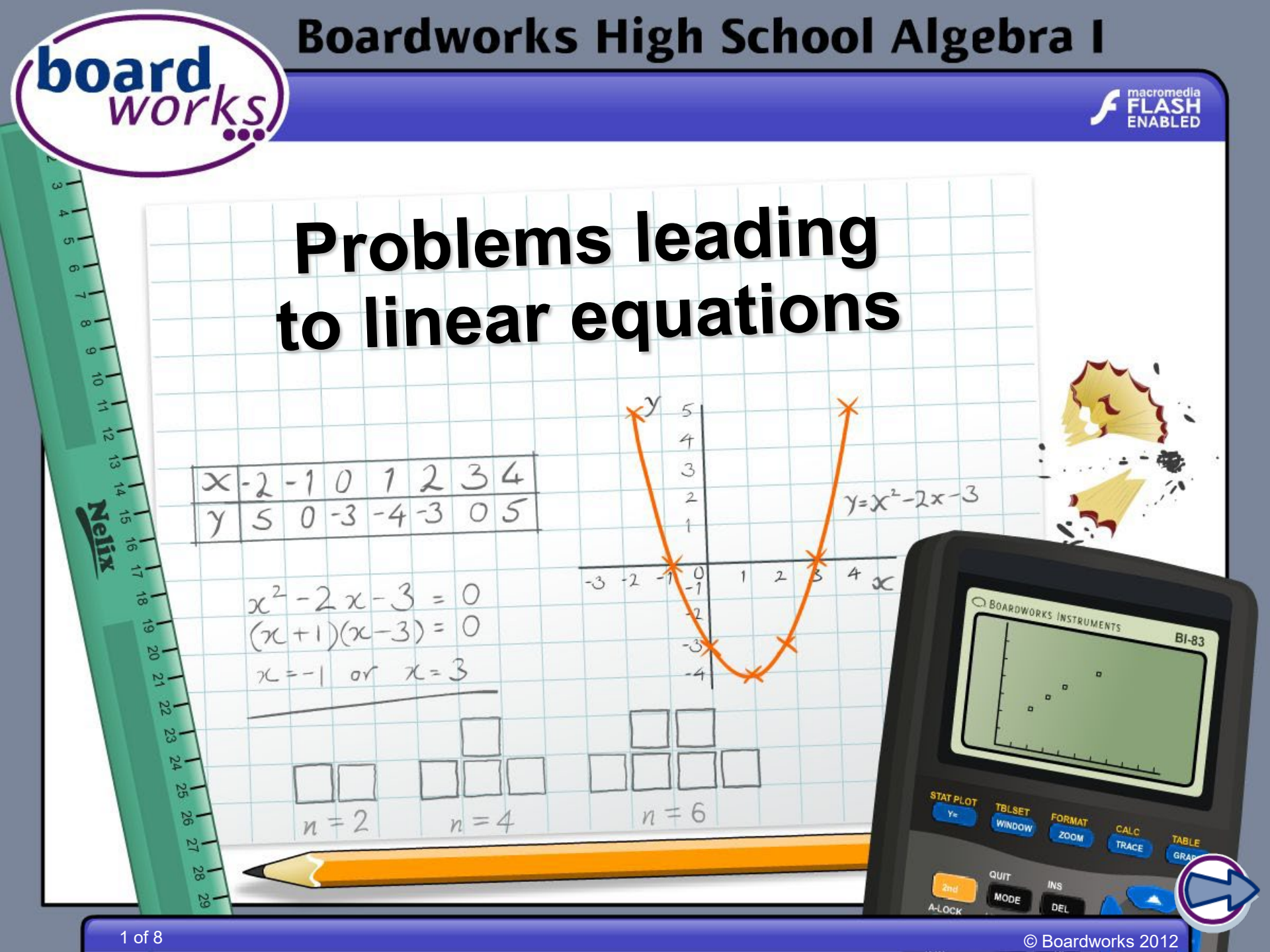
# Problems leading to linear equations



# Information

## Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.


Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

They are:

**1) Make sense of problems and persevere in solving them.**

**2) Reason abstractly and quantitatively.**

**3) Construct viable arguments and critique the reasoning of others.**

**4) Model with mathematics.**

**5) Use appropriate tools strategically.**

**6) Attend to precision.**

**7) Look for and make use of structure.**

**8) Look for and express regularity in repeated reasoning.**

This icon indicates that the slide contains activities created in Flash. These activities are not editable.

This icon indicates teacher's notes in the Notes field.

# Age

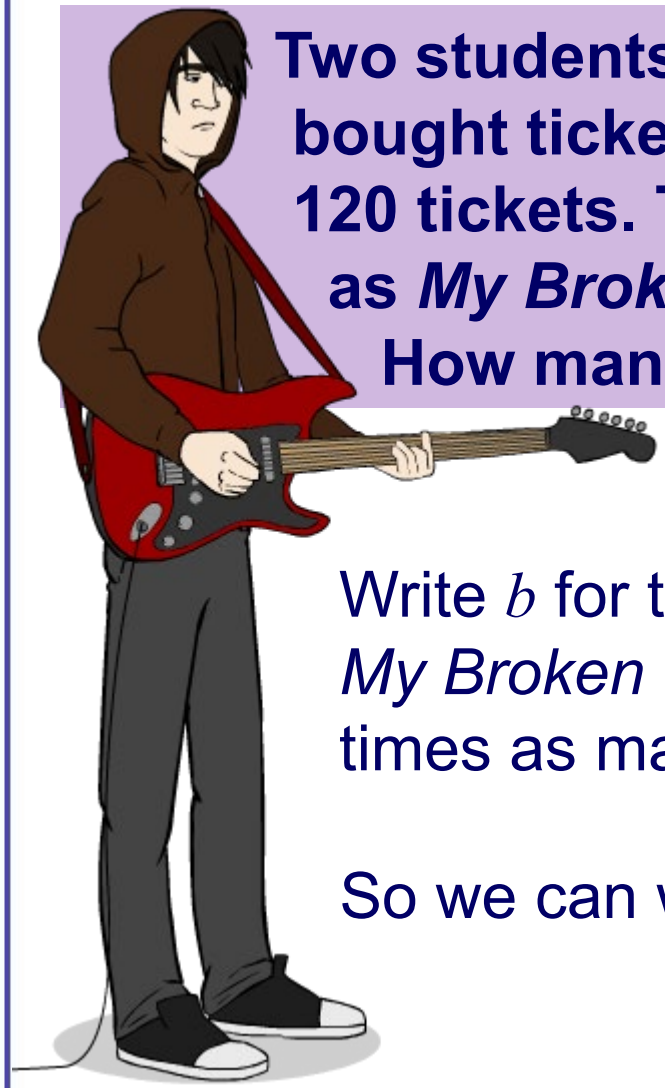
In one year, I will be exactly three times Saffron's age.

My age plus my dad's age is 66 years.

**Can you work out how old Saffron is from the clues she and her father give?**

Press the "=" button to show the calculations step by step.

# Ticket sales



**Two students are comparing how many people bought tickets to their bands' gigs. *Cold T* sold 120 tickets. They sold three times as many tickets as *My Broken Dreams*.**

**How many tickets did *My Broken Dreams* sell?**

Write $b$ for the number of tickets sold by *My Broken Dreams*. Then *Cold T* sold three times as many tickets, $3b$.

So we can write the equation: $3b = 120$

…and solve it: $\boldsymbol{b = 40}$

*My Broken Dreams* sold **40 tickets**.

# Sponsorship

**Carly and Noah did a sponsored sky dive for charity. Together they raised $600. Carly raised $170 more than Noah. How much did Noah raise?**

Write $n$ for the amount raised by Noah.

Write two expressions for the amount raised by Carly:

**$600 minus the amount raised by Noah** $\quad$ **$170 more than Noah**

$$600 - n = n + 170$$

$$n + 170 = 600 - n$$

Solve for $n$:

$$n + n = 600 - 170$$

$$2n = 430$$

$$n = 215$$

**Noah raised $215.**

# Constructing an equation

I am thinking of a number. When I subtract 9 from this number and then double it, I get the same answer as if I divided the number by 5. What number am I thinking of?

Call the unknown number $n$.

We can find the original number by writing what we know about it in an equation:

$$2(n - 9) = \frac{n}{5}$$

**the number with 9 subtracted and then doubled**

**the number divided by 5**

# Solving the equation

Solve the equation by performing the same operations on both sides:

$$2(n - 9) = \frac{n}{5}$$

| | |
|---|---|
| multiply both sides by 5: | $10(n - 9) = n$ |
| distribute the multiplication: | $10n - 90 = n$ |
| add 90 to both sides: | $10n = n + 90$ |
| subtract $n$ from both sides: | $9n = 90$ |
| divide both sides by 9: | $\boldsymbol{n = 10}$ |

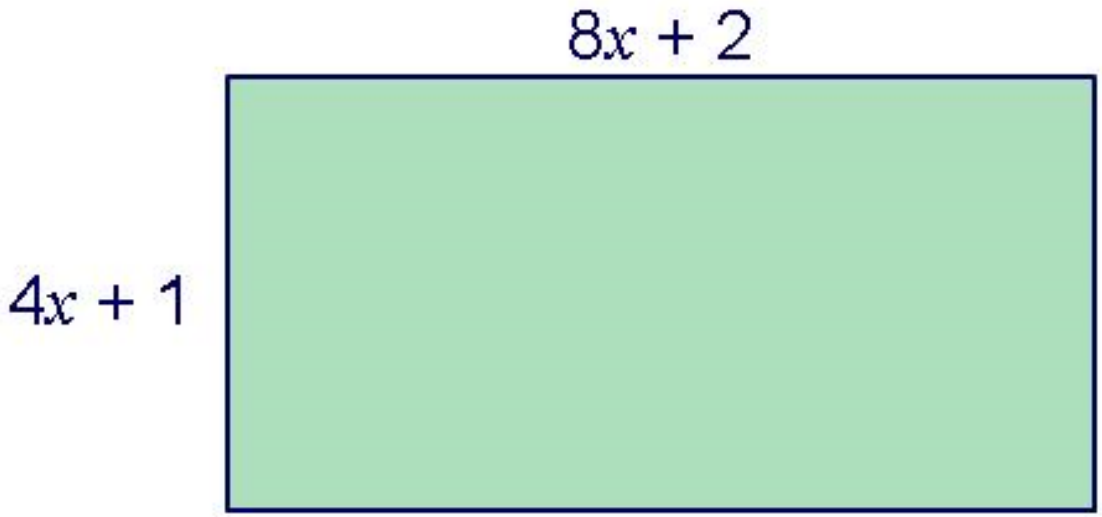
Check the solution by substituting the value of $n$ back into the original equation:

$2 \times (10 - 9) = 2 \times 1 = 2 \quad = 10 \div 5$ ✓

That's right! I was thinking of **10**.

# Rectangle perimeters

The perimeter of this rectangle is 62 cm.




$x =$

1 2