

# Why Don't Robots Ever Panic?



Each equation is either (1) true because of the commutative property, (2) true because of the associative property, or (3) false. Mark the correct choice, then write the corresponding letter in the box containing the exercise number.

<p><b>1</b> <math>m + 8 = 8 + m</math>  <b>E</b> - TRUE (commutative property)  <b>J</b> - TRUE (associative property)  <b>C</b> - FALSE</p>	<p><b>2</b> <math>m \cdot 8 = 8 \cdot m</math>  <b>S</b> - TRUE (commutative property)  <b>V</b> - TRUE (associative property)  <b>P</b> - FALSE</p>	<p><b>3</b> <math>m - 8 = 8 - m</math>  <b>O</b> - TRUE (commutative property)  <b>X</b> - TRUE (associative property)  <b>A</b> - FALSE</p>
<p><b>4</b> <math>m \div 8 = 8 \div m</math>  <b>I</b> - TRUE (commutative property)  <b>L</b> - TRUE (associative property)  <b>E</b> - FALSE</p>	<p><b>5</b> <math>3 + (4 + x) = (3 + 4) + x</math>  <b>S</b> - TRUE (commutative property)  <b>T</b> - TRUE (associative property)  <b>M</b> - FALSE</p>	<p><b>6</b> <math>3 \cdot (4x) = (3 \cdot 4)x</math>  <b>A</b> - TRUE (commutative property)  <b>E</b> - TRUE (associative property)  <b>K</b> - FALSE</p>
<p><b>7</b> <math>3 - (4 - x) = (3 - 4) - x</math>  <b>P</b> - TRUE (commutative property)  <b>S</b> - TRUE (associative property)  <b>H</b> - FALSE</p>	<p><b>8</b> <math>3 \div (4 \div x) = (3 \div 4) \div x</math>  <b>U</b> - TRUE (commutative property)  <b>G</b> - TRUE (associative property)  <b>O</b> - FALSE</p>	<p><b>9</b> <math>3 + (4x) = (3 + 4)x</math>  <b>R</b> - TRUE (commutative property)  <b>O</b> - TRUE (associative property)  <b>H</b> - FALSE</p>
<p><b>10</b> <math>9 + (a + b) = (a + b) + 9</math>  <b>E</b> - TRUE (commutative property)  <b>W</b> - TRUE (associative property)  <b>F</b> - FALSE</p>	<p><b>11</b> <math>9 + (a + b) = (9 + a) + b</math>  <b>T</b> - TRUE (commutative property)  <b>S</b> - TRUE (associative property)  <b>N</b> - FALSE</p>	<p><b>12</b> <math>9 + (a + b) = 9 + (b + a)</math>  <b>E</b> - TRUE (commutative property)  <b>A</b> - TRUE (associative property)  <b>I</b> - FALSE</p>
<p><b>13</b> <math>5(2d) = (2d)5</math>  <b>L</b> - TRUE (commutative property)  <b>D</b> - TRUE (associative property)  <b>N</b> - FALSE</p>	<p><b>14</b> <math>5(2d) = (5 \cdot 2)d</math>  <b>T</b> - TRUE (commutative property)  <b>V</b> - TRUE (associative property)  <b>D</b> - FALSE</p>	<p><b>15</b> <math>5(2d) = 5(d \cdot 2)</math>  <b>F</b> - TRUE (commutative property)  <b>N</b> - TRUE (associative property)  <b>R</b> - FALSE</p>
<p><b>16</b> <math>11 + (6y) = 11 + (y \cdot 6)</math>  <b>Y</b> - TRUE (commutative property)  <b>S</b> - TRUE (associative property)  <b>N</b> - FALSE</p>	<p><b>17</b> <math>11 + (6y) = (6y) + 11</math>  <b>V</b> - TRUE (commutative property)  <b>C</b> - TRUE (associative property)  <b>T</b> - FALSE</p>	<p><b>18</b> <math>11 + (6y) = (11 + 6)y</math>  <b>R</b> - TRUE (commutative property)  <b>P</b> - TRUE (associative property)  <b>E</b> - FALSE</p>
<p><b>19</b> <math>p(7q) = (p \cdot 7)q</math>  <b>G</b> - TRUE (commutative property)  <b>N</b> - TRUE (associative property)  <b>S</b> - FALSE</p>	<p><b>20</b> <math>p + (7 + q) = (p + 7) + q</math>  <b>W</b> - TRUE (commutative property)  <b>R</b> - TRUE (associative property)  <b>T</b> - FALSE</p>	<p><b>21</b> <math>p - (7 + q) = (p - 7) + q</math>  <b>H</b> - TRUE (commutative property)  <b>P</b> - TRUE (associative property)  <b>T</b> - FALSE</p>

5 9 12 16 7 3 14 10 19 1 20 17 6 11 8 15 2 21 18 4 13

# What Happens When You Step on the Brakes?



Use the code key to write the appropriate code letter next to each equation.  
Then write that letter in the box containing the number of the exercise.



## CODE KEY FOR LEFT SIDE:

- commutative property of addition → I
- commutative property of multiplication → U
- associative property of addition → Y
- associative property of multiplication → S
- identity property of addition → E
- identity property of multiplication → A
- THE STATEMENT IS FALSE → T

## CODE KEY FOR RIGHT SIDE:

- commutative property of addition → D
- commutative property of multiplication → R
- associative property of addition → N
- associative property of multiplication → L
- identity property of addition → H
- identity property of multiplication → F
- THE STATEMENT IS FALSE → O

1.  $n + 5 = 5 + n$

2.  $d \cdot 8 = 8 \cdot d$

3.  $5 \cdot (x \cdot y) = (5 \cdot x) \cdot y$

4.  $k + (e + 9) = (k + e) + 9$

5.  $w \cdot 1 = w$

6.  $(p + q) + 7 = 7 + (p + q)$

7.  $(p + q) + 7 = p + (q + 7)$

8.  $y + 0 = y$

9.  $(x \cdot 4)5 = x(4 \cdot 5)$

10.  $a + (b \cdot c) = a + (c \cdot b)$

11.  $a + (b \cdot c) = (b \cdot c) + a$

12.  $a + (b \cdot c) = (a + b) \cdot c$

13.  $a \cdot (b \cdot c) = (a \cdot b) \cdot c$

14.  $7 \cdot (m \cdot 2) = 7 \cdot (2 \cdot m)$

15.  $7 \cdot (m \div 2) = 7 \cdot (2 \div m)$

16.  $10 + (m + 3) = 10 + (3 + m)$

17.  $10 + (m - 3) = 10 + (3 - m)$

18.  $10 + (3 + m) = (10 + 3) + m$

19.  $9(x \cdot 2) = 9(2x)$

20.  $9(2x) = (9 \cdot 2)x$

21.  $t + (d - d) = t$

22.  $\frac{h}{k} \cdot \frac{n}{n} = \frac{h}{k}$

23.  $\frac{h}{k} \cdot \frac{n}{m} = \frac{h}{k}$

24.  $7y + (2y + 6) = (7y + 2y) + 6$

25.  $7y \cdot (2y + 6) = (7y \cdot 2y) + 6$

26.  $\frac{w}{3} \cdot \frac{ab}{ab} = \frac{w}{3}$

4 17 2 19 20 11 22 8 6 13 1 18 7 23 10 14 26 15 25 12 3 21 5 24 16 9