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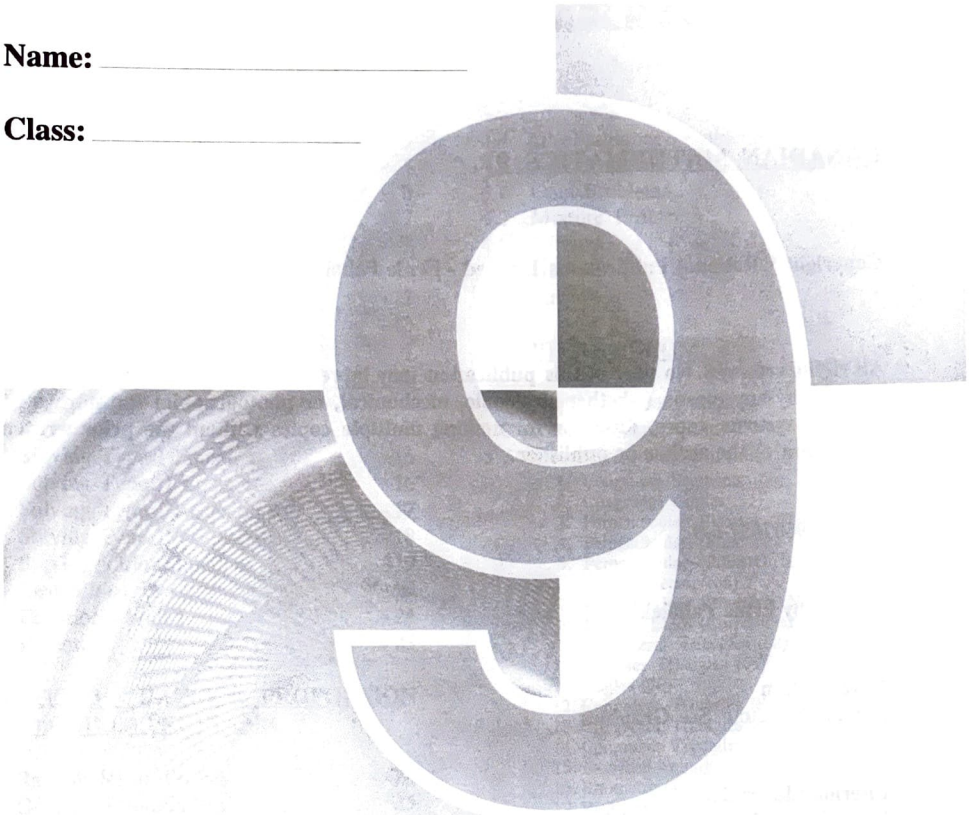


# CANADIAN MATHEMATICS

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# CHAPTER 1 - RATIONAL NUMBERS

## 1.1 INTEGERS (I)

The set of **integers** is defined as all positive whole numbers, all negative whole numbers and zero.

$$\mathbf{I = (\cdots -5, -4, -3, -2, -1, 0, +1, +2, +3, +4, \cdots)}$$

The Rules for Addition of Integers are:

1. If the signs are the same, we **add** the numbers and keep the same sign.

   (a) $(+7) + (+4) = +11$
   (b) $(-6) + (-7) = -13$
   (c) $(-2) + (-5) + (-8) = -15$

2. If the signs are different, **subtract** the numbers and take the sign of the numerically larger number.

   (a) $(+8) + (-3) = +5$
   (b) $(-12) + (+4) = -8$
   (c) $(+13) + (-7) = +6$

The Rules for Subtraction of Integers are:

1. To subtract an integer, we always **add the opposite**.

   (a) $(+4) - (+7) =$
   $(+4) + (-7) = -3$

   (b) $(-9) - (+4) =$
   $(-9) + (-4) = -13$

   (c) $(-6) - (-7) =$
   $(-6) + (+7) = +1$

The Rules for Multiplication & Division of Integers are:

1. The product or quotient of **two positive** integers is always **positive**.

   (a) $(+3)(+6) = +18$ (b) $(+56) \div (+7) = +8$

2. The product or quotient of a **positive and a negative** integer is always **negative**.

   (a) $(+9)(-5) = -45$ (b) $(-36) \div (+9) = -4$

3. The product or quotient of **two negative** integers is always **positive**.

   (a) $(-5)(-7) = +35$ (b) $(-63) \div (-7) = +9$

4. The product or quotient of '*n*' integers depends upon the number of **negatives**. An even number of negatives will give you a **positive** answer. An **odd** number of negatives will give you a **negative** answer.

   (a) $(-2)(+3)(-4)(+3)(-2)(-1) = +144$ (b) $(-48) \div (-6) \div (-2) = -4$

A. Perform the indicated operations with the following positive integers.

1. $863 + 5032$
2. $7935 - 654$
3. $63 \times 234$
4. $5678 \div 15$
5. $16 \times 351$
6. $1360 + 3592$
7. $8259 \div 301$
8. $7563 - 543$
9. $6385 + 8473$
10. $3858 \div 25$
11. $48 \times 31$
12. $14 \times 345$
13. $378 - 86$
14. $742 \times 485$
15. $58 \times 201$
16. $8745 - 4364$
17. $847 + 4827$
18. $8753 \div 37$

B. Calculate each of the following.

1. $(85) + (-50)$
2. $(-13) + (-14)$
3. $(+5) + (-9)$
4. $(-8) - (-9)$
5. $(-36) \div (-3)$
6. $(-35) + (-456)$
7. $(12) + (+13) + (432)$
8. $(16) \times (-7)$
9. $(34) - (-34)$
10. $(87) + (-34) + (-87)$
11. $(-14)(-2)(0)(35)$
12. $(-9) + (+3) - (+6) + (+5)$
13. $(85) \div (-5)$
14. $(-13) \cdot (-23)$
15. $(-6) + (-5) + (-3) + (-4)$
16. $(-7)(-3)(+2)$
17. $(-11) \div (55) \times (10)$
18. $(-3)(-5)(-2)$
19. $(-36) + (-5) - (-5)$
20. $(+6) + (-8) - (-5)$
21. $(-4) + (-13) + (+5)$
22. $(5)(-3)(-2)$
23. $(-9) \div (-3) \times (-2)$
24. $(-6) - (-4) + (+3) - (+7)$
25. $(-9) - (-7) - (-2)$
26. $(-9) + (+5) - (+12)$
27. $(-1)[(+6) + (-7) + (-6)]$
28. $(-14)[(-3) + (-7)]$
29. $(+7)[(-9) + (-7)]$
30. $[(-3) + (+5)][(-9) + (-2)]$
31. $(+7) + (-3) + (+17)$
32. $(-16) - (-24) + (+8)$
33. $(-7) + (-23) + (+24)$
34. $(-12)[(-4) + (-3)]$
35. $(-1)(-1)(-1)(-1)(-1)$
36. $(-31)(0)(+67)(+2)$
37. $[(-3) + (-8)](-7)$
38. $(318) - (-318)$
39. $(-1)[(-3) + (-7) + (-6)]$
40. $(-6) \div (-2) \times (-7)$
41. $(-7)(-3)(2)$
42. $(6)[(-6) + (+3)]$
43. $(-7) + (+83) - (-7)$
44. $(17) + (-38) - (+44)$
45. $(+73) + (-73) + (+84)$
46. $(-3)[(-6) + (-7)]$
47. $(-56) \div (-8) \times (+5)$
48. $(-617) - (-384) - (-617)$
49. $(-12)(-5) - (-60)$
50. $35(-14) + 35(+21)$
51. $(15)(-21) - (6)(5) - 4$
52. $(-6) + (+5) + (-31)$
53. $(+3)[(-7) + (+8)]$
54. $(-14) \div [(-7) + (+21)]$
55. $(279) \div (-9)$
56. $(-14) - (28)$
57. $(+18) - (37)$
58. $(-12) - (5) - (4)$
59. $24 - 3 - 34 + 21$
60. $(-170) - (230) + (110)$

## 1.2 DECIMALS

Whenever performing the operations of **addition, subtraction, multiplication** or **division** in math, we must follow the rules for integers plus those stated and shown in the examples below.

Whenever we **add or subtract** decimal numbers we must line up the decimals before we attempt to find the sum or difference and then place the decimal directly under the other decimals in our answers.

Whenever we are **multiplying**, the decimal moves to the left in the product the same number of places that there were numbers behind the decimal in the multiplicand and multiplier combined.

In **division** we move the decimal to the extreme right in our divisor and then move the decimal the same number of places to the right in our dividend before we attempt to find the quotient.

### ADDING & SUBTRACTING DECIMAL NUMBERS

#### EXAMPLE #1

Find the sum of 82.635, 325.68 and 53.47

$$\begin{array}{rl} 82.635 & \leftarrow \text{Addend} \\ +325.68 & \leftarrow \text{Addend} \\ +\ 53.47 & \leftarrow \text{Addend} \\ 461.785 & \leftarrow \text{SUM} \end{array}$$

#### EXAMPLE #2

Find the difference between 7836.25 and 4532.78

$$\begin{array}{rl} 7836.25 & \leftarrow \text{Minuend} \\ -\ 4532.78 & \leftarrow \text{Subtrahend} \\ 3303.47 & \leftarrow \text{DIFFERENCE} \end{array}$$

### MULTIPLYING DECIMAL NUMBERS

#### EXAMPLE #1

Find the product of 4.54 and 2.5

$$\begin{array}{rl} 4.54 & \leftarrow \text{Multiplicand} \\ \times\ 2.5 & \leftarrow \text{Multiplier} \\ 2\ 270 & \\ 9\ 080 & \\ 11.350 & \leftarrow \text{PRODUCT} \end{array}$$

(The factors have a total of 3 numbers to the right of the decimal point so we move the decimal 3 places to the left in the product.)

#### EXAMPLE #2

Multiplication using the powers of 10

$$\begin{aligned} 2.54 \times 10 &= 25.4 \\ 2.54 \times 100 &= 254 \\ 2.54 \times 1000 &= 2540 \\ 2.54 \times 10\ 000 &= 25\ 400 \end{aligned}$$

(The decimal moves to the right the same number of places as there are zeros.)

### DIVIDING DECIMAL NUMBERS

#### EXAMPLE #1

$$\begin{array}{rl} & 2.6 \quad \leftarrow \text{QUOTIENT} \\ 8.3 \overset{\rightarrow}{)}\ 21.5\overset{\rightarrow}{8} & \leftarrow \text{Dividend} \\ \text{Divisor} \quad \nearrow & 16\ 6\times \\ & 4\ 98 \\ & 4\ 98 \\ & 0 \quad \leftarrow \text{Remainder} \end{array}$$

( The decimal moves to the right of the divisor and then the same number of places in the dividend. We now place the decimal directly above in the quotient.

#### EXAMPLE #2

Division using the powers of 10

$$\begin{aligned} 25.4 \div 10 &= 2.54 \\ 25.4 \div 100 &= 0.254 \\ 25.4 \div 1000 &= 0.0254 \\ 25.4 \div 10\ 000 &= 0.00254 \end{aligned}$$

(The decimal moves to the left the same number of places as there are zeros in the divisor.)

A. Perform the indicated operations with the following positive decimals.

1. $36 + 4.56$
2. $34.76 - 14.87$
3. $7.3 \times 3.7$
4. $298.9 \div 24.5$
5. $36.0672 \div 1.02$
6. $46.987 - 38.76$
7. $0.75 \times 0.65$
8. $57.76 + 0.876$
9. $88.56 \div 7.2$
10. $0.065 + 5.8$
11. $764.3 - 654.9$
12. $4637 - 23.765$
13. $4.83 \times 2.1$
14. $93.654 \div 0.33$
15. $76.654 + 15.76$
16. $7.3 \times 29.1$
17. $0.51 \times 0.61$
18. $0.635 - 0.463$

B. Calculate each of the following.

1. $(9.61) + (3.2)$
2. $(5.01) - (1.42)$
3. $(4.5) \times (-1.18)$
4. $(6.45) \div (15)$
5. $(4.1) \cdot (-0.044)$
6. $(-64) + (+1.19)$
7. $(-7.22) - (+2.35)$
8. $(-8.8) - (-5.9)$
9. $(-0.21)(-3.12)$
10. $(5.23)(-0.123)$
11. $(-23.8) \div (-3.5)$
12. $(1.467) \div (-4.5)$
13. $(0.5) + (4.5) + (7)$
14. $(-8.4) + (5.9)$
15. $(113) - (89.41)$
16. $(6.6) - (-1.96)$
17. $(7.003) \times (4.2)$
18. $(-15)(-0.31)$
19. $(0.016) \div (+3.2)$
20. $(+1.467) \div (-4.5)$
21. $(-7) + (-3.27)$
22. $(-5.8) + (0.9) - (1.9)$
23. $(18.48) - (21)$
24. $(-8.11) - (-6.22)$
25. $(-5.11)(-3.4)$
26. $(14.12)(0.03)$
27. $(0.081) \div (-0.03)$
28. $(14) + (-1.1111)$
29. $(-40) - (+7.11)$
30. $(-26.14) \times (-1.4)$
31. $(-2.25) \div (-1.5)$
32. $(-5.6) \div (0.07)$
33. $(-72.12) \div (0.04)$
34. $(-0.19) \times (-0.11)$
35. $(-26)(0.117)$
36. $(7.48) - (11.12)$
37. $(-66) - (11.35)$
38. $(12.937) + (-13.6)$
39. $(-43) + (0.12) + (7.3)$
40. $(-3.43) \div (2.7)$
41. $(-3.2)(-3.2)$
42. $(-8.5)^2$
43. $(3.2) + (4.8) - (8)$
44. $(3.001)(-3.01)$
45. $(0.15)(-3)(-2.24)$
46. $(-0.162) \div (3.6)$
47. $(81) \div (0.003)$
48. $(-15) + (0.5) + (7.3)$
49. $(-8) - (-3) + (-4.6)$
50. $(5.2)(-3.1)(0)$
51. $(3.645) \div (0)$
52. $(-82.4) \div (0.002)$
53. $(-5.0) + (+2.5)$
54. $(83) - (15) + (17) - (3.5)$
55. $(+4.2) - (-3.4)$
56. $(-2.5) \div (-0.005)$
57. $(-3) \div (-4)$
58. $(1.23) \times (0) \times (3)$
59. $(7)(0)(3.12)(-3.7)$
60. $(-17.1) \div (4.75)$