Objective: Solve equations.

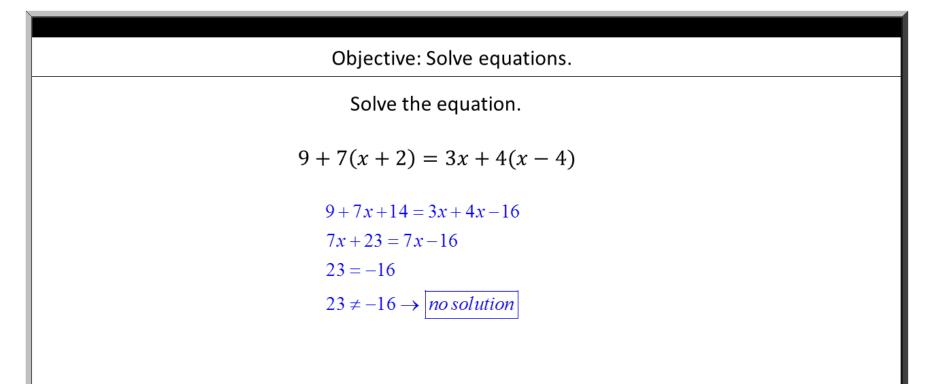
Concept

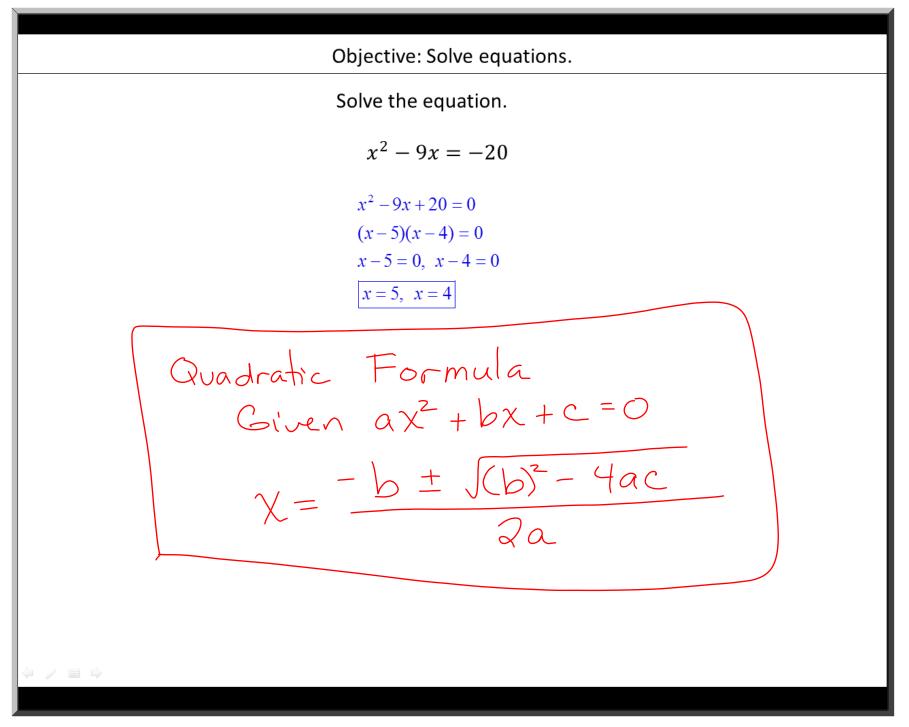
When solving an equation you must recognize the family it belongs to so you know what algebraic strategies/procedures to use and whether there may be extraneous or invalid solutions.

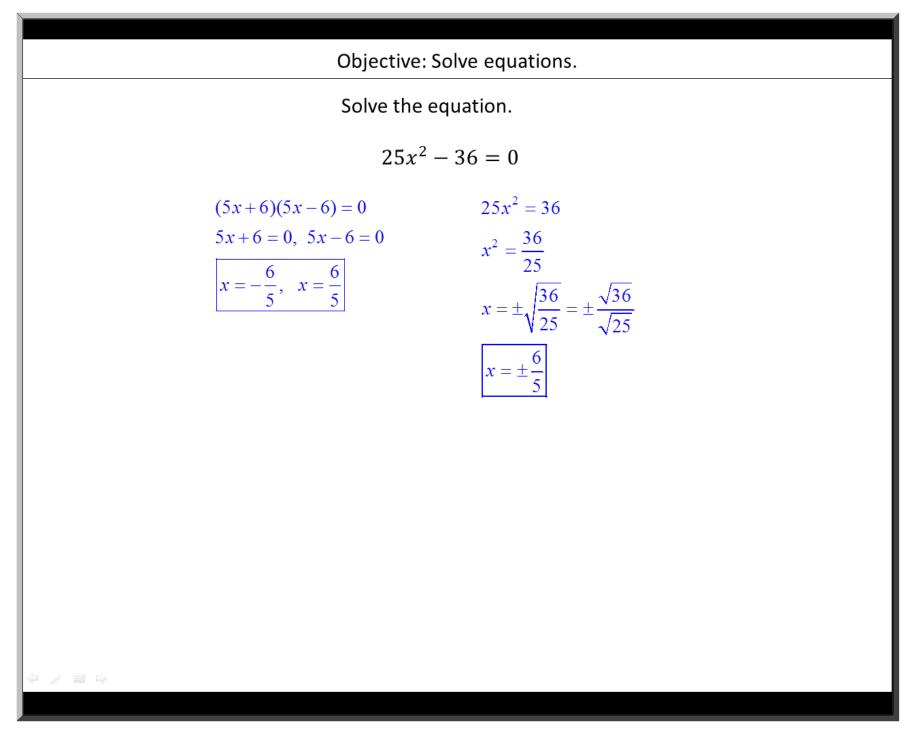
Type of Equation	Types of Solutions
$\frac{\text{Linear}}{\text{Example: } 3x - 6 = 2x + 5}$	One solution, no solution, infinitely many solutions.
$\frac{\text{Polynomial}}{\text{Examples: } x^2 - 5x = 0,}$ $x^3 - 6x^2 + 5x = 0$	The number of solutions is equal to the degree of the polynomial. Solutions can be real or imaginary numbers.
$\frac{\text{Square Root}}{\text{Example: }\sqrt{x-1} = 7}$	Solutions must be real numbers and make the radicand ≥ 0 .
$\frac{\text{Cube Root}}{\text{Example: } \sqrt[3]{3x} = 4}$	Solutions must be real numbers.
Examples: $\frac{3}{x} = \frac{2}{x+4}, \frac{4}{x} - \frac{3}{x-2} = 5$	Solutions cannot make the denominator equal to 0.
Exponential Examples: $4 = 8^x$, $2e^x = 12$	Solutions must be real numbers.

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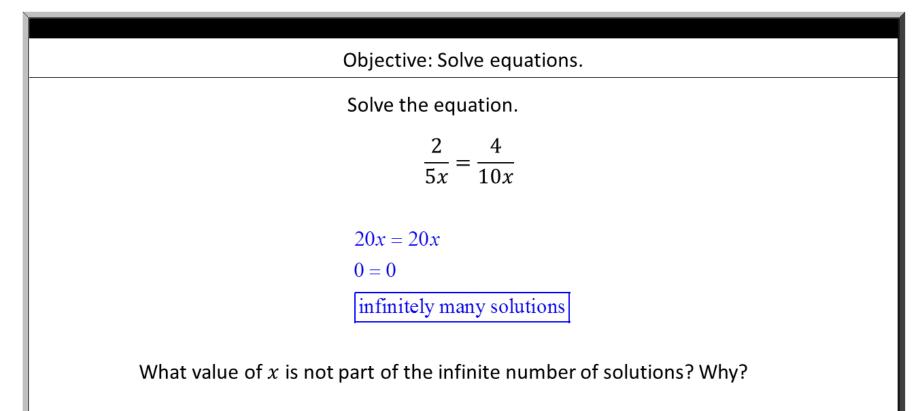
Objective: Solve equations.	
Solve the inequality.	
-x + 2 > 5	
-x + 2 > 5	
-x > 3	
$\frac{-x}{-1} > \frac{3}{-1}$	
x < -3	
↓ ■ ↓	



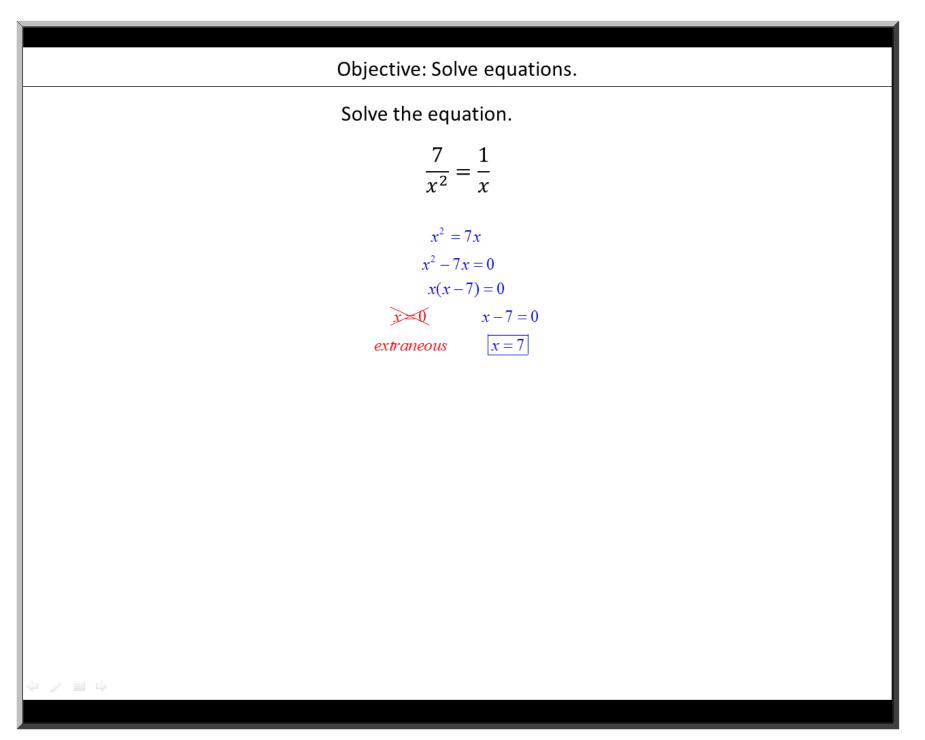




Objective: Solve equations.	
Solve the equation.	
$\frac{6}{x} = 9$	
$\frac{6}{x} = \frac{9}{1}$ $9x = 6$ $x = \frac{6}{1}$	
$x = \frac{1}{9}$ $x = \frac{2}{3}$	

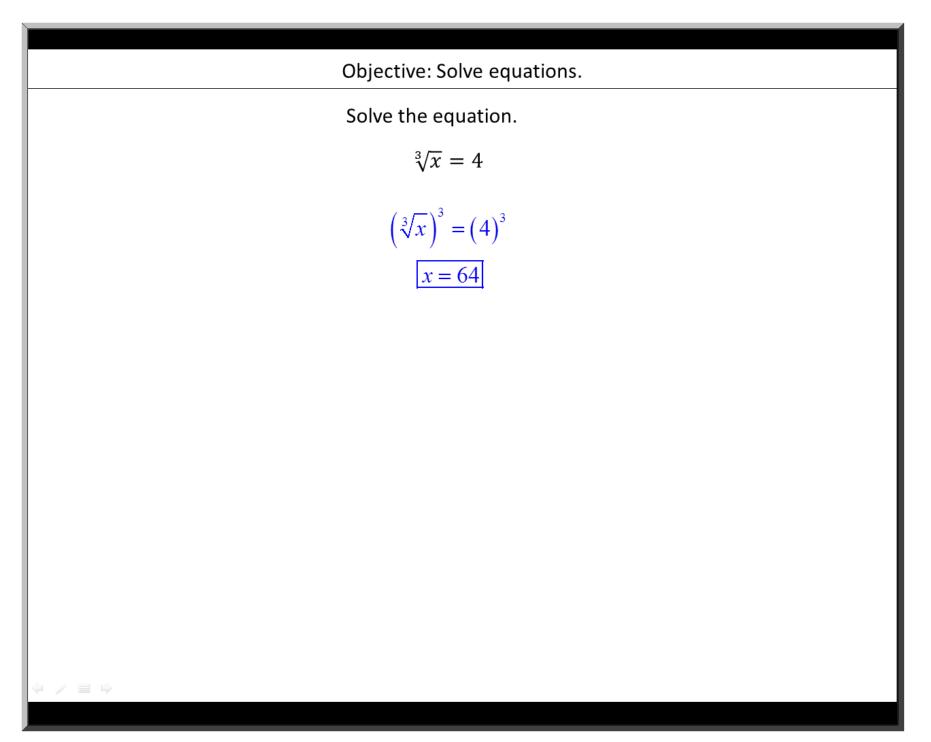


The value x = 0 is not a valid solution because division by 0 is undefined.



Objective: Solve equations.	
Solve the equation.	
$5\sqrt{x} = 45$	
$\frac{5\sqrt{x}}{5} = \frac{45}{5}$	
$\sqrt{x} = 9$ $\left(\sqrt{x}\right)^2 = 9^2$	
x = 81	

Objective: Solve equations.	
Solve the equation.	
$\sqrt{x+2} + 8 = 2$	
$\sqrt{x+2} = -6$	
$\left(\sqrt{x+2}\right)^2 = \left(-6\right)^2$	
x + 2 = 36	
$x \rightarrow no \ solution$ check : $\sqrt{34+2} = -6$	
$\sqrt{36} \neq -6$	



Objective: Solve equations.		
Solve the equation.		
	$2^{x} = 19$	
$\log 2^{x} = \log 19$ $x \cdot \log 2 = \log 19$ $x = \frac{\log 19}{\log 2}$	$\ln 2^{x} = \ln 19$ $x \cdot \ln 2 = \ln 19$ $x = \frac{\ln 19}{\ln 2}$	$x = \log_2 19$ logarithmic form

Objective: Solve equations.				
Solve the equation.				
		$9 = 12^{x}$		
	$log 9 = log 12^{x}$ $log 9 = x \cdot log 12$ $x = \frac{log 9}{log 12}$	$\ln 9 = \ln 12^{x}$ $\ln 9 = x \cdot \ln 12$ $x = \frac{\ln 9}{\ln 12}$	$x = \log_{12} 9$ Iogarithmic form	

Objective: Solve equations.	
Solve the equation.	
$\frac{x}{x+3} = \frac{2}{7}$	
x + 5 /	
2(x+3) = 7x	
2x + 6 = 7x	
6 = 5x	
$x = \frac{6}{5}$	
$\langle \varphi \rangle \equiv \varphi$	