Answer Key

Section 1-1

1. B	2. D	3. A	4. D	5. C
6. B				

Section 1-2

1. 10	2. 13	3. 8/3	4. 117	5. 23
6. 10	7. 42	8. $\frac{1}{18}$		

Section 1-3

1. A	2. B	3. D	4. D	5. B
6. C				

Section 1-4

1. C	2. B	3. C	4. D	5. B
6. 17	7. 1.3			

Chapter 1 Practice Test

1. C	2. D	3. B	4. A	5. D
6. C	7. B	8. C	9. B	10. 5.55
11. 4	12. 8			

Note: Throughout the book, the symbol "$\Rightarrow$" is used to indicate that one step of an equation implies the next step of the equation.

Answers and Explanations

Section 1-1

1. B

$\underbrace{2mn}_{\text{twice the product of } m \text{ and } n}$ $\underbrace{-}_{\text{decreased by}}$ $\underbrace{(m+n)^2}_{\text{the square of the sum of } m \text{ and } n}$

2. D

$\underbrace{4x}_{\text{the product of a number } x \text{ and 4}}$ $\underbrace{-}_{\text{decreased by}}$ $\underbrace{12}_{\text{twelve}}$

3. A

$\underbrace{\frac{19}{d}}_{\text{the quotient of 19 and a number } d}$ $\underbrace{+}_{\text{increased by}}$ $\underbrace{7}_{\text{seven}}$

4. D

The number of text messages Mario received yesterday $= 10y$.
The number of text messages Mario received today $= 20t$
The total number of text messages he received for two days $= 10y + 20t$.

5. C

$\underbrace{3k}_{3 \text{ times } k}$ $(\underbrace{m+\frac{1}{3}n}_{\text{sum of } m \text{ and one third of } n})$

$3k(m+\frac{1}{3}n)$ stands for $3k \times (m+\frac{1}{3}n)$.

6. B

If the smaller number is n to the third power, which is n^3, the greater number is 8 more than n^3, which is n^3+8.

Section 1-2

1. 10

$[(7^2-9)\div 8]2 = [(49-9)\div 8]2$
$= [(40)\div 8]2 = [5]2 = 10$

2. 13

$19 - 3[20 - \frac{2^4-7}{4}\times 8]$
$= 19 - 3[20 - \frac{16-7}{4}\times 8]$
$= 19 - 3[20 - \frac{9}{4}\times 8] = 19 - 3[20 - \frac{72}{4}]$
$= 19 - 3[20-18] = 19 - 3[2]$
$= 19 - 6 = 13$

3. $\frac{8}{3}$

$\frac{72\div 3^2\cdot 2}{6} = \frac{72\div 9\cdot 2}{6} = \frac{8\cdot 2}{6} = \frac{16}{6} = \frac{8}{3}$

4. 117

$5^3 - \frac{1}{2}(12+12\div 3) = 125 - \frac{1}{2}(12+4)$
$= 125 - \frac{1}{2}(16) = 125 - 8 = 117$

5. 23

$$(\frac{2c}{a})^2 - 10 \times \frac{(b+a)}{c} = (\frac{2 \cdot 5}{-2})^2 - 10 \times \frac{(3+-2)}{5}$$
$$= (-5)^2 - 10 \times (\frac{1}{5}) = 25 - 2 = 23$$

6. 10

$$9 - 2x \div (z-y)^3 = 9 - 2(4) \div (-3-(-1))^3$$
$$= 9 - 8 \div (-2)^3 = 9 - 8 \div (-8) = 9 - (-1) = 10$$

7. 42

$$\frac{7 \div (q)^2 \cdot 2}{2p} \cdot \frac{-p + 6q - r}{-q}$$
$$= \frac{7 \div (\frac{1}{2})^2 \cdot 2}{2(4)} \cdot \frac{-(4) + 6(\frac{1}{2}) - 2}{-\frac{1}{2}}$$
$$= \frac{7 \div \frac{1}{4} \cdot 2}{8} \cdot \frac{-3}{-\frac{1}{2}} = \frac{28 \cdot 2}{8} \cdot 6 = 7 \cdot 6 = 42$$

8. $\frac{1}{18}$

$$\frac{c - 2(a+b)}{(c-a)^2} = \frac{\frac{5}{2} - 2(-\frac{1}{2} + \frac{3}{2})}{(\frac{5}{2} - (-\frac{1}{2}))^2} = \frac{\frac{5}{2} - 2(1)}{(3)^2}$$
$$= \frac{\frac{1}{2}}{9} = \frac{1}{18}$$

Section 1-3

1. A

$$\frac{2}{3}(a^2 - a - 3) + \frac{1}{3}(a^2 + 2a + 6)$$
$$= \frac{2}{3}a^2 - \frac{2}{3}a - 2 + \frac{1}{3}a^2 + \frac{2}{3}a + 2 = a^2$$

2. B

$$5.4(x - 2y) - 2.7(x - 3y)$$
$$= 5.4x - 10.8y - 2.7x + 8.1y$$
$$= 2.7x - 2.7y = 2.7(x - y)$$

3. D

$$\frac{1}{2}(2a + 3b + 4c) - \frac{3}{2}(b + 2c)$$
$$= a + \frac{3}{2}b + 2c - \frac{3}{2}b - 3c$$
$$= a - c$$

4. D

$$a(b-c) - b(a+c) - c(a-b)$$
$$= ab - ac - ab - bc - ac + bc$$
$$= -2ac$$

5. B

$$3[6a - 3(1-a) - 5(a+1)]$$
$$= 3[6a - 3 + 3a - 5a - 5]$$
$$= 3[4a - 8] = 12a - 24$$

All of the answer choices except B are equivalent to $12a - 24$.

6. C

$$p - \frac{2}{3}(2p - 3q) - \frac{1}{3}(p + 4q)$$
$$= p - \frac{4}{3}p + 2q - \frac{1}{3}p - \frac{4}{3}q$$
$$= -\frac{2}{3}p + \frac{2}{3}q$$

All of the answer choices except C are equivalent to $-\frac{2}{3}p + \frac{2}{3}q$.

Section 1-4

1. C

$$-5,\ -\sqrt{3}(\approx -1.73),\ \frac{2}{3},\ \sqrt{10}(\approx 3.1),\ 4$$

Answer choice C shows the numbers arranged in increasing order.

2. B

$$11 - 2(2 - 0.8^2) + 24 \div (-4)$$
$$= 11 - 2(2 - .64) + (-6)$$
$$= 11 - 2(1.36) - 6 = 2.28$$

3. C

Use calculator.

$500(1+0.045)^8 - 500(1+0.04)^8$

$= 500[(1.045)^8 - (1.04)^8]$

$= 500(0.05353) \approx 26.76578$

26.765 rounded to the nearest hundredth is 26.77.

4. D

$-\sqrt{10}$ is an irrational number.

$-\sqrt{16} = -4$ is not an irrational number.

5. B

$\sqrt{\frac{49}{64}} = \frac{\sqrt{49}}{\sqrt{64}} = \frac{7}{8}$ is a rational number.

6. 17

$-5 + 32 - 10 = 17$

7. 1.3

$BC = 2AB$

$x - (-0.4) = 2[-0.4 - (-1.25)]$

$x + 0.4 = 2(0.85)$

$x + 0.4 = 1.7$

$x = 1.7 - 0.4 = 1.3$

Chapter 1 Practice Test

1. C

The phrase "two less than the quotient of three and a number n" is translated $\frac{3}{n} - 2$, not $2 - \frac{3}{n}$.

2. D

$(n+3) - (n-11) = n + 3 - n + 11 = 14$

3. B

Number of text messages he received on Friday is m, on Saturday is $2m - 3$, and on Sunday is $2m - 3 + 5$

The total number of text messages he received over the three days is

$m + (2m - 3) + (2m - 3 + 5) = 5m - 1$

4. A

To find a number which is halfway between two numbers, find the average of the two numbers.

$\frac{-\frac{5}{6} + \frac{1}{3}}{2} = \frac{(-\frac{5}{6} + \frac{1}{3})6}{(2)6} = \frac{-5+2}{12} = \frac{-3}{12} = -\frac{1}{4}$

5. D

Underline 9, the digit in the hundredths place.

$4.4\underline{9}85$

The digit to the right of the underlined digit is more than 5, round up. Therefore, 4.4985 rounded to the nearest hundredths place is 4.50.

6. C

$3a + \frac{1}{2}(b - 2c) - \frac{1}{2}(2a + 3b)$

$= 3a + \frac{1}{2}b - c - a - \frac{3}{2}b$

$= 2a - b - c$

7. B

There are $2h \times 60$ minutes in $2h$ hours.

There are $(120h + 6m)$ minutes in $2h$ hours and $6m$ minutes.

8. C

1. Add 5 to a number n. $\Rightarrow$ $n + 5$

2. Divide by 8. $\Rightarrow$ $\frac{(n+5)}{8}$

3. Subtract by 1. $\Rightarrow$ $\frac{(n+5)}{8} - 1$

4. Multiply by 8. $\Rightarrow$ $[\frac{(n+5)}{8} - 1] \times 8$

$[\frac{(n+5)}{8} - 1] \times 8 = (n+5) - 8 = n - 3$

9. B

$(2y - x) - 2(y - 2z) - 4(x + z)$

$= 2y - x - 2y + 4z - 4x - 4z$

$= -5x$

10. 5.55

$\frac{x}{2} + \frac{x}{20} + \frac{x}{200} = \frac{10}{2} + \frac{10}{20} + \frac{10}{200}$

$= 5 + 0.5 + 0.05 = 5.55$

11. 4

Choose the first few positive integers for x and make substitutions for the given equation. Construct a table of values.

x	y
1	not an integer
2	not an integer
3	not an integer
4	2

Both x and y are positive integers when x equals 4 and y equals 2. Therefore the value of x is 4.

12. 8

$$7-\frac{a-12\div(2-b)}{c+3}=7-\frac{3-12\div(2-(-1))}{-2+3}$$
$$=7-\frac{3-12\div(3)}{1}=7-\frac{3-4}{1}=7-\frac{-1}{1}$$
$$=7+1=8$$