

# Answer Key

- |                    |                    |                    |                     |
|--------------------|--------------------|--------------------|---------------------|
| 1. 11.1            | 6. 14.7            | 11. 5.8            | 16. 6.97            |
| 2. 12.3            | 7. 5.3             | 12. 4.7            | 17. 8.81            |
| 3. 12.8            | 8. 0.6             | 13. 2.7            | 18. 13.53           |
| 4. 11.9            | 9. 4.1             | 14. 4.4            | 19. 11.97           |
| 5. 14.8            | 10. 1              | 15. 13.84          | 20. 9.98            |
| 21. 39             |                    | 31. $\frac{2}{7}$  | 36. $\frac{3}{5}$   |
| 22. 68             | 26. 31             | 32. $\frac{6}{7}$  | 37. $\frac{3}{4}$   |
| 23. 31             | 27. 42             | 33. $\frac{7}{9}$  | 38. $\frac{2}{3}$   |
| 24. 32             | 28. 38             | 34. $\frac{4}{5}$  | 39. $\frac{7}{10}$  |
| 25. 74             | 29. 64             | 35. $\frac{4}{7}$  | 40. $\frac{5}{7}$   |
|                    | 30. 46             |                    |                     |
| 41. $\frac{2}{9}$  | 46. $\frac{5}{6}$  | 51. $7\frac{1}{6}$ | 56. $2\frac{2}{9}$  |
| 42. $\frac{3}{7}$  | 47. $\frac{4}{9}$  | 52. $7\frac{5}{6}$ | 57. $6\frac{1}{8}$  |
| 43. $\frac{3}{10}$ | 48. $\frac{5}{9}$  | 53. $3\frac{5}{7}$ | 58. $5\frac{7}{9}$  |
| 44. $\frac{6}{11}$ | 49. $\frac{7}{8}$  | 54. $4\frac{4}{7}$ | 59. $6\frac{2}{9}$  |
| 45. $\frac{2}{5}$  | 50. $\frac{5}{8}$  | 55. $4\frac{3}{8}$ | 60. $4\frac{1}{11}$ |
| 61. $6\frac{3}{4}$ | 66. $6\frac{2}{4}$ | 71. 9              |                     |
| 62. $3\frac{2}{6}$ | 67. $4\frac{1}{6}$ | 72. 20             | 76. 40              |
| 63. $3\frac{2}{8}$ | 68. $3\frac{2}{8}$ | 73. 6              | 77. 15              |
| 64. $3\frac{2}{9}$ | 69. $4\frac{3}{9}$ | 74. 6              | 78. 6 & 2 (R)       |
| 65. $3\frac{3}{6}$ | 70. $4\frac{1}{6}$ | 75. 24             | 79. 480             |
|                    |                    |                    | 80. 1 & 8 (R)       |

# MAP 239+ (T3) Issue 8

- |          |                       |                       |          |
|----------|-----------------------|-----------------------|----------|
| 81. 98   | 86. 96                | 91. 5                 | 96. 5    |
| 82. 43.2 | 87. 115               | 92. 66                | 97. 74.7 |
| 83. 48   | 88. 7 & 1 (Remainder) | 93. 7 & 4 (Remainder) | 98. 2    |
| 84. 51   | 89. 105               | 94. 4                 | 99. A    |
| 85. 270  | 90. 17.5              | 95. 210               | 100. 25  |

101. C  
 102. D  
 103.  $\frac{2}{11} = 2/11$

104. Design 1: 5  
 Design 2: 8 (= 5 + 3)  
 Design 3: 13 (= 8 + 5)  
 Design 4: 20 (= 13 + 7)  
 Ans = 20

105. A  
 106. C  
 107. B (glass) & C (mug) & A (jar)

	Glass	Mug	Jar
Lemonade	x	✓	x
Milk	✓		x
Water			✓

108.  $4 \times 240 = \underline{960}$

109. B  
 110. B  
 111. B  
 112. A  
 113. B  
 114.  $3 \times 2 \times 3 = 18$   
 115.  $2 \times 25 = 50$   
 116.  $3 \times 8 = 24$   
 117. 2.5

# Answer Key

- |                                  |                                  |                     |
|----------------------------------|----------------------------------|---------------------|
| 1. $1\frac{1}{2}$                | 6. $4\frac{4}{9}$                | 16. 8.8             |
| 2. $\frac{18}{5} = 3\frac{3}{5}$ | 7. $8\frac{8}{9}$                | 11. 6.3             |
| 3. $6\frac{2}{3}$                | 8. $\frac{33}{4} = 8\frac{1}{4}$ | 12. 8.8             |
| 4. $6\frac{5}{12}$               | 9. $1\frac{4}{5}$                | 13. 5.4             |
| 5. $\frac{15}{2} = 7\frac{1}{2}$ | 10. 7                            | 14. 5.6             |
|                                  |                                  | 15. 7.2             |
| 21. 14                           |                                  | 31. $\frac{1}{4}$   |
| 22. 1.5                          | 26. 9                            | 32. $\frac{3}{8}$   |
| 23. 16                           | 27. 12                           | 33. $\frac{3}{5}$   |
| 24. 17                           | 28. 18                           | 34. $\frac{10}{21}$ |
| 25. 18                           | 29. 21                           | 35. $\frac{11}{72}$ |
|                                  | 30. 24                           | 36. $\frac{15}{56}$ |
|                                  |                                  | 37. $\frac{5}{14}$  |
|                                  |                                  | 38. $\frac{5}{6}$   |
|                                  |                                  | 39. $\frac{7}{36}$  |
|                                  |                                  | 40. $\frac{9}{56}$  |
| 41. 1000, 10000                  | 46. 6000, 60000                  | 51. 556             |
| 42. 2000, 20000                  | 47. 7000, 70000                  | 52. $\frac{9}{16}$  |
| 43. 3000, 30000                  | 48. 8000, 80000                  | 53. 21              |
| 44. 4000, 40000                  | 49. 9000, 90000                  | 54. 0.12            |
| 45. 5000, 50000                  | 50. 100, 1000                    | 55. 6000            |
|                                  |                                  | 56. .3              |
|                                  |                                  | 57. 2.25            |
|                                  |                                  | 58. 6,000           |
|                                  |                                  | 59. .005            |
|                                  |                                  | 60. F               |

# MAP 249+ (T3) Issue 8

- |  |  |   |                           |
|--|--|---|---------------------------|
| 61. 211  | 66. .02  | 71. \$1   | 76. 8                     |
| 62. 80%  | 67. 88.3                                       | 72. 10 hr   | 77. \$12.15               |
| 63. 12   | 68. {1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84} | 73. \$80  | 78. 6 (Gerald) 12 (Frank) |
| 64. 1.24   | 69. $\Delta = 3$                               | 74. \$95  | 79. 6 (Jon) 12 (Tom)      |
| 65. 15.92  | 70. 75%  | 75. \$25  | 80. 12 (Jon) 18 (Ken)     |
| <br>   |  |   |                           |
| 81. 200 mi   | 86. 12 (pets)                                  | 91. 25%   | 96. 22                    |
| 82. 114  | 87. 50 sq. ft.                                 | 92. (a) 25% (b) 75%   | 97. \$341                 |
| 83. \$2.50   | 88. \$0.75                                     | 93. (a) 60% (b) 40%   | 98. 15                    |
| 84. <u>240 books</u>   | 89. 20   | 94. <u>22%</u>  | 99. 22                    |
| 85. \$10   | 90. \$0.08                                     | 95. 37.5%   | 100. 72 lb                |
| <br>   |  |   |                           |
| 101. $102 - 85 = 17$<br>$\frac{17}{85} = \frac{1}{5} = 0.2 = 20\%$                           |  | 106. $240 - 192 = 48$<br>$\frac{48}{192} = \frac{1}{4} = 25\%$                          |                           |
| 102. $20\% \times 50 = 0.2 \times 50 = 10$   |  | 107. $12.5\% = \frac{1}{8}$<br>$192 \times 1\frac{1}{8} = 192 + 24 = \underline{\$216}$ |                           |
| 103. (a) $\frac{16}{25} = \underline{64\% (B)}$<br>(b) $\frac{9}{25} = \underline{36\% (G)}$ |  | 108. $50 \times 5\% = \$2.50$   |                           |
| 104. 80%   |  | 109. $\frac{45-40}{40} = \frac{1}{8} = 12.5\%$  |                           |
| 105. $\frac{2}{3} = 0.6\overline{6} = 66\frac{2}{3}\% = 66\frac{2}{3}\%$ (precise percent)   |  | 110. $12 \times 3 \times 1.05 = 36 \times 1.05 = \$37.80$                               |                           |

# Answer Key

- |   |                       |   |   |
|---|-----------------------|---|---|
| 1. $9\frac{1}{3}$   | 6. $77\frac{6}{35}$   | 11. 529   | 16. 1764                                    |
| 2. $17\frac{1}{7}$  | 7. $77\frac{6}{35}$   | 12. 1849  | 17. 2025                                    |
| 3. $35\frac{2}{15}$   | 8. $109\frac{1}{35}$  | 13. 2809  | 18. 3844                                    |
| 4. $38\frac{2}{35}$   | 9. $109\frac{2}{35}$  | 14. 2704  | 19. 5184                                    |
| 5. $38\frac{2}{35}$   | 10. $117\frac{9}{35}$ | 15. 1089  | 20. $\frac{1}{12}$                          |
| 21. $\frac{106}{135}$   | 26. $\frac{41}{216}$  | 31. 0.15  | 36. 16                                      |
| 22. $\frac{13}{36}$   | 27. $\frac{47}{90}$   | 32. 0.16  | 37. 8.75                                    |
| 23. $\frac{2}{135}$   | 28. $\frac{59}{225}$  | 33. 35  | 38. 0.4                                     |
| 24. $\frac{25}{96}$   | 29. $\frac{71}{360}$  | 34. 0.3   | 39. 0.125                                   |
| 25. $\frac{31}{45}$   | 30. 0.8               | 35. 37.5  | 40. 0.045                                   |
| 41. 0.32  | 46. 0.24              | 51. 5600  | 56. 0.0042                                  |
| 42. 1500  | 47. 0.5               | 52. 7   | 57. 0.36                                    |
| 43. 0.005   | 48. 4800              | 53. 2,500   | 58. 0.001                                   |
| 44. 0.36  | 49. 0.024             | 54. 0.014   | 59. 0.02                                    |
| 45. 3600  | 50. 30,000            | 55. 2   | 60. 1                                       |
| 61. 280   | 66. 42,000            | 71. 18 (ft <sup>2</sup> )   | 76. 7500 sq m                               |
| 62. 800   | 67. 0.012             | 72. 21  | 77. 24 (cm)                                 |
| 63. 0.02  | 68. 0.012             | 73. 250.  | 78. 18 m                                    |
| 64. 0.049   | 69. 0.018             | 74. <span style="border: 1px solid black; padding: 0 2px;">350</span> | 79. 12 (km)                                 |
| 65. 24  | 70. 12 (tiles)        | 75. 6000 m <sup>2</sup>   | 80. 4500 (cm <sup>3</sup> )                 |
| 81. $40 \times 20 \times 25 = 20,000$                                 | 86. 24 sq. units.     | 91. 160 (min)   | 96. $2 \times 5 \times 3 = 30 \text{ in}^3$ |
| 82. <span style="border: 1px solid black; padding: 0 2px;">184</span> | 87. 18 sq. units.     | 92. 15  | 97. 62 in <sup>2</sup>                      |
| 83. <span style="border: 1px solid black; padding: 0 2px;">104</span> | 88. 18 sq. units.     | 93. $9 \times 10 \times 5 = 450$                                      | 98. 78                                      |
| 84. <span style="border: 1px solid black; padding: 0 2px;">100</span> | 89. 20 sq. units.     | 94. 69 min  | 99. 20%                                     |
| 85. 4 m <sup>2</sup> .  | 90. 176%              | 95. Ann   | 100. 9 combinations                         |

# MAP 259+ (T3) Issue 8

101.  $56 \div 80 = 0.7 = 70\%$

102. \$46

103. \$30

104.  $40 \times 15\% = \$6$

105.  $700 + 700 \times 20\% = 700 + 140 = 840$

# Answer Key

1.  $14x^3 + 7x - 11$   
 $-11 + 7x + 14x^3$
2.  $17x^3 + 17x^2 - 25$   
 $-25 + 17x^2 + 17x^3$
3.  $16x^3 + 19x^2 - 7$   
 $-7 + 19x^2 + 16x^3$
4.  $-7x^4 + 2x^2 + 4.5$   
 $4.5 + 2x^2 - 7x^4$
5.  $11.5x^3 + 11.5x - 6.5$   
 $-6.5 + 11.5x + 11.5x^3$
6.  $-13x^3 + 6.5x^2 - 5$   
 $-5 + 6.5x^2 - 13x^3$
7.  $10x^4 + 7x^3 + 9.5x - 7.5$   
 $-7.5 + 9.5x + 7x^3 + 10x^4$
8.  $12.5x^4 - 3x^3 + 16x + 6$   
 $6 + 16x - 3x^3 + 12.5x^4$
9.  $x^3 + 7x^2 - 5.5x + 16.5$   
 $16.5 - 5.5x + 7x^2 + x^3$
10.  $9x^4 + 1.5x^3 + 13x^2 - 5x + 22$   
 $22 - 5x + 13x^2 + 1.5x^3 + 9x^4$
11.  $7x^4 - 10x^3 - 15x^2$
12.  $12x^3 + 12x^2 + 8x + 12$
13.  $5x^4 - 3x^3 - 7x^2$
14.  $6x^3 + x^2 + x - 2$
15.  $18x^2 - 9x + 3$
16.  $15x^2 - 14x + 8$
17.  $8x^2 + 2x - 6$
18.  $-4x^3 - 2x^2 - 12x$
19.  $4x^3 + 16x^2 + 10x - 4$
20.  $14x^3 + 14x^2 + 10x$
21.  $32x^3 - 4x$
22.  $4x^4 + 6x^2 - 2x$
23.  $4x^4 - 6x^3 + 12x^2$
24.  $18x^3 + 14x^2 + 10x$
25.  $6x^4 - 9x^3 - 12x^2 - 3x$
26.  $2x^3 + 2x^2 - 4x + 6$
27.  $4x^4 - 4x^3 - 2x^2 - 6x$
28.  $-36x^2 + 3x + 13$
29.  $-2x^4 - 6x^3 - 4x^2 + 4x + 4$
30.  $9x^3 + 10x^2 - 4x - 6$
31.  $x^2 + 2x - 24$
32.  $x^2 - 5x + 4$
33.  $x^2 + 3x - 28$
34.  $\frac{1}{2}x^2 + 2x - 16$
35.  $-0.5x^2 + 3x - 4$
36.  $-6x^2 + 12x + 48$
37.  $36x^2 - 96x + 15$
38.  $15x^2 + 85x + 120$
39.  $4.2x^2 - 9.1x + 4.2$
40.  $-7.5x^2 - 14x - 2.5$
41.  $(x + 2)(x + 3)$
42.  $(x + 2)(x + 7)$
43.  $(x + 4)(x + 7)$
44.  $(2x + 1)(3x + 2)$
45.  $(x - 9)(3x - 4)$
46.  $(x - 9)(x - 1)$
47.  $(x - 2)(x + 5)$
48.  $(x + 8)(x - 5)$
49.  $(x - 9)(x + 2)$
50.  $(x + 4)(x - 5)$
51.  $33x + 14$
52.  $21x + 26$
53.  $10$
54.  $4x^6$
55.  $12x^2$
56.  $6$
57.  $-11x$
58.  $-7x^3$
59.  $8x^2 - 3x + 18$
60.  $-2x^2 + 3x - 4$
61.  $5x^2 + 10x + 2$
62.  $6x + 3 - 3x^2 + 12x + 6$   
 $= -3x^2 + 18x + 9$
63.  $2(3x^2 - 4x + 7) + 3(5x^2 + x + 11)$   
 $= 6x^2 - 8x + 14 + 15x^2 + 3x + 33$   
 $= 21x^2 - 5x + 47$
64.  $3(2x^2 + 3) + 2(-4x^2 + 3x - 7)$   
 $= 6x^2 + 9 - 8x^2 + 6x - 14$   
 $= -2x^2 + 6x - 5$
65.  $\frac{1}{2}(4x^3 + 8) + \frac{1}{3}(-6x + 3) - \frac{1}{5}(2x^3 - 20x^2 + 15)$   
 $= 2x^3 + 4 - 2x + 1 - 0.4x^3 + 4x^2 - 3$   
 $= 1.6x^3 + 4x^2 - 2x + 2$

# MAP 269+ (T3) Issue 8

66.  $1.1(4x^3 + 7x + 8) - 3.2(4x^3 - 2x^2 + 3)$   
 $= 4.4x^3 + 7.7x + 8.8 - 12.8x^3 + 6.4x^2 - 9.6$   
 $= -8.4x^3 + 6.4x^2 + 7.7x - 0.8$
67.  $0.\overline{076923}$

Excel spread sheet:

	13
0	1
7	9
69	3
23	1

68.  $0.\overline{1}$
69.  $0.\overline{012345679}$
70. 10
71.  $0.\overline{037}$
72.  $0.\overline{012345679}$
73.  $0.\overline{0588235294117647}$

Excel spread sheet:

	17
0	1
5	15
88	4
23	9
52	16
94	2
11	13
76	8
47	1

74.  $P = 2R$   
 $R = 3S$   
 $P:R:S = 6:3:1$   
 $(P+S):R = 7:3$   
 $R = \frac{3}{7} \times 140 = \$60$
75. C  
 $3 + 5 = 8$   
 $8 \div 3 = 2\frac{2}{3}$   
 $3 - 2\frac{2}{3} = \frac{1}{3}$  (contribution from the first fisherman)  
 $5 - 2\frac{2}{3} = 2\frac{1}{3}$  (contribution from the second fisherman)  
 $\frac{1}{3} : 2\frac{1}{3} = 1:7$   
 \$1 to the first, and \$7 to the second fisherman.
76.  $20\% = \frac{1}{5} = 1:5$   
 boys:girls = 1:5  
 boys =  $\frac{1}{6}$   
 girls =  $\frac{5}{6}$   
 $\frac{5}{6}(30) = 25$  (girls)

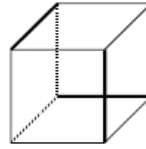
77.  $72 \div 3 = 24$   
 $96 \div 24 = 4$  (gal)  
 $18 \times \frac{4}{5} = \$14.40$

78.

See the table below.

Sleep	School	Home work	Activities
8	6	3	7
$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{8}$	7/24
33.3%	25%	12.5%	29.2%

79.  $3.25 \div 0.25 = 13$   
 $13 \times 50 = 650 = 10 \text{ min \& } 50 \text{ sec}$
80. 1 foot = 12 inches  
 8 feet = 96 inches  
 $96 \div 10 = 9.6$  (hr)  
 $8 \div 3 = 2R2$   
 $30 \times 2 = 60 \text{ min} = 1 \text{ hr}$  (Charlie rests twice.)  
 $9.6 + 1 = 10.6 \text{ hr} = 10 \text{ hr } 36 \text{ min}$
81. B  
 If the heavy black lines represent the color red, every face will have exactly one red edge. So the smallest number of red edges is 3.



82.  $25^2 = 20^2 + 15^2$
83.  $6 \times 5 \div 2 = 15$  chords
84.  $60 + 60 \times 5\% = 60 + 3 = \boxed{\$63}$
85.  $\frac{500000}{100} \times 0.36 \times 5$   
 $= 5000 \times 0.36 \times 5$  (cancellation)  
 $= 50 \times 36 \times 5$  (moving decimal)  
 $= 10 \times 180 \times 5$   
 $= 1800 \times 5$   
 $= \$9000$
86. (a)  $0.2 \times 12,000 = 2,400$   
 (b)  $12,000 + 2,400 = 14,400$
87.  $120 \times (1 - 0.2) = \$96$
88.  $1\frac{1}{3} = \frac{4}{3}$   
 $(\frac{4}{3})^3 = \frac{64}{27}$
89. A  
 $5 + 3 = 8$  (points won by Mary)  
 $8 \div 2 = 4$  (games won by Mary)  
 $4 + 3 = 7$  (total games)
90. 1 foot = 12 inches  
 8 feet = 96 inches  
 $96 \div 10 = 9.6$  (hr)  
 $8 \div 3 = 2R2$   
 $30 \times 2 = 60 \text{ min} = 1 \text{ hr}$  (Charlie rests twice.)  
 $9.6 + 1 = 10.6 = 10 \text{ hr \& } 36 \text{ min}$

## MAP 269+ (T3) Issue 8

91.  $\frac{3}{4} \times 72 = 54$  (one way)

$54 \times 2 = 108$  (round trip)

$\frac{108}{2\frac{1}{4}} = \underline{48 \text{ mph}}$

92.  $1 + 2 + 1 = 4 = 2^2$

$1 + 2 + 3 + 2 + 1 = 9 = 3^2$

$1 + 2 + 3 + 4 + 5 + \dots + 15 + 14 + 13 + \dots + 3$

$+ 2 + 1 = 15^2$

$N = 15$

93. C

$1 - 20\% = 0.8$

2<sup>nd</sup> time:  $0.8 \times 0.8 = 0.64$

3<sup>rd</sup> time:  $0.8 \times 0.64 = 0.512$

4<sup>th</sup> time:  $0.8 \times 0.512 = 0.4096$

# Answer Key

1. a)  $-2/9$   
b)  $2x + 9y = -16$   
c)  $2x + 9y = 25$   
d)  $9x - 2y = 55.5$   
e)  $9x - 2y = -72$
2. a)  $-3/2$   
b)  $3x + 2y = -12$   
c)  $3x + 2y = 0$   
d)  $2x - 3y = 24.5$   
e)  $2x - 3y = 5$
3. a)  $-7/5$   
b)  $7x + 5y = -18$   
c)  $7x + 5y = 12$   
d)  $5x - 7y = 114$   
e)  $5x - 7y = -34$
4. a)  $-10/3$   
b)  $10x + 3y = -24$   
c)  $10x + 3y = -30$   
d)  $3x - 10y = 298$   
e)  $3x - 10y = -29$
5. a)  $-4$   
b)  $4x + y = -20$   
c)  $4x + y = -6$   
d)  $x - 4y = 131$   
e)  $x - 4y = -5$
6. a)  $-4, +4$   
b)  $0$   
c)  $0, -24$   
d)  $1.5$   
e)  $1.5, -4, +4$   
f)  $1.5, 0, -24$   
g)  $1.5, 0, -24$
7. a)  $+7, -3$   
b)  $-2$   
c)  $-2, 75$   
d)  $-3$   
e)  $-3, +7, -3$   
f)  $-3, -12, 63$   
g)  $-3, -2, 75$
8. a)  $+5, -3$   
b)  $-1$   
c)  $-1, -48$   
d)  $3$   
e)  $3, +5, -3$   
f)  $3, 6, -45$   
g)  $3, -1, -48$
9. a)  $+4, -2$   
b)  $-1$   
c)  $-1, -31.5$   
d)  $3.5$   
e)  $3.5, +4, -2$   
f)  $3.5, 7, -28$   
g)  $3.5, -1, -31.5$
10. a)  $-4, +2$   
b)  $1$   
c)  $1, -27$   
d)  $3$   
e)  $3, -4, +2$   
f)  $3, -6, -24$   
g)  $3, 1, -27$
11.  $14x^3 + 7x - 11$   
 $-11 + 7x + 14x^3$
12.  $17x^3 + 17x^2 - 25$   
 $-25 + 17x^2 + 17x^3$
13.  $16x^3 + 19x^2 - 7$   
 $-7 + 19x^2 + 16x^3$
14.  $-7x^4 + 2x^2 + 4.5$   
 $4.5 + 2x^2 - 7x^4$
15.  $11.5x^3 + 11.5x - 6.5$   
 $-6.5 + 11.5x + 11.5x^3$
16.  $-13x^3 + 6.5x^2 - 5$   
 $-5 + 6.5x^2 - 13x^3$
17.  $10x^4 + 7x^3 + 9.5x - 7.5$   
 $-7.5 + 9.5x + 7x^3 + 10x^4$
18.  $12.5x^4 - 3x^3 + 16x + 6$   
 $6 + 16x - 3x^3 + 12.5x^4$
19.  $x^3 + 7x^2 - 5.5x + 16.5$   
 $16.5 - 5.5x + 7x^2 + x^3$
20.  $9x^4 + 1.5x^3 + 13x^2 - 5x + 22$   
 $22 - 5x + 13x^2 + 1.5x^3 + 9x^4$
21.  $x^2, x, 1$
22.  $15$
23.  $31$
24.  $14$
25.  $15x^2 + 31x + 14$
26.  $20x^2$
27.  $60x^2$
28.  $12x$
29.  $22x$

# MAP 279+ (T3) Issue 8

30.  $x^2 + x - 6$

	$x$	$- 2$
$\times$ )	$x$	$+ 3$
	<hr style="width: 100%;"/>	
	$3x$	$- 6$
	$x^2$	$-2x$
	<hr style="width: 100%;"/>	
	$x^2$	$+x$
		$- 6$

31.  $x^2 - 3x - 18$

32.  $2x^2 + 12x + 16$

33.  $x^2 - 13x + 36$

34.  $x^2 + 7x + 12$

35.  $6x^2 - 2x - 20$

36.  $2x^2 - x - 10$

37.  $14x^2 + 9x + 1$

38.  $24x^2 + 11x + 1$

39.  $24x^2 + 28x + 8$

40.  $24x^2 + 10x + 1$

41.  $(x + 6)(x + 3)$

42.  $(x + 2)(x + 10)$

43.  $(x - 5)(x - 2)$

44.  $(x - 8)(x - 3)$

45.  $(x - 4)(x + 7)$

46.  $(x - 1)(x + 7)$

47.  $(x - 6)(x + 2)$

48.  $(x - 3)(x + 2)$

49.  $(x + 1)(x + 5)$

50.  $(x + 4)(x + 5)$

51.  $(x + 3)(x + 9)$

52.  $(x - 4)(x - 3)$

53.  $(x - 6)(x - 5)$

54.  $(x - 1)(x + 4)$

55.  $(x - 7)(x + 3)$

56.  $(3x + 4)(x + 4)$

57.  $(3x + 2)(3x - 5)$

58.  $(2x - 5)(x - 3)$

59.  $(x + 7)(3x - 4)$

60.  $(3x - 2)(3x - 1)$

61. A

62. D

63. B

64. D

65. C

$$8x^2 - 16x + 6x^2 - 2x = 14x^2 - 18x$$

66. A

67. B

68. A

69. B

70. C

71. B

72. B

73. A

74. B

75. D

76. D

77. C

78. 18

79. A

80. C

# Answer Key

1.  $30y^4z^5$
2.  $36x^5yz^4$
3.  $4x^2z^2$
4.  $6x^5y^3z^3$
5.  $5\frac{y^2z}{x}$
6.  $4x^2y^2z^2$
7.  $1\frac{1}{2}x^2z$
8.  $10x$
9.  $12x^4y^2z^2$
10.  $3y^2z$
11. 512
12. 121
13. 1331
14. 144
15. 169
16. 196
17. 225
18. 289
19. 324
20. 400
21. 2
22. 2
23. 2
24. 3
25. 4
26. 2
27. 3
28. 2
29. 3
30. 2
31.  $\frac{1}{3} + \frac{3}{1} = 3\frac{1}{3}$
32.  $\frac{9}{7} + \frac{1}{2} = 1\frac{11}{14}$
33.  $\frac{3}{1} + \frac{1}{3} = 3\frac{1}{3}$
34.  $\frac{10}{7} + \frac{1}{2} + \frac{2}{3} = 2\frac{25}{42}$
35.  $\frac{7}{3} + \frac{1}{3} + \frac{1}{3} = 3$
36.  $2(3x + 4)(4x - 3)$
37.  $-(8x - 7)(6x + 1)$
38.  $-2(x - 3)(8x + 5)$
39.  $2(8x + 3)(6x - 1)$
40.  $4(5x + 3)(3x - 4)$
41.  $x - 1$   
 $3x^2 - 5x + 2 =$   
 $(x - 1)(3x - 2)$   
 $4x^2 - 7x + 3 =$   
 $(x - 1)(4x - 3)$
42.  $x + 2$   
 $2x^2 + 7x + 6 =$   
 $(x + 2)(2x + 3)$   
 $x^2 + 6x + 8 =$   
 $(x + 2)(x + 4)$
43.  $x + 1$   
 $4x^2 + 7x + 3 =$   
 $(x + 1)(4x + 3)$   
 $2x^2 + 3x + 1 =$   
 $(x + 1)(2x + 1)$
44.  $x - 2$   
 $x^2 - 3x + 2 =$   
 $(x - 2)(x - 1)$   
 $3x^2 - 7x + 2 =$   
 $(x - 2)(3x - 1)$
45.  $x + 2$   
 $x^2 + 4x + 4 =$   
 $(x + 2)(x + 2)$   
 $x^2 + 3x + 2 =$   
 $(x + 2)(x + 1)$
46.  $5(4x - 5) = 3(7x - 3)$   
 $20x - 25 = 21x - 9$   
 $x = -16$
47.  $9n - (n - 6) = -34$   
 $8n = -40$   
 $n = -5$
48.  $-2(x + 9) = x - 5$   
 $-2x - 18 = x - 5$   
 $3x = -13$   
 $x = \frac{-13}{3}$
49.  $x - 2(x + 5) = 3x$   
 $4x = -10$   
 $x = -2.5$
50. Assumption of non-zero denominator:  $x \neq -6$  or  $3$ .  
 Let's multiply both sides by  $(x + 6)(x - 3)$ .  
 $5(x - 3) = 6(x + 6)$   
 $x = -51$

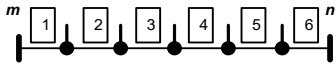
# Advanced Math (T3) Issue 8

51. Assumption of non-zero denominator:  $x \neq 0$ .  
 Multiply both sides by  $27x$ .  
 $x(x + 6) = 27$   
 $x^2 + 6x - 27 = 0$   
 $(x + 9)(x - 3) = 0$   
 $x = -9$  or  $3$  (valid)
52.  $-85/18$
53.  $-3$
54.  $x - 3(x - 6) = 6$   
 $-2x = -12$   
 $x = 2$
55. Multiply both sides by  $(x-2)(x+1)$ .  
 $3(x+1) = 4(x-2)$   
 $3x + 3 = 4x - 8$   
 $x = 11$
56.  $4$  or  $\frac{1}{4}$
57.  $6$
58. Assumption of non-zero denominator:  $x \neq 2$  or  $-1$ .  
 Multiply both sides by  $(x - 2)(x + 1)$ .  
 $3(x + 1) = 4(x - 2)$   
 $x = \boxed{11}$
59. Assumption of non-zero denominator:  $x \neq 5$  or  $-9$ .  
 $-2(x + 9) = x - 5$   
 $-2x - 18 = x - 5$   
 $3x = -13$   
 $x = \frac{-13}{3}$
60. Assumption of non-zero denominator:  $x \neq 0$ .  
 Multiply both sides by  $10x$ .  
 $(3x - 7)x = 20$   
 $3x^2 - 7x = 20$   
 $3x^2 - 7x - 20 = 0$   
 $(3x + 5)(x - 4) = 0$   
 $x = \boxed{\frac{5}{3}}$  or  $4$
61.  $\frac{1}{x} = \frac{2}{8}$   
 $\frac{1}{x} = \frac{1}{4}$   
 $x = \boxed{4}$
62.  $x^2 = 2(x + 4)$   
 $x^2 - 2x - 8 = 0$   
 $(x - 4)(x + 2) = 0$   
 $x = \boxed{4}$  or  $-2$
63.  $x^2 = 5x - 6$   
 $x^2 - 5x + 6 = 0$   
 $(x - 2)(x - 3) = 0$   
 $x = \boxed{2}$  or  $3$
64.  $-3(x - 3) = 2x^2$   
 $2x^2 + 3x - 9 = 0$   
 $(2x - 3)(x + 3) = 0$   
 $x = \boxed{\frac{3}{2}}$  or  $-3$
65.  $\frac{2x-3}{x} = \frac{x}{4}$   
 $x^2 = 8x - 12$   
 $x^2 - 8x + 12 = 0$   
 $(x - 2)(x - 6) = 0$   
 $x = \boxed{2}$  or  $6$
66.  $\frac{8}{3}$
67.  $\frac{7}{9}$
68.  $\frac{5}{8}$
69.  $\frac{7}{4}$
70.  $\frac{9}{5}$
71.  $\frac{6}{5}$
72.  $\frac{7}{6}$
73.  $\frac{9}{8}$
74.  $\frac{6}{5}$
75.  $\frac{7}{2}$
76.  $(A+B+C)^2 = (A+[B+C])^2$   
 $= A^2 + 2A[B + C] + [B + C]^2$   
 $= A^2 + 2AB + AC + B^2 + 2BC + C^2$   
 $= A^2 + B^2 + C^2 + 2AB + 2BC + 2AC$
77. Easy
78. Easy
79. Easy
80. Use your imagination, the answer is  
 $A^3 + B^3 + C^3 + 3(A^2B + AB^2 + B^2C + BC^2 + C^2A + CA^2)$
81. Since it has a root  $-1$ ,  $-1$  should satisfy the equation, thus we have  $1 - a + 6 = 0 \Rightarrow a = 7$ .  
 Once we know  $a$ , we have  $x^2 + 7x + 6 = (x+1)(x+6) = 0 \Rightarrow$  We have another root  $-6$ .
82. By adding the two equations, we have  $2a = 6c \Rightarrow a = 3c$ . Thus, substitute it back to the first equation, we have  $3c + 3b = 5c \Rightarrow 3b = 2c, b = \frac{2}{3}c$ . Thus,  $a:b:c = 3:\frac{2}{3}:1 = 9:2:3$ .
83.  $(\frac{1}{2})^n$
84.  $(\frac{1}{2})^n$
85.  $(\frac{1}{2})^n$  (no-head means all tail)
86.  $1 - (\frac{1}{2})^n$  ("at least one head" and "all tails" are complementary events. Thus,  
 $P(\text{at least one head})$   
 $= 1 - P(\text{all tails})$   
 $= 1 - (\frac{1}{2})^n$
87.  $f(x) = a(x-1.5)(x+2.5)$ . Since  $f(1) = 3$ , it leads to  
 $a(-.5)(3.5) = 7 \Rightarrow a = -4$ .  
 Thus,  $f(10) = -4(8.5)(12.5) = -425$ .

# Advanced Math (T3) Issue 8

88. The pure alcohol in the original solution is  $rs$  quarts. The new mixture has  $rs + t$  quarts of pure alcohol. The total solution is  $r + s$  quarts. The concentration is  $\frac{rs+t}{r+s}$ .

89. 9:49



90. There are 6 steps between  $m$  and  $n$ . Thus, the length of each step is  $\frac{1}{6}(n-m)$ . The five numbers are  $\frac{5m+n}{6}$ ,  $\frac{4m+2n}{6}$ ,  $\frac{3m+3n}{6} = \frac{m+n}{2}$ ,  $\frac{2m+4n}{6}$  and  $\frac{m+5n}{6}$ .

91. 4

92. 5

93. Let  $x = 2^y$   
 $2^{2^y} = (2^y)^{32} = 2^{32y}$   
 $2^y = 2^{5y}$   
 $2^{y-5} = y$   
 $y = 8$   
 $x = 2^8$

94. C

$$f(x) = -x + 2$$

$$g(x) = x^2 - 1$$

Find the intersection:  $-x + 2 = x^2 - 1$

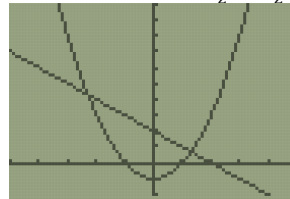
$$x^2 + x = 3$$

$$x^2 + x + \frac{1}{4} = 3 + \frac{1}{4} = \frac{13}{4}$$

$$\left(x + \frac{1}{2}\right)^2 = \frac{13}{4}$$

$$b = \frac{\sqrt{13}}{2} - \frac{1}{2}$$

$$c = -b + 2 = -\frac{\sqrt{13}}{2} + \frac{1}{2} + 2 = -\frac{\sqrt{13}}{2} + \frac{5}{2} > 0$$



95.  $2x^2y(x + 3)$