

Answer Key

1. $x = -1$
 2. $x = -2$
 3. $x = 2$
 4. $x = 3$
 5. $x = 2$
 6. $x = 4$
 7. $3/2$
 8. 0.4
 9. 0.625
 10. $-\frac{2}{3}$
 11. 1.2×10^{15}
 12. 1.4×10^{12}
 13. 1.6×10^{13}
 14. 1.8×10^{16}
 15. 2×10^{11}
 16. 2.2×10^8
 17. 2.4×10^{12}
 18. 1.8×10^{11}
 19. 2.8×10^{11}
 20. 3×10^{12}
 21. 7.5×10^{-3}
 22. 8.75×10^2
 23. 8×10^3
 24. 1.125×10^3
 25. 1.25×10^{-6}
 26. 1.3×10^0
 27. 1.5×10^{-4}
 28. 2×10^6
 29. 1.8×10^4
 30. 1.6×10^4
 31. $x^2 + 7x - 18$
 32. $x^2 + 2x - 8$
 33. $x^2 + 4x - 12$
 34. $x^2 - x - 2$
 35. $x^2 + x - 6$
 36. $x^2 - x - 2$
 37. $9x^2 - 3x - 2$
 38. $3x^2 - 31x + 36$
 39. $a = 2, b = 1, k = 8$
 40. $a = 3, b = 5, k = 20$
 41. $a^2 + 2a + 1$
 42. $a^2 + 4a + 4$
 43. $a^2 + 2ab + b^2$
 44. $a^2 + 4ab + 4b^2$
 45. $a^2 - 6ab + 9b^2$
 46. $a^2 - 2 + \frac{1}{a^2}$
 47. $a^2 - a + \frac{1}{4}$
 48. $4a^2 - 12ab + 9b^2$
 49. $9a^2 + 12ab + 4b^2$
 50. $a^2 + b^2 + c^2 + 2ab + 2ac + 2bc$
 51. $11 + 4$ & $11 - 4$
Roots = 15 & 7
 52. $-4 + 3$ & $-4 - 3$
Roots = -1 & -7
 53. 5 & 2
 $5 + 2$ & $5 - 2$
Roots = 7 & 3
 54. 3 & 5
 $3 + 5$ & $3 - 5$
Roots = 8 & -2
 55. -2 & 1
 $-2 + 1$ & $-2 - 1$
Roots = -1 & -3
 56. $x^\circ + 50^\circ = 180^\circ$
 $x = 130^\circ$
 57. The angle can be expressed as $\angle 1$. But, it is wrong to express it as $\angle BAC$. Instead, it should be $\angle ABC$.
 58. Two angles of a linear pair are supplementary to each other.
- | Angle | Complementary angle |
|------------------------------|------------------------------|
| 20° | 70° |
| 30° | 60° |
| 40° | 50° |
| 35° | 55° |
| 45° | 45° |
| 89° | 1° |
| 50° | 40° |
59.

Angle	Supplementary angle
20°	160°
30°	150°
130°	50°
135°	45°
35°	145°
89°	91°
80°	100°
 - 60.
 61. complementary, 40°
 62. $x = 90^\circ - 55^\circ = 35^\circ$.
 63. The complementary angle of 35° is 55° . The supplementary angle of 35° is 145° .
 64. 100°
The complementary angle of 40° is 50° . The angle is two times 50° , so it must be 100° .
 65. $\angle 1 = \angle 4$, (vertical angle)
 $\angle 4 = \angle 3$ (given)
 $\angle 3 = \angle 2$ (vertical angle)
 $\angle 1 = \angle 2$ (transitivity)
 66. 140°
 $\angle AOB + 40^\circ = 90^\circ$ (Given)
 $\angle AOB = 50^\circ$
 $\angle AOD = \angle AOB + \angle BOD$ (angle addition property)
 $= 50^\circ + 90^\circ$
 $= 140^\circ$
 67. $\angle 1 = 90^\circ + 45^\circ = 135^\circ$ since the bisector divides the right angle to two angles with 45° .

MAP 270+ (T1) Issue 2

68. Method I):

There are 6 handshakes among the politicians and $4 \times 3 = 12$ between politicians and lawyers. The total of handshakes is $6 + 12 = 18$.

Method II):

Let A, B, C and D be the politicians. Let X, Y and Z are the lawyers. Use the following table to label all the handshakes. For example, "1" means the first handshake is the one between A and B. Another example, "18" means the last handshake is the one between D and Z. Each shaded cell indicates there is no handshake needed or repeated between the two persons.

	A	B	C	D	X	Y	Z
A		1	2	3	4	5	6
B			7	8	9	10	11
C				12	13	14	15
D					16	17	18
X							
Y							
Z							

69. $84 \div 2 = 42$

$$42 \times \frac{2}{2+5} = 12 \text{ in (width)}$$

$$42 \times \frac{5}{2+5} = 30 \text{ in (length)}$$

$$12 \times 30 = 360 \text{ in}^2$$

70. $\frac{3}{10}$

71. $\frac{7}{10}$

72. $\frac{3}{7}$

73. $\frac{7}{3}$

74. $24 \div 60 = \frac{2}{5}$

75. $32.50 \div 0.65 = \$50$

76. 21 ft and 42 ft

77. There are 11 letters in total. There are 4 letters of 's'.

The chance of getting a 's' is $\frac{4}{11}$.

78. $\frac{4}{11}$

79. $3 \times 9 = 27$ different paths

80. Assume he got x points for his lowest grade, so the highest one is $3x - 9$.

$$x + 3x - 9 = 135$$

$$4x = 144$$

$$x = 36$$

$$3x - 9 = 99 \text{ points (highest)}$$

81. Assume the angle is x° . Its complement is $90 - x$.

$$x + 3(90 - x) = 202$$

$$270 - 2x = 202$$

$$68 = 2x$$

$$x = 34$$

82. $1 - \frac{1}{3} = \frac{2}{3}$

$$\frac{1}{3} \div \frac{2}{3} = \frac{1}{2} \text{ (ratio between used gas and un-used gas)}$$

$$\frac{1}{2} \times 8 = 4 \text{ gallons}$$

83. $110 + 75 + 315 = 500$

$$110 + 75 = 185$$

$$185 \div 500 = 37\%$$

84. 45 miles = 45×5280 ft

$$45 \times 5280 \times \frac{1}{60 \times 60} = 66 \text{ ft per sec}$$

85. Let x be amount invested at 10% and, therefore, $x + 250$ at 15%.

$$0.25x + 37.5 = 225$$

$$0.25x = 187.5$$

$$x = \$750 \text{ (at 10\%)}$$

$$x + 250 = \$1000 \text{ (at 15\%)}$$

86. Let x be the amount he saves.

$$1.15x = 3,450$$

$$x = \$3000$$

87. Let x : the amount invested at 20%

$x + 500$: the amount at 25%

$$1.2x + 1.25(x + 500) = 3075$$

$$2.45x + 625 = 3075$$

$$2.45x = 2450$$

$$x = \$1000 \text{ (at 20\%)}$$

$$x + 500 = \$1500 \text{ (at 25\%)}$$