

# Simplifying Expressions With Integers

To add two numbers with the same sign, *add* their absolute values. The sum has the same sign as the numbers. To add two numbers with different signs, find the *difference* between their absolute values. The sum has the same sign as the number with the greater absolute value.

## 1 EXAMPLE Add.

a.  $-8 + (-5) = -13$

b.  $-8 + 5 = -3$

c.  $8 + (-5) = 3$

To subtract a number, add its opposite.

## 2 EXAMPLE Subtract.

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

b.  $-4 - (-7) = -4 + 7$   
 $= 3$

c.  $-4 - 7 = -4 + (-7)$   
 $= -11$

The product or quotient of two numbers with the same sign is positive. The product or quotient of two numbers with different signs is negative.

## 3 EXAMPLE Multiply or divide.

a.  $(-3)(-5) = 15$

b.  $-35 \div 7 = -5$

c.  $24 \div (-6) = -4$

## 4 EXAMPLE Simplify $2^2 - 3(4 - 6) - 12$ .

Use the order of operations shown at the right.

$$\begin{aligned} 2^2 - 3(4 - 6) - 12 &= 2^2 - 3(-2) - 12 \\ &= 4 - 3(-2) - 12 \\ &= 4 - (-6) - 12 \\ &= 4 + 6 - 12 \\ &= 10 - 12 = -2 \end{aligned}$$

### Order of Operations

1. Perform any operation(s) inside grouping symbols.
2. Simplify any terms with exponents.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

## EXERCISES

Simplify each expression.

- |   |   |  |                                   |                            |
|---|---|--|-----------------------------------|----------------------------|
| 1. $-4 + 5$ <b>1</b>  | 2. $12 - 12$ <b>0</b>                         | 3. $-15 + (-23)$ <b>-38</b>                  | 4. $4 - 17$ <b>-13</b>            | 5. $-5 - 12$ <b>-17</b>    |
| 6. $17 + (-18)$ <b>-1</b>                                       | 7. $3 - (-5)$ <b>8</b>                        | 8. $-8 - (-12)$ <b>4</b>                     | 9. $-19 + 5$ <b>-14</b>           | 10. $-8 + (-8)$ <b>-16</b> |
| 11. $(-7)(-4)$ <b>28</b>  | 12. $-120 \div 30$ <b>-4</b>                  | 13. $(-3)(4)$ <b>-12</b>                     | 14. $75 \div (-3)$ <b>-25</b>     | 15. $(-6)(15)$ <b>-90</b>  |
| 16. $(18)(-4)$ <b>-72</b>                                       | 17. $-84 \div (-7)$ <b>12</b>                 | 18. $(-13)(-3)$ <b>39</b>                    | 19. $(-225) \div (-15)$ <b>15</b> | 20. $-16 \div 8$ <b>-2</b> |
| 21. $-2(1 + 5) + (-3)(2)$ <b>-18</b>                            | 22. $-4(-2 - 5) + 3(1 - 4)$ <b>19</b>         | 23. $20 - (3)(12) + 4^2$ <b>0</b>            |                                   |                            |
| 24. $\frac{-15}{-5} - \frac{36}{-12} + \frac{-12}{-4}$ <b>9</b> | 25. $5^2 - 6(5 - 9)$ <b>49</b>                | 26. $4[(12)(3) - \frac{12}{3}]$ <b>128</b>   |                                   |                            |
| 27. $(-3 + 2^3)(4 + \frac{-42}{7})$ <b>-10</b>                  | 28. $(3 - 10)^2 + 3(-10)$ <b>19</b>           | 29. $(7 + 7)(7 - 7) - \frac{7}{-7}$ <b>1</b> |                                   |                            |
| 30. $5 - (-4)(-3) + 3^2$ <b>2</b>                               | 31. $(\frac{-15}{5})^2 + (7 - 4)^2$ <b>18</b> | 32. $[4(-3)]^2 + 4(-3)^2$ <b>180</b>         |                                   |                            |