# Exponential Equations – Practice and Answers

Exponential equations can sometimes be solved by exploiting the one-to-one property of exponential functions. For example

$$2^{(4x-3)} = 16$$

We can solve this by first writing both sides of the equation in terms of the same base. We know $16 = 2^4$ that, so re-writing

$$2^{(4x-3)} = 2^4$$

Using the one-to-one property

$$4x - 3 = 4$$

$$4x = 7$$

$$x = \frac{7}{4}$$

Solve each of the following equations by using the one-to-one property of exponential functions.

1) $2^{2x+1} = 8$

2) $5^{2x-1} = 125$

3) $3^{2x-1} = 81$

4) $4^{3x} = 128$

5) $5^{2x} = 625$

6) $8^{2x} = 32$

7) $4^{x^2+2x+1} = 16$

8) $9^{6x} = 243$

9) $2^{5x} = 1024$

10) $2^{x^2} \times 3^{x^2} = 36^{x-\frac{1}{2}}$

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## Answers

1) $x = 1$

2) $x = 2$

3) $x = \frac{5}{2}$

4) $x = \frac{7}{6}$

5) $x = 2$

6) $x = \frac{5}{6}$

7) $x = -1 \pm \sqrt{2}$

8) $x = \frac{5}{12}$

9) $x = 2$

10) $x = 1$