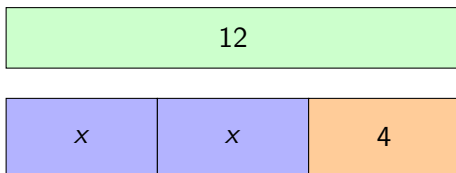


Year 8 Algebra Starters

Starter 1

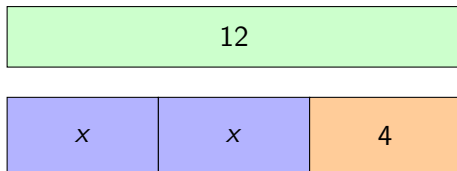
- ▶ Calculate: $-5 + 12 = \underline{\quad}$
- ▶ Collect like terms: $3x + 4x = \underline{\quad}$
- ▶ Expand: $3(x + 4) = \underline{\quad}$
- ▶ Solve: $x + 6 = 14 \Rightarrow \underline{\quad}$



- ▶ Write an equation represented by the bar model and solve it.
- ▶ If the total was 18 instead of 12, what would x be?
- ▶ Is $3(x + 4) = 3x + 4$ true or false? Explain.

Starter 1

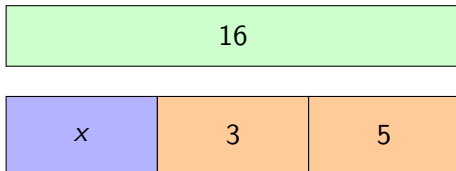
- ▶ Calculate: $-5 + 12 = 7$
- ▶ Collect like terms: $3x + 4x = 7x$
- ▶ Expand: $3(x + 4) = 3x + 12$
- ▶ Solve: $x + 6 = 14 \Rightarrow x = 8$



- ▶ Write an equation represented by the bar model and solve it.
 $2x + 4 = 12$, so $x = 4$.
- ▶ If the total was 18 instead of 12, what would x be $x = 7$.
- ▶ Is $3(x + 4) = 3x + 4$ true or false? Explain. False, because $3(x + 4) = 3x + 12$.

Starter 2

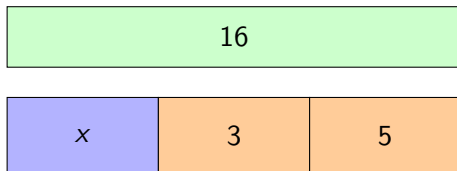
- ▶ Calculate: $6 - 11 = \underline{\quad}$
- ▶ Collect like terms: $5x + 2 + 3x = \underline{\quad}$
- ▶ Expand: $4(a + 2) = \underline{\quad}$
- ▶ Solve: $2x = 14 \Rightarrow \underline{\quad}$



- ▶ Write the equation represented by the bar model and solve it.
- ▶ Which part of the diagram represents the constant?
- ▶ Create a bar model for $8x + 2 = 26$.
- ▶ Simplify: $ax + bx = \underline{\quad}$

Starter 2

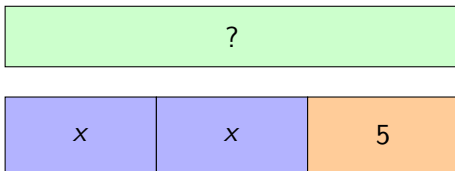
- ▶ Calculate: $6 - 11 = -5$
- ▶ Collect like terms: $5x + 2 + 3x = 8x + 2$
- ▶ Expand: $4(a + 2) = 4a + 8$
- ▶ Solve: $2x = 14 \Rightarrow x = 7$



- ▶ Write the equation represented by the bar model and solve it.
 $x + 3 + 5 = 16$, so $x = 8$.
- ▶ Which part of the diagram represents the constant? The 3 and 5 blocks (total 8).
- ▶ Create a bar model for $8x + 2 = 26$. Eight x -blocks and a 2-block, with total 26.
- ▶ Simplify: $ax + bx = (a + b)x$

Starter 3

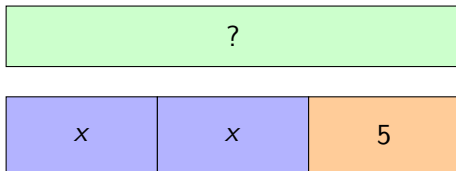
- ▶ Calculate: $-3 + 8 = \underline{\quad}$
- ▶ Collect like terms: $6a + 3 + 2a = \underline{\quad}$
- ▶ Expand: $2(x + 7) = \underline{\quad}$
- ▶ Solve: $x - 4 = 9 \Rightarrow \underline{\quad}$



- ▶ Suppose the total is 17. Write and solve the equation.
- ▶ Suppose the total is 25. What is x now?
- ▶ Expand: $3(x + 7) = \underline{\quad}$
- ▶ Expand: $3(x - 7) = \underline{\quad}$

Starter 3

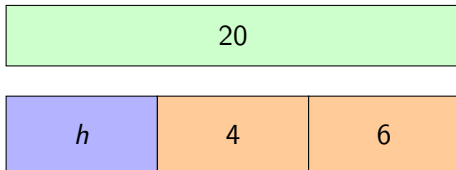
- ▶ Calculate: $-3 + 8 = 5$
- ▶ Collect like terms: $6a + 3 + 2a = 8a + 3$
- ▶ Expand: $2(x + 7) = 2x + 14$
- ▶ Solve: $x - 4 = 9 \Rightarrow x = 13$



- ▶ Suppose the total is 17. Write and solve the equation.
 $2x + 5 = 17$, so $x = 6$.
- ▶ Suppose the total is 25. What is x now $x = 10$.
- ▶ Expand: $3(x + 7) = 3x + 21$
- ▶ Expand: $3(x - 7) = 3x - 21$

Starter 4

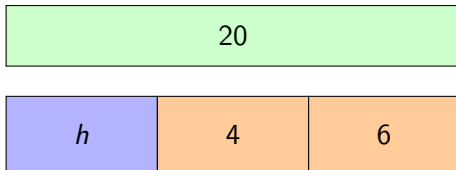
- ▶ Calculate: $-6 \div 3 = \underline{\hspace{2cm}}$
- ▶ Collect like terms: $9a - 4a + 2 + 3b = \underline{\hspace{2cm}}$
- ▶ Expand: $5(y + 3) = \underline{\hspace{2cm}}$
- ▶ Solve: $3d = 18 \Rightarrow \underline{\hspace{2cm}}$



- ▶ Write an equation represented by the diagram and solve for h .
- ▶ If the 4 block was instead h and the h block was 4, what equation would we have?
- ▶ Expand: $(x - 3)(x - 2) = \underline{\hspace{2cm}}$
- ▶ Simplify: $a^2 \times a \times b = \underline{\hspace{2cm}}$

Starter 4

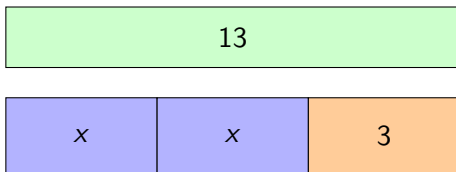
- ▶ Calculate: $-6 \div 3 = -2$
- ▶ Collect like terms: $9a - 4a + 2 + 3b = 5a + 2 + 3b$
- ▶ Expand: $5(y + 3) = 5y + 15$
- ▶ Solve: $3d = 18 \Rightarrow d = 6$



- ▶ Write an equation represented by the diagram and solve for h .
 $h + 4 + 6 = 20$, so $h = 10$.
- ▶ If the 4 block was instead h and the h block was 4, what equation would we have $4 + h + 6 = 20$.
- ▶ Expand: $(x - 3)(x - 2) = x^2 - 5x + 6$
- ▶ Simplify: $a^2 \times a \times b = a^3b$

Starter 5

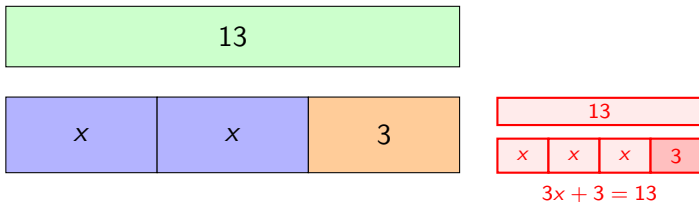
- ▶ Calculate: $7 - 12 = \underline{\quad}$
- ▶ Collect like terms: $2x + 7 + 3x = \underline{\quad}$
- ▶ Expand: $3(a + 5) = \underline{\quad}$
- ▶ Solve: $2x + 3 = 11 \Rightarrow \underline{\quad}$



- ▶ Write and solve the equation represented by the model.
- ▶ Explain how each part of the diagram matches the equation.
- ▶ Draw a bar model to represent $3x + 3 = 13$.
- ▶ Write an equation with solution $x = 5$.

Starter 5

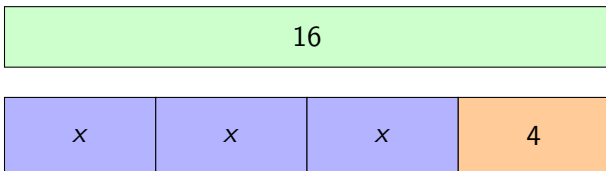
- ▶ Calculate: $7 - 12 = -5$
- ▶ Collect like terms: $2x + 7 + 3x = 5x + 7$
- ▶ Expand: $3(a + 5) = 3a + 15$
- ▶ Solve: $2x + 3 = 11 \Rightarrow x = 4$



- ▶ Write and solve the equation represented by the model.
 $2x + 3 = 13$, so $x = 5$.
- ▶ Explain how each part of the diagram matches the equation.
Two x -blocks and a 3-block make the total 13.
- ▶ Draw a bar model to represent $3x + 3 = 13$.
- ▶ Write an equation with solution $x = 5$. e.g. $x + 2 = 7$.

Starter 6

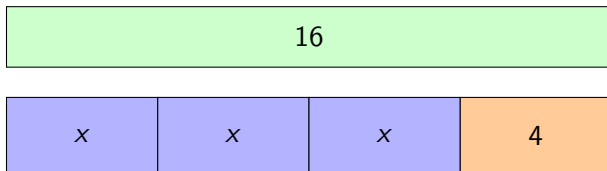
- ▶ Calculate: $-4 \times 6 =$ _____
- ▶ Collect like terms: $7x + 3x - 5 =$ _____
- ▶ Expand: $2(3x + 4) =$ _____
- ▶ Solve: $3x + 5 = 17 \Rightarrow$ _____
- ▶ Solve: $4x + 3 = 2x + 15 \Rightarrow$ _____
- ▶ Solve: $\frac{x}{3} + 4 = 9 \Rightarrow$ _____



- ▶ Write one equation that could be represented by this bar model.
- ▶ Write a different equation with the same solution.
- ▶ Create an equation with solution $x = 4$ that includes a

Starter 6

- ▶ Calculate: $-4 \times 6 = -24$
- ▶ Collect like terms: $7x + 3x - 5 = 10x - 5$
- ▶ Expand: $2(3x + 4) = 6x + 8$
- ▶ Solve: $3x + 5 = 17 \Rightarrow x = 4$
- ▶ Solve: $4x + 3 = 2x + 15 \Rightarrow x = 6$
- ▶ Solve: $\frac{x}{3} + 4 = 9 \Rightarrow x = 15$



- ▶ Write one equation that could be represented by this bar model. $3x + 4 = 16$.
- ▶ Write a different equation with the same solution. e.g. $2x + 3 = 11$.
- ▶ Create an equation with solution $x = 4$ that includes a