

Precalculus

Exponent equation that reduces to masked quadratic, part 2

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Example (Exponential equation that reduces to quadratic)

Solve the equation.

$$3^{2x} = 2 + 63 \cdot 3^{-2x}$$

$$3^{2x} - 2 - 63 \cdot 3^{-2x} = 0$$

$$u - 2 - 63u^{-1} = 0$$

$$u^2 - 2u - 63 = 0$$

$$(u - 9)(u + 7) = 0$$

$$u - 9 = 0 \text{ or } u + 7 = 0$$

$$u = 9 \text{ or } u = -7$$

$$3^{2x} = 9 \text{ or no real solution}$$

$$2x = \log_3 9$$

$$2x = 2$$

$$x = 1$$

> 2 terms \Rightarrow
transfer one side

$$3^{2x} = u$$

$$3^{-2x} = (3^{2x})^{-1} = u^{-1}$$

Multiply $\cdot u$