

## 5.1 Same Base Exponential Equations

Solve exponential equations by writing both sides with the same base.

① solve  $3^{2x} = 3^3$

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

If  $a^m = a^n$   
then  $m = n$

② solve  $9^{-3x} = 3^3$

$$(3^2)^{-3x} = 3^3$$
$$3^{-6x} = 3^3$$
$$\frac{-6x}{-6} = \frac{3}{-6}$$
$$x = -\frac{1}{2}$$

$$9 = 3^2$$

$$\frac{3 \div 3}{-6 \div 3} = \frac{-1}{2}$$

③ solve  $5^{3n-2} = 125$

$$5^{3n-2} = 5^3$$
$$\frac{3n-2}{+2} = \frac{3}{+2}$$
$$\frac{3n}{3} = \frac{5}{3}$$
$$n = \frac{5}{3}$$

④ solve  $32^{-2x} = 16$

$$(2^5)^{-2x} = 2^4$$

$$2^{-10x} = 2^4$$

$$\underline{-10x} = \underline{4}$$

$$\underline{-10} \quad \underline{-10}$$

$$x = \frac{-4 \div 2}{10 \div 2} = \boxed{\frac{-2}{5}}$$