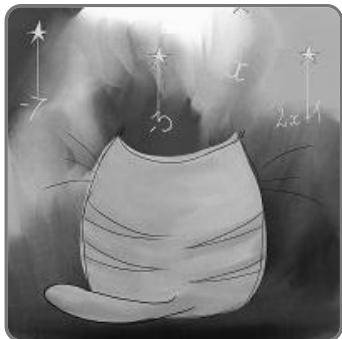# IDENTIFYING QUADRATIC EQUATIONS

- For this web exercise, you need to fully understand what **terms** are.
  So, you may want to check these out:
  Recognizing Products and Sums; Identifying Factors and Terms
  Identifying Variable Parts and Coefficients of Terms

> **DEFINITION**   *quadratic equation*
>
> Let a, b and c be real numbers, with $a \neq 0$.
> A **quadratic equation** is an equation of the form:
>
> $$ax^2 + bx + c = 0$$

Important notes about the definition:

- A quadratic equation is, first and foremost, an **equation**.
  It must have an '$=$' sign.

- When mathematicians say 'an equation of the form ...'
  they **really** mean 'an equation that **can be put** in the form ...'
  by using the two primary equation-solving tools:
  the Addition Property of Equality and the Multiplication Property of Equality.

- A quadratic equation **must** have an x^2 term.
  This is what $a \neq 0$ tells us.

- A quadratic equation is allowed (but not required) to have an x term.
  The coefficient b might be zero, which means the x term is gone.

- A quadratic equation is allowed (but not required) to have a constant term.
  (Recall that a **constant** term is just a number—no variables.)
  The constant term, c, might be zero.

So, to check if an equation is a **quadratic** equation,
you want to make two passes through it (both sides):

- Does it have an x^2 term appearing somewhere?
  If not, then it's not a quadratic equation.
  Note: it can have **lots** of x^2 terms!

- The only other two term types that are allowed are x terms and constants terms.
  (For example: no x^3 terms, no variables inside square roots, no variables in denominators, and so on.)
  So, sweep across the equation and look for anything other than x terms and constant terms.
  If you find any, then it's not a quadratic equation.

EXAMPLES:

In this exercise, you will practice identifying quadratic equations.

Question: Is $x^2 = x + 4$ a quadratic equation?
Solution:
Does it have an x^2 term?   Check!
Anything other than x terms or constant terms?   Nope.   Check!
YES, it is a quadratic equation.

Question: Is $3x - 4 = x + 1$ a quadratic equation?
Solution:
Does it have an x^2 term?   Nope.
So, it's not a quadratic equation.

Question: Is $x - 2x^2 = 1 + x^5$ a quadratic equation?
Solution:
Does it have an x^2 term?   Check!
Anything other than x terms or constant terms?   Oops.
Quadratic equations are not allowed to have an x^5 term.
So, it's not a quadratic equation.