

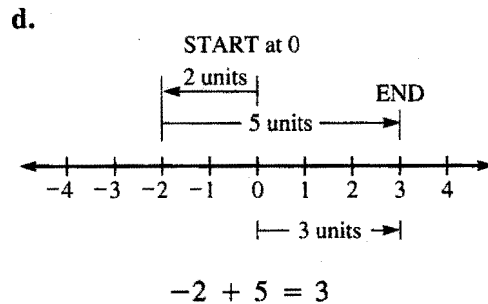
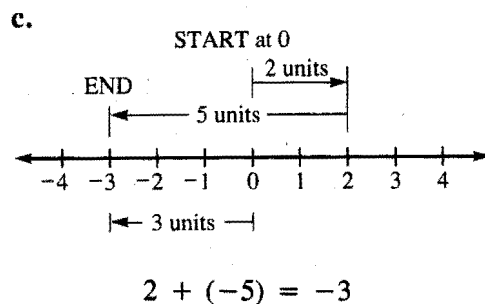
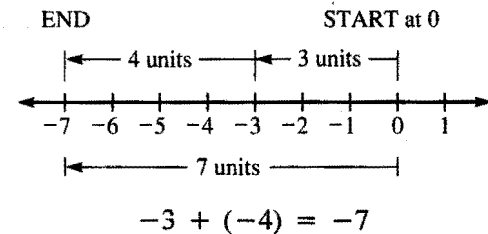
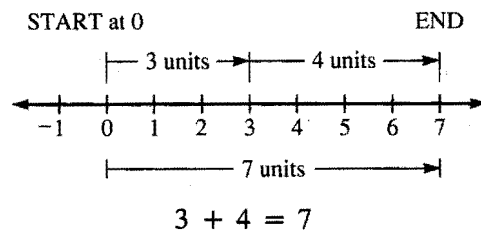
2-2 Addition On A Number Line

Objective: To add real numbers using a number line or properties about opposites.

Properties	Examples
Identity Property of Addition The sum of a real number and 0 is identical to the number itself. $a + 0 = a$ and $0 + a = a$	$5 + 0 = 5$ and $0 + 5 = 5$
Properties of Opposites Every real number has an opposite. The sum of a real number and its opposite is 0. $a + (-a) = 0$ and $(-a) + a = 0$	$3 + (-3) = 0$ and $(-3) + 3 = 0$
Property of the Opposite of a Sum For all real numbers a and b : $-(a + b) = (-a) + (-b)$	$-(2 + 3) = -5 = (-2) + (-3)$

Example 1 Simplify: a. $3 + 4$ b. $-3 + (-4)$ c. $2 + (-5)$ d. $-2 + 5$

Solution



Simplify each expression. If necessary, draw a number line to help you.

- | | | |
|--------------------|--------------------|--------------------|
| 1. $4 + 2$ | 2. $-4 + (-2)$ | 3. $6 + (-9)$ |
| 4. $-6 + 9$ | 5. $3 + 5$ | 6. $-3 + (-5)$ |
| 7. $-8 + 4$ | 8. $8 + (-4)$ | 9. $(-2 + 5) + 4$ |
| 10. $(-4 + 7) + 1$ | 11. $(-3 + 1) + 2$ | 12. $(-6 + 5) + 3$ |

2-2 Addition On A Number Line (continued)

Simplify each expression. If necessary, draw a number line to help you.

13. $(-6 + 9) + (-2)$

14. $(-4 + 7) + (-3)$

15. $(-3 + 5) + 7$

16. $(-8 + 12) + (-6)$

17. $[-6 + (-5)] + 6$

18. $[-3 + (-7)] + 3$

19. $25 + [7 + (-2)]$

20. $32 + [8 + (-14)]$

21. $[19 + (-9)] + [2 + (-2)]$

22. $(-2 + 2) + [26 + (-6)]$

23. $[0 + (-6)] + [-5 + (-25)]$

24. $(-7 + 7) + [14 + (-4)]$

25. $-1 + (-2) + (-7)$

26. $(-4) + (-6) + (-9)$

27. $-3 + (-11) + 8 + (-5)$

28. $-10 + 14 + (-3) + (-12)$

29. $-5.3 + (-1.5) + 6.8$

30. $4.2 + (-3.4) + (-6.9)$

31. $-\frac{3}{4} + 3 + \left(-\frac{9}{4}\right)$

32. $-\frac{11}{3} + (-4) + \left(-\frac{7}{3}\right)$

Example 2 Simplify $3 + (-2) + x + 6$.**Solution** Use the commutative and associative properties to regroup.

$$\begin{aligned} 3 + (-2) + x + 6 &= 1 + x + 6 \\ &= x + (1 + 6) \\ &= x + 7 \end{aligned}$$

Simplify.

33. $2 + x + (-6)$

34. $y + (-1) + 5$

35. $3n + 4 + (-1)$

36. $5 + 2n + (-4)$

37. $12 + 4n + (-20)$

38. $-8 + (-2z) + 11$

Mixed Review Exercises

Simplify.

1. $6 + 8 \div 2$

2. $|-5| + |2|$

3. $9 - [-(-1)]$

4. $\frac{2 + (3 \cdot 6)}{4}$

5. $\left| \frac{3}{5} \right| + \left| -\frac{2}{5} \right|$

6. $\left| -\frac{3}{4} \right| + \left| -\frac{1}{4} \right|$

7. $52 + 35 + 48 + 15$

8. $12 \cdot 5 \cdot 30$

9. $(2x)(4y)(5z)$

10. $4\frac{3}{4} + 2\frac{1}{3} + 5\frac{1}{4} + \frac{2}{3}$

11. $0.3 + 2.6 + 5.7$

12. $4 \cdot 19 \cdot 25$