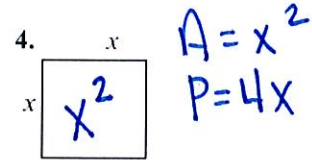
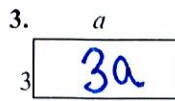
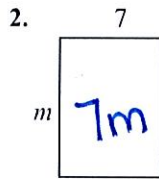
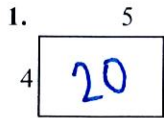


**Task #11: Distributive Property Using Area**

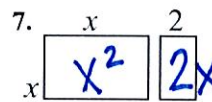
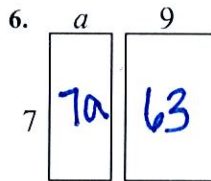
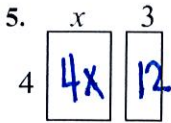
**Distributive Property Using Area**

NAME Key

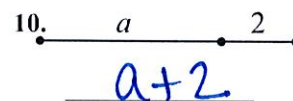
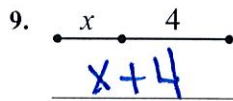
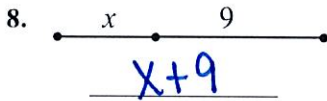
Write the expression that represents the area of each rectangle.  $A=lw$



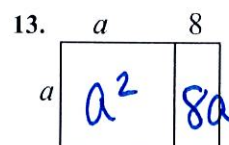
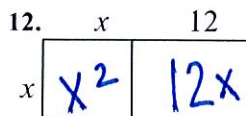
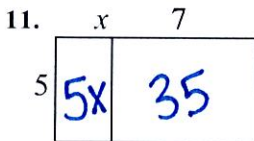
Find the area of each box in the pair.



Write the expression that represents the total length of each segment.



Write the area of each rectangle as the product of **length**  $\times$  **width** and also as a sum of the areas of each box.



| AREA AS PRODUCT ( $\times$ ) | AREA AS SUM (+) |
|------------------------------|-----------------|
| $5(x+7)$                     | $5x+35$         |

| AREA AS PRODUCT | AREA AS SUM |
|-----------------|-------------|
| $x(x+12)$       | $x^2+12x$   |

| AREA AS PRODUCT | AREA AS SUM |
|-----------------|-------------|
| $a(a+8)$        | $a^2+8a$    |

This process of writing these products as a sum uses the **distributive property**.

Use the distributive property to re-write each expression as a sum. You may want to draw a rectangle on a separate page to follow the technique above.

- 14.  $4(x+7) = 4x+28$
- 16.  $-2(x+4) = -2x-8$
- 18.  $a(a-1) = a^2-a$
- 20.  $-4(a-4) = -4a+16$

- 15.  $7(x-3) = 7x-21$
- 17.  $x(x+9) = x^2+9x$
- 19.  $3m(m+2) = 3m^2+6m$
- 21.  $a(a-12) = a^2-12a$

**Task #12: Factoring a Common Factor Using Area**

**Factoring a Common Factor Using Area**

NAME Key

Fill in the missing information for each: dimensions, area as product, and area as sum

|   |       |      |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |
|---|-------|------|-----|-----|------|------|---|--|-----|-----|-----|------|------|---|--|-----|-----|-----|------|------|---|--|-----|-----|------|-------|------|
| <p>1.</p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>6</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>2</math></td> <td style="width: 40px; text-align: center;"><math>2x</math></td> <td style="width: 40px; text-align: center;"><math>12</math></td> </tr> </table> <p><math>p \rightarrow 2(x+6)</math><br/><math>s \rightarrow 2x+12</math></p> |       | $x$  | $6$ | $2$ | $2x$ | $12$ | <p>2.</p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>4</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>5</math></td> <td style="width: 40px; text-align: center;"><math>5x</math></td> <td style="width: 40px; text-align: center;"><math>20</math></td> </tr> </table> <p><math>p \rightarrow 5(x+4)</math><br/><math>s \rightarrow 5x+20</math></p> |  | $x$ | $4$ | $5$ | $5x$ | $20$ | <p>3.</p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>8</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>6</math></td> <td style="width: 40px; text-align: center;"><math>6x</math></td> <td style="width: 40px; text-align: center;"><math>48</math></td> </tr> </table> <p><math>p \rightarrow 6(x+8)</math><br/><math>s \rightarrow 6x+48</math></p> |  | $x$ | $8$ | $6$ | $6x$ | $48$ | <p>4.</p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>3</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>10</math></td> <td style="width: 40px; text-align: center;"><math>10x</math></td> <td style="width: 40px; text-align: center;"><math>30</math></td> </tr> </table> <p><math>p \rightarrow 10(x+3)</math><br/><math>s \rightarrow 10x+30</math></p> |  | $x$ | $3$ | $10$ | $10x$ | $30$ |
|   | $x$   | $6$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |
| $2$   | $2x$  | $12$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |
|   | $x$   | $4$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |
| $5$   | $5x$  | $20$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |
|   | $x$   | $8$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |
| $6$   | $6x$  | $48$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |
|   | $x$   | $3$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |
| $10$  | $10x$ | $30$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |      |       |      |

Fill in the missing dimensions from the expression given.

|   |      |      |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
|---|------|------|-----|-----|------|------|---|--|-----|-----|-----|------|------|---|--|-----|-----|-----|------|------|
| <p>5. <math>5x+35 = 5(x+7)</math></p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>7</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>5</math></td> <td style="width: 40px; text-align: center;"><math>5x</math></td> <td style="width: 40px; text-align: center;"><math>35</math></td> </tr> </table> |      | $x$  | $7$ | $5$ | $5x$ | $35$ | <p>6. <math>2x+12 = 2(x+6)</math></p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>6</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>2</math></td> <td style="width: 40px; text-align: center;"><math>2x</math></td> <td style="width: 40px; text-align: center;"><math>12</math></td> </tr> </table>   |  | $x$ | $6$ | $2$ | $2x$ | $12$ | <p>7. <math>3x+21 = 3(x+7)</math></p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>7</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>3</math></td> <td style="width: 40px; text-align: center;"><math>3x</math></td> <td style="width: 40px; text-align: center;"><math>21</math></td> </tr> </table>   |  | $x$ | $7$ | $3$ | $3x$ | $21$ |
|   | $x$  | $7$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
| $5$   | $5x$ | $35$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
|   | $x$  | $6$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
| $2$   | $2x$ | $12$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
|   | $x$  | $7$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
| $3$   | $3x$ | $21$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
| <p>8. <math>7x+21 = 7(x+3)</math></p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>3</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>7</math></td> <td style="width: 40px; text-align: center;"><math>7x</math></td> <td style="width: 40px; text-align: center;"><math>21</math></td> </tr> </table> |      | $x$  | $3$ | $7$ | $7x$ | $21$ | <p>9. <math>+3x+15 = +3(x+5)</math></p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>5</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>3</math></td> <td style="width: 40px; text-align: center;"><math>3x</math></td> <td style="width: 40px; text-align: center;"><math>15</math></td> </tr> </table> |  | $x$ | $5$ | $3$ | $3x$ | $15$ | <p>10. <math>+5x+45 = 5(x+9)</math></p> <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px; text-align: center;"><math>x</math></td> <td style="width: 20px; text-align: center;"><math>9</math></td> </tr> <tr> <td style="width: 20px; text-align: center;"><math>5</math></td> <td style="width: 40px; text-align: center;"><math>5x</math></td> <td style="width: 40px; text-align: center;"><math>45</math></td> </tr> </table> |  | $x$ | $9$ | $5$ | $5x$ | $45$ |
|   | $x$  | $3$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
| $7$   | $7x$ | $21$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
|   | $x$  | $5$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
| $3$   | $3x$ | $15$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
|   | $x$  | $9$  |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |
| $5$   | $5x$ | $45$ |     |     |      |      |   |  |     |     |     |      |      |   |  |     |     |     |      |      |

This process of writing a sum or difference as the product of factors is called **factoring**.

Factor these:  
 11.  $4x-16 = 4(x-4)$   
 13.  $9x-81 = 9(x-9)$

12.  $-7x-35 = -7(x+5)$   
 14.  $4x+18 = 2(2x+9)$