Answer Key

1. N/A
2. N/A
3. N/A
4. N/A
5. N/A
6. N/A
7. N/A
8. N/A
9. N/A
10. N/A
11. 4
12. 5
13. 8
14. 8
15. 7
16. 12
17. 32
18. 21
19. 33
20. 50
21. 16.7
22. 0.2
23. 13.8
24. +
25. +
26. 8.3
27. 9.5
28. 9.9
29. 1.6
30. 6.5
31. A=6, B=8, C=0
    Ans=6 (for A) & 8 (for B) & 0 (for C)
32. A=7, B=0, C=2
    Ans=7 (for A) & 0 (for B) & 2 (for C)
33. A=3, B=8, C=9
    Ans=3 (for A) & 8 (for B) & 9 (for C)
34. A=5, B=4, C=7
    Ans=5 (for A) & 4 (for B) & 7 (for C)
35. A=1, B=5, C=2
    Ans=1 (for A) & 5 (for B) & 2 (for C)
36. A=9, B=0, C=2
    Ans=9 (for A) & 0 (for B) & 2 (for C)
37. A=4, B=3, C=3
    Ans=4 (for A) & 3 (for B) & 3 (for C)
38. A=7, B=7, C=4
    Ans=7 (for A) & 7 (for B) & 4 (for C)
39. A=9, B=1, C=9
    Ans=9 (for A) & 1 (for B) & 9 (for C)
40. A=7, B=9, C=7
    Ans=7 (for A) & 9 (for B) & 7 (for C)
41. 7
42. 6
43. 4
44. 6
45. 8
46. 9
47. 7
48. 54
49. 36
50. 8
51. 13
52. 85
53. 139
54. 64
55. 7
56. 36
57. 12
58. 29
59. 68
60. 20
61. 3
62. 6
63. 8
64. 7
65. 7
66. 6
67. 9
68. 3
69. 4
70. 5
71. B
72. 72 - 18 = 54
73. 46°
74. 30 more
75. $56 \div 8 = 7$
76. $3 \times 7 = 21$
77. 73 – 55 = 18

78. 15 + 26 = 41
79. 12 - 3 - 3 = 6
80. 62 + 59 = 121 (points)
81. 5 - 3 = 2
    2×12 = 24 inches
82. 21 + 11 + 36 = 68
83. 5×4 = 20 (in)
84. 4 days
85. B
86. D
87. 20 milligrams
88. 350 - 200 = 150
89. 23 - 10 = 13
90. B
    8×4 = 32
    5×7 = 35

Answer Key

1. 2
2. 26
3. 10
4. 40
5. 3
6. 51
7. 2
8. 72
9. 8
10. 36
11. 5
12. 85
13. 15
14. 95
15. 2
16. 38
17. 6
18. 87
19. 8
20. 80
21. Inverted division:

$$\begin{array}{r|l} 2 & 144 \quad 180 \\ \hline 2 & 72 \quad 90 \\ \hline 3 & 36 \quad 45 \\ \hline 3 & 12 \quad 15 \\ \hline & 4 \quad 5 \end{array}$$

GCF = 2×2×3×3 = 36
LCM = 36×4×5

22.
23. 2 (GCF) & 24 (LCM)
24. 6 (GCF) & 36 (LCM)
25. 3 (GCF) & 60 (LCM)
26. 6 (GCF) & 90 (LCM)
27. 7 (GCF) & 42 (LCM)
28. 5 (GCF) & 75 (LCM)
29. 6 (GCF) & 120 (LCM)
30. 12 (GCF) & 120 (LCM)
31. 1.05
32. 1.1
33. 1.15
34. 1.2
35. 1.25
36. 1.3
37. 1.35
38. 1.4
39. 1.45
40. 1.5
41. 105/100 = 21/20
42. 110/100 = 11/10
43. 115/100 = 23/20
44. 120/100 = 6/5
45. 125/100 = 5/4
46. $\frac{75}{100} \xrightarrow{\div 5} \frac{15}{20} \xrightarrow{\div 5} \frac{3}{4}$
47. $0.8 = \frac{4}{5} = 4/5$
48. $0.24 = \frac{24}{100} = \frac{6}{25} = 6/25$
49. $0.25 = \frac{25}{100} = \frac{1}{4} = 1/4$
50. $0.36 = \frac{36}{100} = \frac{9}{25} = 9/25$
51. 7 & 1 (Remainder)
52. 105
53. 17.5
54. 5
55. 66
56. 28
57. 23
58. 20
59. 30
60. 5
61. 25
62. 76
63. 38
64. 19
65. 51
66. 492
67. 575
68. 735
69. 782
70. 3192
71. 1/8
72. 1/4
73. 3/8
74. 5/8
75. 3/4
76. D

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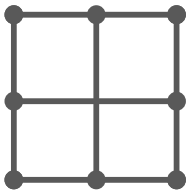
77. A
78. 20
79. 45
80. B
81. B
82. 92 - 36 = 56
83. 62 + 9 = 71
    62 + 71 = 133
84. 15×3 = 45
85. 8×.5 = 4
    5 - 4 = $1
86. 6×3×4 = 72
    80 - 72 = $8
87. length: 50÷2 - 10=15
    area: 15×10=150 sq. inches
88. 10 + 2×6 = $22
89. 12
90. 8 – 1 = 7
    8 + 7 = 15
    15 – 1 = 14
    8 + 7 + 14 = 29
91. 6 sticks to make 5 squares.
    4 little one + 1 big one.
    Ans = 6

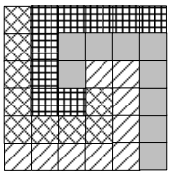


92. 15+16+17+18+19+20 = 105
    14+15+16+17+18+20 = 100
    Discard 14 cards to keep a total of 100:
    1, 2, …, 13, 19
    Ans = 14 cards
93. Convert the question into the following:

	R	A	T
–	T	A	R
	?	?	?

    Now, try to maximize the difference.
    R = 9
    T = 1
    A = any digit

	9	0	1
–	1	0	9
	7	**9**	**2**

    Ans = 792
94. 5 + 6 + 10 = 21
    33 – 21 = 12
    12÷2 = 6
95. 1÷2÷4 = ⅛
    3÷ (⅛×4) = 6
96. 80 – 14 – 12 – 1 – 7 = 46
97. 
    Ans = 4
98. 8×3 = 24
    2×(4 – 3) = 2
    8+ 2×2 = 12

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Answer Key

1. -16
2. -10
3. -8
4. -14
5. -10
6. -4
7. 2
8. -5
9. 1
10. 5
11. 6
12. 63
13. 120
14. 165
15. 20
16. -4
17. 17
18. 0
19. -2
20. 6
21. 105
22. 990 + 11 = 1090
23. 243 + 18 = 261
24. 280 + 21 = 301
25. 147 + 35 = 182
26. 190 + 57 = 247
27. 180 + 72 = 252
28. 192 + 24 = 216
29. 135 + 12 = 147
30. 224 + 32 = 256
31. 2500
32. 512000
33. 8100
34. 0.16
35. 2.89
36. 0.0025
37. $(\frac{5}{3})^2 = 2\frac{7}{9} = 2\ 7/9$
38. $\frac{1}{100} = 1/100$
39. $4^3 = 64$
40. 1
41. $4\sqrt{5}$
42. $3\sqrt{14}$
43. $4\sqrt{15}$
44. $5\sqrt{11}$
45. $12\sqrt{2}$
46. 48
47. 128
48. 288
49. 648
50. 972
51. 40
52. 1/2
53. 1/4
54. 1/5
55. 2.5
56. 5/4 = 1.25
57. 8
58. 4
59. 1/9
60. 10
61. 4 + 13 - 1 = 16 (deducting 1 since there is a king of heart)
    $\frac{16}{52} = \frac{4}{13} = 4/13$
62. $\frac{2}{52} = \frac{1}{26} = 1/26$
63. $\frac{26}{52} = \frac{1}{2} = 1/2$
64. $1 - \frac{1}{13} = \frac{12}{13} = 12/13$
65. $\frac{1}{4}\times\frac{1}{5}=\frac{1}{20} = 1/20$
66. $\frac{1}{4}\times\frac{1}{5}=\frac{1}{20} = 1/20$
67. $\frac{1}{4}\times\frac{1}{5}=\frac{1}{20} = 1/20$
68. $\frac{1}{2}\times\frac{3}{5} = \frac{3}{10} = 3/10$
69. $\frac{1}{2}\times\frac{2}{5} = \frac{1}{5} = 1/5$
70. 9×10×10×10 = 9000 numbers
    Note: The first digit cannot be a 0, thus it has only 9 choices.
71. There are 11 letters in total. There are 4 letters of 's'. The chance of getting a 's' is $\frac{4}{11} = 4/11$
72. $\frac{4}{11} = 4/11$
73. 6

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74. The sums are
1 + 2 = 3
1 + 3 = 4
1 + 4 = 5
2 + 3 = 5
2 + 4 = 6
3 + 4 = 7
Ans = 5

75. 4/6 = $\frac{2}{3}$ = 2/3
There are four of them as the shaded.

76. 35%×80% = 0.35×0.8 = 0.28 = 28%

77. 65%×40% = 0.65×0.4 = 0.26 = 26%

78. The probability of a male customer has no charge card is 35%×20%=7%. The probability of a female customer has no charge card is 65%×40% =.65×.4=.26=26%. Thus, the sum is 7% + 26% = 33%.

79. 0.30 = 30%

80. 0.3×0.3 = 0.09 = 9%

81. \$1: £1 = 0.6: 1
\$450×0.6 = 270 (British pounds)

82. car: van = $\frac{130}{65}$: $\frac{252}{12}$= 20: 21

83. 45: 30 = 3: 2

84. (a) 40: 32 = 5: 4
(b) $\frac{40}{72}$ = $\frac{5}{9}$ = 5/9

85. 5 min = 300 sec
300×$\frac{40}{30}$ = 300×$\frac{4}{3}$ = 400 words

86. $\frac{600}{14}$×35 = 1500

87. 225 ×$\frac{2}{75}$= 6 oz

88. 8×$\frac{75}{2}$= 300 cm^3

89. $5\frac{1}{3}$ yd = $\frac{16}{3}$ yd = 16 ft
16÷8×3 = 6 inches

90. time = $\frac{\text{distance}}{\text{speed}}$ = $\frac{18}{40}$ = 0.45 hour = 0.45×60 min = 27 min

91. Boys: Girls = 12: 8 = 3: 2 (reduced)

92. 50 - 20 - 10 - 5 = 15
spent: saved
= 35: 15
= 7: 3

93. 1 - $\frac{1}{4}$ = $\frac{3}{4}$
$\frac{1}{4}$: $\frac{3}{4}$ = 1: 3
Note: The problem can be done without using 175,000.

94. 15: 25
= 3: 5
2(3 + 5) = 16
width: length: perimeter
= 3: 5: 16

95. 100×$\frac{300}{3.75}$ = 100 × $\frac{100}{1.25}$ = 8,000 lb

96. To partition 90° with the ratio of 3: 2, the smaller angle should
90°- 54° = 36°

97. A
6.4÷32 = 0.2 (Cleanser A cheaper)
2.5÷12 > 0.2

98. 1: 144
ft = 12 in
(ft)^2 = (12 in)^2 = 144 in^2

99. 10000: 1
m = 100 cm
m^2 = (100 cm)^2 = 10000 cm^2

100. 50: 1
1 m^2: 200 cm^2 = (100cm)^2: 200cm^2 =10000: 200 = 50: 1

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Answer Key

1. 2 in (A) & 3 in (B) & 4 in (C) & 3 in (D)
2. 3 in (A) & 2 in (B) & 2 in (C) & 3 in (D)
3. 5 in (A) & 2 in (B) & 4 in (C) & 3 in (D)
4. 4 in (A) & 3 in (B) & 2 in (C) & 5 in (D)
5. 2 in (A) & 3 in (B) & 3 in (C) & 2 in (D)
6. 6 (=1×2×3)
7. 30 (=1×3×10)
8. 60 (=1×4×15)
9. 42 (=2×3×7)
10. 360 (=3×4×30)
11. 40 (=2×5×4)
12. 220 (=4×5×11)
13. 540 (=5×6×18)
14. 168 (=3×7×8)
15. 1120 (=4×7×40)
16. $2^2\times3^0\times5^1\times7^0$
17. $2^0\times3^1\times5^1\times7^0$
18. $2^4\times3^0\times5^0\times7^0$
19. $2^2\times3^1\times5^0\times7^0$
20. $2^1\times3^0\times5^0\times7^1$
21. $2^1\times3^0\times5^1\times7^0$
22. $2^0\times3^0\times5^2\times7^0$
23. $2^0\times3^1\times5^0\times7^1$
24. $2^1\times3^2\times5^0\times7^0$
25. $2^3\times3^1\times5^0\times7^0$
26. 1/14
27. 21
28. 1/16
29. 18
30. 1/21
31. 1/32
32. 18
33. 21
34. 32
35. 1/10
36. 0.035
37. 0.064
38. 0.048
39. 0.045
40. 0.028
41. 1/64
42. 1/128
43. 1/256
44. 1.21
45. 1.331
46. 1.44
47. 16/25
48. 64/125
49. 256/625
50. 1024/3125
51. 11/12
    LCD = 12
52. 7/72
    LCD = 72
53. 12/35
    LCD = 35
54. 15/112
    LCD = 112
55. 15/28
    LCD = 28
56. 3/140
    LCD = 140
57. 1/36
    LCD = 36
58. 7/45(=14/90)
    LCD = 90
59. 2/3(=4/6)
    LCD = 6
60. 1/8(=3/24)
    LCD = 24
61. 3 + 11 = 14
62. $\frac{1}{2}(3 + 11) = 7$
63. 3×11 = 33
64. (a) $\frac{180+10}{2} = 95$ (Larry)
    (b) $\frac{180-10}{2} = 85$ (Wilson)
65. 72×2 = 144
    144 + 66 = 210
    210 ÷ 3 = 70
66. 2×75 + 3×70 = 150 + 210 = 360
    360÷5 = 72
67. $\frac{1}{2}(95 + 105) = 100$
68. $\frac{1}{3}(100\times2 + 70) = 90$
69. 95×4 - 90×3 = 110
70. $5\frac{1}{3} - 4\frac{3}{4} = \frac{7}{12}$ ft = 7 inches
71. $\frac{0.83+1.45+1.17}{3}$= $1.15

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72. (a) 20 + 5 = 25 (quarts, larger)
(b) 20 - 5 = 15 (quarts, smaller)

73. 80×4 = 320 lb
60×3 = 180 (total weight of A, B, C)
320 - 180 = 140 lb (D's weight)

74. (a) $\frac{21+7}{2}$ = 14 (larger)
(b) $\frac{21-7}{2}$ = 7 (smaller)

75. 1.99×5 - 7 = 2.95

76. 15×20 = 300
300÷(15 - 3) = 25 days

77. $24\frac{1}{2} - 12\frac{5}{8} = 11\frac{7}{8}$
$4\times11\frac{7}{8} = 44\frac{7}{2}$ = \$47.50

78. $\frac{1}{3}\times18 = 6$

79. $18\div\frac{3}{4} = 24$
18 + 6 = 24

80. B
2×2 = 4
3×4 + 2 = 14
4×14 = 56

81. $\frac{3}{8}$ = 3/8

82. 0.6÷4 = 0.15
0.15×50 = \$7.50

83. 33×0.15 = \$4.95
Ans = 33 minutes

84. $91 \div 35 = \frac{91}{35} = \frac{13}{5}$ = 2.6 hours = 2 hr & 36 min

85. $\frac{5000-4000}{5000}$ = 0.2 = 20%

86. 27÷3 = 9
8, 9, 10
8×9×10 = 720

87. $\frac{3}{2}$ or $1\frac{1}{2}$ = 1 1/2

88. 1*yx*9×9 = 9*xy*1
or
9*xy*1÷9 = 1*yx*9
What is the quotient in the long division of 9*xy*1÷9?
If $x = 9$, then $y = 1$, but 9911 is not divisible by 9.
Therefore, $x \neq 9$, thus the quotient of 9*xy*1÷9 must be 10*y*9. To be divisible by 9,
1+0+*y*+9 must be divisible by 9, so $y = 8$.
Ans = 1089

89. $\frac{35}{5}\times8 = 7\times8$ = \$56

90. 30

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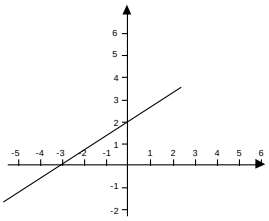
Answer Key

1. Rewrite it as the slope–intercept form:
   $y = \frac{2}{3}x + 2$
   The slope is $\frac{2}{3}$ and the y–intercept is 2. The graph is as below.



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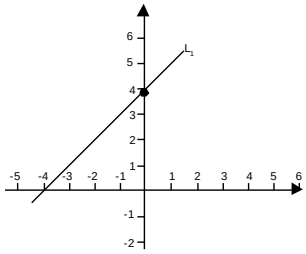

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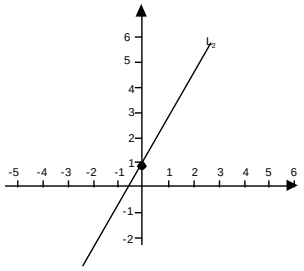

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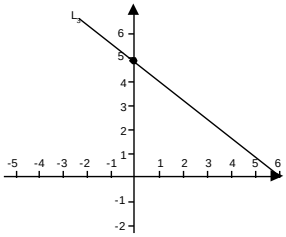

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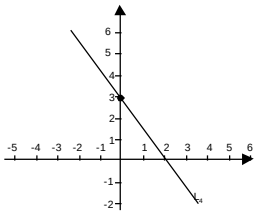

6. Using the slope–intercept form, we have
   $y = 4x + b$
   The value of b can be decided by "plugging" the point "into" the above equation,
   $(3) = 4(2) + b$
   thus we have
   $b = -5$
   Putting them together we conclude the linear equation:
   $y = 4x - 5$
7. $y = 4x + b \Rightarrow 7 = 4(2) + b \Rightarrow b = -1$
   Therefore, we have
   $y = 4x - 1$
8. $y = -3x + 2$
9. $y = 10x - 1$
10. $y = 3x - 10$
11. $y = mx - 3$
    $2 = m - 3$
    $m = 5$
    $y = 5x - 3$
12. slope=–2, y=–2x+9
13. slope=–5, y=–5x+6
14. slope=4, y=4x–5
15. slope=1, y=x–3
16. Note that the slope=3,
    so the equation must be like
    $y = 3x + b$ (Right?)
    What is b? The point (1, 5) must satisfy the equation, so we have
    $5 = 3(1) + b$
    $b = 2$
    We conclude that the equation must be
    $y = 3x + 2$
17. slope=–4, y=–4x+3
18. slope=2, y=2x–4
19. slope=–3/5, y–intercept=6/5
20. slope = $\frac{1}{2}$, y–intercept=2.5

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21. a) slope vector = [1, 6]

    b) normal vector = [6, -1]

    c) Lp: $6x - y = 10$

    d) Np: $x + 6y = 14$

    e) Lq: $6x - y = 125$

    f) Nq: $x + 6y = 64$

22. a) slope vector = [2, -5]

    b) normal vector = [5, 2]

    c) Lp: $5x + 2y = -5$

    d) Np: $2x - 5y = -2$

    e) Lq: $5x + 2y = 55$

    f) Nq: $2x - 5y = -7$

23. a) slope vector = [3, 1]

    b) normal vector = [1, -3]

    c) Lp: $x - 3y = -2$

    d) Np: $3x + y = 4$

    e) Lq: $x - 3y = -12$

    f) Nq: $3x + y = 24$

24. a) slope vector = [7, 2]

    b) normal vector = [2, -7]

    c) Lp: $2x - 7y = -12$

    d) Np: $7x + 2y = 11$

    e) Lq: $2x - 7y = -52$

    f) Nq: $7x + 2y = 136$

25. a) slope vector = [7, 5]

    b) normal vector = [5, -7]

    c) Lp: $5x - 7y = -10$

    d) Np: $7x + 5y = -14$

    e) Lq: $5x - 7y = -50$

    f) Nq: $7x + 5y = 226$

26. a) C = (4, 4)
    b) $r^2 = 10$
    c) $(x - 4)^2 + (y - 4)^2 = 10$
    d) AB: $3x - y = 8$
    e) Tc: $x + 3y = 16$
    f) Ta: $x + 3y = 6$
    g) Tb: $x + 3y = 26$

27. a) C = (4, 2)
    b) $r^2 = 13$
    c) $(x - 4)^2 + (y - 2)^2 = 13$
    d) AB: $3x - 2y = 8$
    e) Tc: $2x + 3y = 14$
    f) Ta: $2x + 3y = 1$
    g) Tb: $2x + 3y = 27$

28. a) C = (0, 8)
    b) $r^2 = 17$
    c) $(x - 0)^2 + (y - 8)^2 = 17$
    d) AB: $4x - y = -8$
    e) Tc: $x + 4y = 32$
    f) Ta: $x + 4y = 15$
    g) Tb: $x + 4y = 49$

29. a) C = (-1, 8)
    b) $r^2 = 25$
    c) $(x + 1)^2 + (y - 8)^2 = 25$
    d) AB: $4x - 3y = -28$
    e) Tc: $3x + 4y = 29$
    f) Ta: $3x + 4y = 4$
    g) Tb: $3x + 4y = 54$

30. a) C = (5, 8)
    b) $r^2 = 26$
    c) $(x - 5)^2 + (y - 8)^2 = 26$
    d) AB: $5x - y = 17$
    e) Tc: $x + 5y = 45$
    f) Ta: $x + 5y = 19$
    g) Tb: $x + 5y = 71$

31. a) Lp: $4x - y = -5$
    Lq: $4x - y = 35$
    b) Np: $x + 4y = 3$
    Nq: $x + 4y = 13$
    c) N/A

32. a) Lp: $5x - 9y = 28$
    Lq: $5x - 9y = 103$
    b) Np: $9x + 5y = 8$
    Nq: $9x + 5y = 143$
    c) N/A

33. a) Lp: $x - y = 5$
    Lq: $x - y = 25$
    b) Np: $x + y = 1$
    Nq: $x + y = 21$
    c) N/A

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34. a) Lp: $6x + y = -15$
    Lq: $6x + y = 75$
    b) Np: $x - 6y = -21$
    Nq: $x - 6y = -6$
    c) N/A
35. a) Lp: $9x + 10y = 39$
    Lq: $9x + 10y = 174$
    b) Np: $10x - 9y = -17$
    Nq: $10x - 9y = 133$
    c) N/A
36. a) $(x - 6)^2 + (y - 6)^2 = (10)^2$
    b) C = (6, 6)
    c) R = 10
37. a) $(x - 2)^2 + (y - 5)^2 = (2)^2$
    b) C = (2, 5)
    c) R = 2
38. a) $(x - 1.5)^2 + (y + 3)^2 = (5)^2$
    b) C = (1.5, -3)
    c) R = 5
39. a) $(x - 2)^2 + (y + 3.5)^2 = (3)^2$
    b) C = (2, -3.5)
    c) R = 3
40. a) $(x + 1.5)^2 + (y + 2.5)^2 = (3)^2$
    b) C = (-1.5, -2.5)
    c) R = 3
41. a) -6/5
    b) 6
    c) $y = (-\ 6/5)x + 6$
    d) 5/6
    e) $y - 5 = 5/6(x - 12)$
    f) $y = (5/6)x - 5$
42. a) -7/3
    b) -7
    c) $y = (-\ 7/3)x - 7$
    d) 3/7
    e) $y + 3 = 3/7(x + 14)$
    f) $y = (3/7)x + 3$
43. a) 3/4
    b) 6
    c) $y = (3/4)x + 6$
    d) -4/3
    e) $y + 4 = -4/3(x - 6)$
    f) $y = (-\ 4/3)x + 4$
44. a) 7/4
    b) 7
    c) $y = (7/4)x + 7$
    d) -4/7
    e) $y + 4 = -4/7(x - 14)$
    f) $y = (-\ 4/7)x + 4$
45. a) -2
    b) 4
    c) $y = (-\ 2)x + 4$
    d) 1/2
    e) $y - 1 = 1/2(x - 4)$
    f) $y = (1/2)x - 1$
46. -0.6, 0.09
47. 1.2, 0.36
48. $(2x + 7)^2$
49. $(3x - 8)^2$
50. 4, $(5x - 2)^2$
51. 75, –120, 30
52. 12, 84, 22
53. 27, –144, 3
54. 48, 168, 16
55. 12, 108, 20
56. 4, 1, –0.3, –30.36
57. 4, 1, 0.2, 1.84
58. 4, 1, 0.5, 29
59. 4, 4, –1, 26
60. 4, 2, 3, –26

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