\frac{3}{4}+5=8\frac{1}{4}$ = 8 1/4 quarts
71. 11×60 = 660 ft (1 min)
    $5280\div660$ = 8 min
    $\frac{60}{8}$ = 7.5 mi
72. 8×120 = 960 min = 16 hr = 16 hr
73. $\frac{1200}{50}\times4=24\times4$ = 96 min
74. $\frac{10}{8}+\frac{10}{20}=1\frac{1}{4}+\frac{1}{2}=1\frac{3}{4}$ hr = 1 hr & 45 min
75. 50×3 = 150 mi
76. $200\times75\%$ = 150 acres
77. 18×3 = 54
    15×2 = 30
    54 + 30 = 84 mi
78. $720\div36$ = 20
    20×3 = 60 hr
79. $21\times70\%=21\times0.7$ = \$14.70

Answer Key

1. 1.69
2. 0.0256
3. $\frac{2}{3}$
4. 7.46
5. 20
6. 250%
7. 25%
8. 54
9. 20
10. $133\frac{1}{3}\%$
11. 81.6
12. $66\frac{2}{3}\%$
13. 60%
14. 39
15. 185
16. $1333\frac{1}{3}$
17. 57600
18. 38000
19. 3240000
20. $\frac{1}{4}$
21. 5
22. 9
23. 8
24. 8
25. 3
26. 9
27. 7
28. −2
29. −6
30. −9
31. $y = -3x + 6$
32. $y = \frac{1}{2}x + 4$
33. $y = \frac{-4}{7}x - \frac{26}{7}$
34. $y = x + 1$
35. $\frac{x}{3} + \frac{y}{4} = 1$
36. $3x+2y = -1$
37. $y + 3x - 6 = 0$
38. $x = 3$
39. 3
40. A(0, 1), B(3, 10)
41. $y = 3x + b$
    $5 = 3(2) + b$
    $b = -1$
    $y = 3x - 1$
42. $y = 3x + b$
    $-2 = 3(5) + b$
    $b = -17$
    $y = 3x - 17$
43. $\frac{-1}{3}$
44. $y = \frac{-1}{3}x + b$
45. $y = \frac{-1}{3}x + b$
    $1 = \frac{-1}{3}(0) + b$
    $b = 11$
    $y = \frac{-1}{3}x + 1$
46. $y = \frac{-1}{3}x + b$
    $10 = \frac{-1}{3}(3) + b$
    $b = 11$
    $y = \frac{-1}{3}x + 11$
47. Parallel
    1:–3 = –2:6
48. Perpendicular
    $-\frac{2}{3}\times\frac{3}{2} = -1$
49. Parallel
50. Neither
51. Neither
52. Perpendicular
53. $4x - y - 8 = 0$
54. $4x + y = 0$
55. a) 4/2
    b) 4
    c) $y = (4/2)x + 4$
    d) $x/-2 + y/4 = 1$
    e)
56. a) -1/1
    b) 1
    c) $y = (-1/1)x + 1$
    d) $x/1 + y/1 = 1$
    e)
57. a) -2/1
    b) 2
    c) $y = (-2/1)x + 2$
    d) $x/1 + y/2 = 1$
    e)

58. a) -3/1
    b) 3
    c) $y = (-3/1)x + 3$
    d) $x/1 + y/3 = 1$
    e)
59. a) -4/1
    b) 4
    c) $y = (-4/1)x + 4$
    d) $x/1 + y/4 = 1$
    e)
60. a) -2/9
    b) $2x + 9y = -16$
    c) $2x + 9y = 25$
    d) $9x – 2y = 55.5$
    e) $9x – 2y = -72$
61. a) -3/2
    b) $3x + 2y = -12$
    c) $3x + 2y = 0$
    d) $2x – 3y = 24.5$
    e) $2x – 3y = 5$
62. a) -7/5
    b) $7x + 5y = -18$
    c) $7x + 5y = 12$
    d) $5x – 7y = 114$
    e) $5x – 7y = -34$
63. a) -10/3
    b) $10x + 3y = -24$
    c) $10x + 3y = -30$
    d) $3x – 10y = 298$
    e) $3x – 10y = -29$
64. a) -4
    b) $4x + y = -20$
    c) $4x + y = -6$
    d) $x – 4y = 131$
    e) $x – 4y = -5$
65. $(x + 1)(8x + 2)$
66. $(4x – 8)(2x + 3)$
67. $(x + 2)(2x + 4)$
68. $(x + 1)(8x + 1)$
69. $(x – 5)(x + 2)$
70. $x = 4/3$ or $x = 3/2$
71. $x = 8$ or $x = -2$
72. $x = -1$ or $x = -4$
73. $x = 2$ or $x = -7$
74. $x = 3$ or $x = -9$
75. $0.\overline{142857}$
76. $0.\overline{285714}$
77. $0.\overline{428571}$
78. $0.\overline{571428}$
79. $0.\overline{714285}$
80. $0.\overline{857142}$
81. $0.\overline{9} = 1$
82. $0.\overline{9} = 1$
83. $0.\overline{9} = 1$
84. $0.0\overline{714285}$
85. 0.064
86. $⅙ – \frac{1}{20} = \frac{7}{60} = 7/60$
87. 0.2
88. 192
89. 130 – 100 = 30
90. $1 + \frac{1}{1+\frac{1}{2}} = 1⅔ = \frac{5}{3}$
    $½(\frac{5}{3}) = \frac{5}{6} = 5/6$
91. $120x + 720 = 840x – 1440$
    Divide both sides by 120, then we have
    $x + 6 = 7x – 12$
    $18 = 6x$
    $x = 3$
92. 20% = 12÷60 = 0.2
93. 14÷1¾ = 8
    8×25 = 200 mi
94. $\frac{936}{52} = \frac{x}{80}$
    x = 1440
95. 5 lb 8 oz = 5½ lb
    3 lb 4 oz = 3¼ lb
    3½×4 +2¼×2 = 14 + 4.50 = 18.50 (total)
    20 – 18.50 = $1.50 (change)
96. $½x – ⅓x = 6$
    $⅙x = 6$
    $x = 36$
97. 160÷4 = 40
    40÷2 = 20
    The square below cover ¼ of each circle. The area of the shaded region is
    20×20 – 10²×3.14 = 400 – 314 = 86



98. (1, 1), (1, 2), and (2, 1)
    $\frac{3}{36} = \frac{1}{12} = 1/12$
99. $2\{½×100\pi\} + ½×200\pi$
    $= 200\pi$
    = 628 yards
100. 628÷4 = 157 hours.

101. $108 \div 3 = 36$
$36 = 6^2$
each side = 6 cm
$2(18+6) = 48$ cm (perimeter)

102. LCM(6, 8) = 24 min
A = 20 rounds
B = 21 rounds
20 + 21 = 41 rounds

103. $\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$
$8 \div \frac{1}{6} = 48$ (the weight of whole wine when full)
$\frac{1}{2} \times 48 = 24$
68 – 24 = 44 pounds

104. $25 \div 2 = 12.5$
$3 \div 2 = 1.5$
12.5 + 1.5 = 14

Answer Key

1. $4^6 \div 2^3 = 2^{12} \div 2^3 = 2^9$
2. 8^3
3. 2^6
4. $16^2 \times 2^3 = (2^4)^2 \times 2^3 = 2^8 \times 2^3 = 2^{11}$
5. 8^4
6. 8^5
7. $4^4 = (2^2)^4 = 2^8$
8. $4^3 = 2^6$
9. $4^2 \times 2^3 = 2^4 \times 2^3 = 2^7$
10. 4^6
11. 16^3
12. 3^3
13. 27^6
14. 27^3
15. $3^6 \div 9^2 = 3^6 \div 3^4 = 3^2$
16. $25^3 = (5^2)^3 = 5^6$
17. $25^2 \times 5^4 = 5^4 \times 5^4 = 5^8$
18. 25^3
19. 5^7
20. 125^6
21. $30x^4y^4z^5$
22. $5x^5y^3z^5$
23. $4\frac{1}{xyz^2}$
24. $\frac{1}{3}\frac{1}{y^2z}$
25. $1\frac{1}{2}x^3z$
26. $\frac{4}{5}xz^3$
27. $\frac{1}{10}\frac{1}{z}$
28. $15\frac{x^2}{y}$
29. $5x^3z^3$
30. $1x^4z^3$
31. $\frac{-2(2n+3)-6(n-6)}{(n-6)(2n+3)}$
    $= \frac{-10n+30}{(n-6)(2n+3)}$
32. $\frac{9y+10x}{12x^2y^2}$
33. $\frac{2x+7(x+4)}{(x+4)(x-4)}$
    $= \frac{9x+28}{(x+4)(x-4)}$
34. $\frac{(2x+7)(x-3)}{(5x-1)(2x+7)}$
    $= \frac{x-3}{5x-1}$
35. $\frac{1}{(a-9)(a+6)} - \frac{4}{(a-9)(a+5)}$
    $= \frac{(a+5)-4(a+6)}{(a-9)(a+6)(a+5)}$
    $= \frac{-3a-19}{(a-9)(a+6)(a+5)}$
36. $\frac{x-8}{(x-2)(x-4)} - \frac{x+6}{(x+3)(x-2)}$
    $= \frac{(x-8)(x+3)-(x+6)(x-4)}{((x-4)x+3)(x-2)}$
    $= \frac{-7x}{(x-4)(x+3)(x-2)}$
37. $\frac{2x+5(x+4)}{x(x+4)}$
    $= \frac{7x+20}{x(x+4)}$
38. $\frac{36p^2+(3p+q)^2-(3p-q)^2}{(3p+q)(3p-q)}$
    $= \frac{36p^2+12pq}{(3p+q)(3p-q)}$
    $= \frac{12p(3p+q)}{(3p+q)(3p-q)}$
    $= \frac{12p}{3p-q}$
39. $\frac{r^2-s^2}{rs} \div \frac{s-r}{rs}$
    $= -(r + s)$
40. $\frac{x^2-2x-3}{x+2} \div \frac{x^2+4x+3}{x+2}$
    $= (x^2 - 2x - 3) \div (x^2 + 4x + 3)$
    $= \frac{(x-3)(x+1)}{(x+3)(x+1)}$
    $= \frac{x-3}{x+3}$
41. $\frac{x^2}{(x-2)(x-1)} \div \frac{x^2}{(x-2)(x-3)}$
    $= \frac{x-3}{x-1}$
42. -1
43. $(\frac{y^2-y-2}{y-3})(\frac{y^2+y-2}{y+3}) \div (\frac{y^4-5y^2+4}{y^2-9})$
    $= (y - 2)(y + 1)(y + 2)(y - 1) \div [(y + 1)(y - 1)(y + 2)(y - 1)]$
    $= 1$
44. $\frac{u^2+v^2}{u+v} \times \frac{v^2-u^2}{u^2v^2} \div \frac{u^4-v^4}{u+v}$
    $= \frac{-1}{u^2v^2}$

45. 8
Assumption of non-zero denominator: $n \neq 0$.
Multiply both sides by $2n$.
$10 + n = 18$
$n = 8$ (valid)

46. .7
Assumption of non-zero denominator: $x \neq 0$. Let's multiply $12x$ to both sides:
$9 + 10x = 16$
$10x = 7$
$x = .7$ (valid)

47. 5
Assumption of non-zero denominator: $n \neq 0$. Let's multiply both sides by n:
$47 - n = 8n + 2$
$9n = 45$
$n = 5$ (valid)

48. -2.5
Assumption of non-zero denominator: $x \neq -5$.
Let's multiply both sides by $x + 5$.
$x - 2(x + 5) = 3x$
$4x = -10$
$x = -2.5$ (valid)

49. $\frac{-85}{18}$
Assumption of non-zero denominator: $x \neq 0$.
Multiply both sides by $30x$.
$105 + 18x = 20$
$18x = -85$
$x = \frac{-85}{18}$

50. 1
Multiply both sides by 12.
$4(x - 2) + 3(x + 1) = 2$
$4x - 8 + 3x + 3 = 2$
$7x - 5 = 2$
$7x = 7$
$x = 1$

51. $(2a^{-3})(5ab^2)(3a^{-4}b) = 30a^{-6}b^3 = \frac{30b^3}{a^6}$

52. $x^5 \cdot x^2 = x^7$

53. $(2w^2)^5 = 32w^{10}$

54. $x^2 \cdot (-x^5)^3 = -x^{17}$

55. $(-2a^2 x) \cdot (4a^3x^3) = -8a^5x^4$

56. $(s^3)^8 = s^{24}$

57. $5s^2 \cdot (2s)^3 \cdot 3s^4 = 120s^9$

58. $(-c^2)^3 = -c^6$

59. $\frac{(-5a^2b^3)^2}{(-10a^4b^2)^3} = \frac{25a^4b^6}{-1000a^{12}b^6} = \frac{1}{-40a^8}$

60. $\frac{7abc^4 \cdot 9a^5b^2}{-3a^4b} = \frac{63a^6b^3c^2}{-3a^4b} = -21a^2b^2c$

61. Since $\pi r^2 = a^2$, therefore, $r = \frac{a}{\sqrt{\pi}}$, and the circumference is $2\pi r = 2a\sqrt{\pi}$

62. $(1-r)(1+r+r^2+\ldots+r^n) = 1 - r^{n+1}$
Therefore, $1+r+r^2+\ldots+r^n = \frac{1-r^{n+1}}{1-r}$

63. $5^{1.3} = 5^1 \times 5^{.3} = 5(5^{0.03})^{10} = 5a^{10}$

64. $a:b:c = \frac{1}{3}:\frac{1}{4}:\frac{1}{5}$ (multiplied by 60) = 6:15:12

65. $-s - t$

66. This problem may appear too hard for you right now. It is fine to skip it. We will employ a technique called *matrix* to solve it.

67. Subtract the second equation from the first one, you will get the desired result.
Ans = -13

68. $40 \times \frac{3}{2} = 60$ in.

69. The surface area ratio is 4:9. Since the larger one is 36 in^2, the smaller one is 16 in^2.

70. The volume ratio is $2^3:3^3 = 8:27$. The total parts is 8+27=35. 140÷35 = 4. Thus, the smaller one has a volume of 32 cm^3. (The larger one has a volume of 108 cm^3.)

71. First, figure out her hourly rate: \$560÷35=\$16. Overtime rate is $\$16 \times \frac{3}{2} = \$24$. She gets pay for \$16×40=\$640 for 40-hour week. Now that she earned \$880, an excess of \$240. So, she must have worked overtime. How many hours? \$240÷24=10 (hours). Therefore, she worked 40+10 = 50 hours

72. $m((1 + \frac{r}{12})^{24} - 1)$
The interest rate for three month is $\frac{1}{4}r$. Thus, in a year the yield =
$m((1 + \frac{r}{12})^{12} - 1)$ and the yield will be
$m((1 + \frac{r}{12})^{24} - 1)$ in two years.

73. 14 days
Since the number of infants doubles so it can only 2 weeks, or 14 days.

74. $|y(x - 1)|$

75. 4 hours
The amount of work is 6×8=48, which needs 4 hours for 12 men.

76. area(ΔABC) = area(ΔADF) = 3a
area(ΔABC) = area(ΔCDE) = 2b
3a = 2b
a : b = 2 : 3
$\frac{h}{6} = \frac{a}{a+b} = \frac{2}{5}$
h = 2.4