

# Evaluating Expressions

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 24

## Quick Review

To **evaluate** an expression, you **substitute** a given number for each variable and then simplify. For example, to evaluate  $3x + 5$  when  $x = 4$ , replace  $x$  with 4 to get  $3(4) + 5$ . Then follow the **order of operations**: multiply first,  $3 \times 4 = 12$ , then add,  $12 + 5 = 17$ . Always put the substituted number in parentheses so you don't lose track of an operation. Substitution turns a general expression into a single number answer.

◇ **Example:** Evaluate  $2a + 7$  when  $a = 6$ .

⇒ First, swap the variable for its value: wherever we see  $a$ , we put 6. That gives  $2(6) + 7$ . Now we follow the order of operations — multiplication comes before addition, so  $2 \times 6 = 12$ . The expression is now  $12 + 7$ , and adding gives 19. Substituting carefully and then working in order is the whole secret.

**Answer:** 19

## PRACTICE

Evaluate each expression for the given value of the variable.

- |                                     |       |                                    |       |
|-------------------------------------|-------|------------------------------------|-------|
| 1. $x + 8$ when $x = 5$             | _____ | 11. $8x - 5$ when $x = 1$          | _____ |
| 2. $y - 3$ when $y = 10$            | _____ | 12. $x^2$ when $x = 4$             | _____ |
| 3. $4n$ when $n = 6$                | _____ | 13. $2x^2$ when $x = 3$            | _____ |
| 4. $\frac{m}{2}$ when $m = 14$      | _____ | 14. $4(n + 2)$ when $n = 6$        | _____ |
| 5. $3x + 1$ when $x = 4$            | _____ | 15. $3a + 2b$ when $a = 5, b = 4$  | _____ |
| 6. $2y + 9$ when $y = 5$            | _____ | 16. $\frac{x+6}{2}$ when $x = 10$  | _____ |
| 7. $10 - 2k$ when $k = 3$           | _____ | 17. $x^2 + 5$ when $x = 6$         | _____ |
| 8. $5p - 4$ when $p = 2$            | _____ | 18. $7y - 2y$ when $y = 4$         | _____ |
| 9. $6 + 3n$ when $n = 7$            | _____ | 19. $2(a + b)$ when $a = 3, b = 7$ | _____ |
| 10. $\frac{a}{3} + 2$ when $a = 12$ | _____ | 20. $5x^2 - 3$ when $x = 2$        | _____ |

## Word Problems

21. The expression  $12n$  gives the total cost in dollars of  $n$  movie tickets. How much do 5 tickets cost? \_\_\_\_\_
22. A plumber charges  $50 + 35h$  dollars for a job that takes  $h$  hours. What is the cost of a 3-hour job? \_\_\_\_\_
23. The area of a rectangle is  $\ell w$ , where  $\ell$  is length and  $w$  is width. Find the area when  $\ell = 9$  cm and  $w = 4$  cm. \_\_\_\_\_
24. A square has side length  $s$ . Its area is  $s^2$ . Find the area of a square with side length 7 inches. \_\_\_\_\_



## Answer Keys

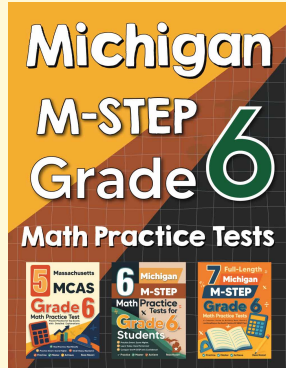
- |        |                      |
|--------|----------------------|
| 1. 13  | 13. 18               |
| 2. 7   | 14. 32               |
| 3. 24  | 15. 23               |
| 4. 7   | 16. 8                |
| 5. 13  | 17. 41               |
| 6. 19  | 18. 20               |
| 7. 4   | 19. 20               |
| 8. 6   | 20. 17               |
| 9. 27  | 21. \$60             |
| 10. 6  | 22. \$155            |
| 11. 3  | 23. 36 square cm     |
| 12. 16 | 24. 49 square inches |

### Step-by-Step Explanations

- |  |   |
|--|---|
| <p>1. Substitute 5 for <math>x</math>: <math>5 + 8 = 13</math>.</p> <p>2. Replace <math>y</math> with 10: <math>10 - 3 = 7</math>.</p> <p>3. <math>4n</math> means <math>4 \times n</math>, so <math>4 \times 6 = 24</math>.</p> <p>4. Substitute 14: <math>\frac{14}{2} = 7</math>.</p> <p>5. <math>3(4) = 12</math>, then <math>12 + 1 = 13</math>.</p> <p>6. <math>2(5) = 10</math>, then <math>10 + 9 = 19</math>.</p> <p>7. <math>2(3) = 6</math>, then <math>10 - 6 = 4</math>.</p> <p>8. <math>5(2) = 10</math>, then <math>10 - 4 = 6</math>.</p> <p>9. <math>3(7) = 21</math>, then <math>6 + 21 = 27</math>.</p> <p>10. <math>\frac{12}{3} = 4</math>, then <math>4 + 2 = 6</math>.</p> <p>11. <math>8(1) = 8</math>, then <math>8 - 5 = 3</math>.</p> <p>12. <math>x^2</math> means <math>x \times x</math>, so <math>4 \times 4 = 16</math>.</p> | <p>13. <math>x^2 = 9</math> first, then <math>2 \times 9 = 18</math>.</p> <p>14. Inside the parentheses: <math>6 + 2 = 8</math>, then <math>4 \times 8 = 32</math>.</p> <p>15. <math>3(5) = 15</math> and <math>2(4) = 8</math>, so <math>15 + 8 = 23</math>.</p> <p>16. The fraction bar groups the top: <math>10 + 6 = 16</math>, then <math>\frac{16}{2} = 8</math>.</p> <p>17. <math>x^2 = 36</math>, then <math>36 + 5 = 41</math>.</p> <p>18. <math>7(4) = 28</math> and <math>2(4) = 8</math>, so <math>28 - 8 = 20</math>.</p> <p>19. Inside the parentheses: <math>3 + 7 = 10</math>, then <math>2 \times 10 = 20</math>.</p> <p>20. <math>x^2 = 4</math>, then <math>5 \times 4 = 20</math>, and <math>20 - 3 = 17</math>.</p> <p>21. Substitute <math>n = 5</math> into <math>12n</math>: <math>12 \times 5 = 60</math>, so 5 tickets cost 60 dollars.</p> <p>22. Substitute <math>h = 3</math>: <math>50 + 35(3) = 50 + 105 = 155</math> dollars.</p> <p>23. Substitute the values: <math>\ell w = 9 \times 4 = 36</math> square centimeters.</p> <p>24. Substitute <math>s = 7</math> into <math>s^2</math>: <math>7^2 = 7 \times 7 = 49</math> square inches.</p> |
|--|---|



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