

## ARITHMETIC OPERATIONS WITH NUMBERS

# 1

**Adding integers:** If the signs are the same, add the numbers and keep the same sign. If the signs are different, ignore the signs (that is, use the absolute value of each number) and find the difference of the two numbers. The sign of the answer is determined by the number farthest from zero, that is, the number with the greater absolute value.

same signs

a)  $2 + 3 = 5$  or  $3 + 2 = 5$

b)  $-2 + (-3) = -5$  or  $-3 + (-2) = -5$

different signs

c)  $-2 + 3 = 1$  or  $3 + (-2) = 1$

d)  $-3 + 2 = -1$  or  $2 + (-3) = -1$

**Subtracting integers:** To find the difference of two values, change the subtraction sign to addition, change the sign of the number being subtracted, then follow the rules for addition.

a)  $2 - 3 \Rightarrow 2 + (-3) = -1$

c)  $-2 - 3 \Rightarrow -2 + (-3) = -5$

b)  $-2 - (-3) \Rightarrow -2 + (+3) = 1$

d)  $2 - (-3) \Rightarrow 2 + (+3) = 5$

**Multiplying and dividing integers:** If the signs are the same, the product will be positive. If the signs are different, the product will be negative.

a)  $2 \cdot 3 = 6$  or  $3 \cdot 2 = 6$

b)  $-2 \cdot (-3) = 6$  or  $(+2) \cdot (+3) = 6$

c)  $2 \div 3 = \frac{2}{3}$  or  $3 \div 2 = \frac{3}{2}$

d)  $(-2) \div (-3) = \frac{2}{3}$  or  $(-3) \div (-2) = \frac{3}{2}$

e)  $(-2) \cdot 3 = -6$  or  $3 \cdot (-2) = -6$

f)  $(-2) \div 3 = -\frac{2}{3}$  or  $3 \div (-2) = -\frac{3}{2}$

g)  $9 \cdot (-7) = -63$  or  $-7 \cdot 9 = -63$

h)  $-63 \div 9 = -7$  or  $9 \div (-63) = -\frac{1}{7}$

Follow the same rules for fractions and decimals.

Remember to apply the correct order of operations when you are working with more than one operation.

Simplify the following expressions using integer operations WITHOUT USING A CALCULATOR.

1.  $5 + 2$

2.  $5 + (-2)$

3.  $-5 + 2$

4.  $-5 + (-2)$

5.  $5 - 2$

6.  $5 - (-2)$

7.  $-5 - 2$

8.  $-5 - (-2)$

9.  $5 \cdot 2$

10.  $-5 \cdot (-2)$

11.  $-5 \cdot 2$

12.  $2 \cdot (-5)$

13.  $5 \div 2$

14.  $-5 \div (-2)$

15.  $5 \div (-2)$

16.  $-5 \div 2$

17.  $17 + 14$

18.  $37 + (-16)$

19.  $-64 + 42$

20.  $-29 + (-18)$

21.  $55 - 46$

22.  $37 - (-13)$

23.  $-42 - 56$

24.  $-37 - (-15)$

25.  $16 \cdot 32$

26.  $-42 \cdot (-12)$

27.  $-14 \cdot 4$

28.  $53 \cdot (-10)$

29.  $42 \div 6$

30.  $-72 \div (-12)$

31.  $34 \div (-2)$

32.  $-60 \div 15$

Simplify the following expressions without a calculator. Rational numbers (fractions or decimals) follow the same rules as integers.

33.  $(16 + (-12))3$

34.  $(-63 \div 7) + (-3)$

35.  $\frac{1}{2} + (-\frac{1}{4})$

36.  $\frac{3}{5} - \frac{2}{3}$

37.  $(-3 \div 1\frac{1}{2})2$

38.  $(5 - (-2))(-3 + (-2))$

39.  $\frac{1}{2}(-5 + (-7)) - (-3 + 2)$

40.  $-(0.5 + 0.2) - (6 + (-0.3))$

41.  $-2(-57 + 71)$

42.  $33 \div (-3) + 11$

43.  $-\frac{3}{4} + 1\frac{3}{8}$

44.  $\frac{4}{5} - \frac{6}{8}$

45.  $-2(-\frac{3}{2} \cdot \frac{2}{3})$

46.  $(-4 + 3)(2 \cdot 3)$

47.  $-\frac{3}{4}(3 - 2) - (\frac{1}{2} + (-3))$

48.  $(0.8 + (-5.2)) - 0.3(-0.5 + 4)$

### Answers

1. 7

2. 3

3. -3

4. -7

5. 3

6. 7

7. -7

8. -3

9. 10

10. 10

11. -10

12. -10

13.  $\frac{5}{2}$  or  $2\frac{1}{2}$  or 2.5

14.  $\frac{5}{2}$  or  $2\frac{1}{2}$  or 2.5

15.  $-\frac{5}{2}$  or  $-2\frac{1}{2}$  or -2.5

16.  $-\frac{5}{2}$  or  $-2\frac{1}{2}$  or -2.5

17. 31

18. 21

19. -22

20. -47

21. 9

22. 50

23. -98

24. -22

25. 512

26. 504

27. -56

28. -530

29. 7

30. 6

31. -17

32. -4

33. 12

34. -12

35.  $\frac{1}{4}$

36.  $-\frac{1}{15}$

37. -4

38. -35

39. -5

40. -6.4

41. -28

42. 0

43.  $\frac{5}{8}$

44.  $\frac{2}{40} = \frac{1}{20}$

45. 2

46. -6

47.  $1\frac{3}{4}$

48. -5.45