

## Objective 4 - Solve Exponential

*Solve exponential equations with the same or different bases.*

Link to section in online textbook.

First, watch [this video](#) to learn how to solve certain types of exponential equations (when the bases are the same). Then practice this method below.

**Question 1** Solve the exponential equation below.

$$6^{-3x+4} = 6^{-6x+3}$$

$$x = \boxed{-0.333}$$

**Question 2** Solve the exponential equation below.

$$25^{-6x-6} = 5^{-6x-3}$$

$$x = \boxed{-1.5}$$

**Question 3** Solve the exponential equation below.

$$\left(\frac{1}{216}\right)^{-4x+3} = 6^{-2x+5}$$

$$x = \boxed{1.0}$$

**Question 4** Solve the exponential equation below.

$$9^{2x-3} = 27^{-2x-2}$$

$$x = \boxed{0.0}$$

Learning outcomes:  
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It's great when equations line up like this, but what happens if we **can't** write the bases to be the same? Watch [this video](#) to learn how to solve **any** type of exponential equation. Then practice with the questions below.

*Note: Yes, you can use this method all of the time! While changing the bases to be the same to rewrite the question can be easier sometimes, taking the log of both sides will **always** solve exponential equations.*

**Question 5** Solve the exponential equation below.

$$8^{2x-4} = 7^{5x+3}$$

$$x = \boxed{-2.541}$$

**Question 6** Solve the exponential equation below.

$$9^{2x+4} = 36^{-4x-6}$$

$$x = \boxed{-1.617}$$

**Question 7** Solve the exponential equation below.

$$343^{4x+4} = \frac{1}{512}^{-5x-3}$$

$$x = \boxed{0.591}$$

**Question 8 Main takeaway:** Before looking, you should work through the previous problems. Have you finished working through the examples?

**Feedback(correct):** While changing the bases to be the same to rewrite the question can be easier sometimes, taking the log of both sides will **always** solve exponential equations.