

## 3.5 Day 2 Practice

Solve each equation.

1)  $7^{11x-10} = 7^{-6x^2}$

$$11x - 10 = -6x^2$$

$$6x^2 + 11x - 10 = 0$$

$$6x^2 + 15x - 4x - 10 = 0$$

$$3x(2x+5) - 2(2x+5) = 0$$

$$(3x-2)(2x+5) = 0$$

$$x = 2/3, -5/2$$

3)  $10^{2x+3} = 1000^{x+5}$

$$10^{2x+3} = 10^{3(x+5)}$$

$$2x+3 = 3x+15$$

$$-12 = x$$

5)  $2^{9x^2} = 16$

$$2^{9x^2} = 2^4$$

$$9x^2 = 4$$

$$9x^2 - 4 = 0$$

$$(3x-2)(3x+2) = 0$$

$$x = 2/3, -2/3$$

2)  $9^{2x+3} = \left(\frac{1}{27}\right)^{3x+1}$

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

$$4x+6 = -9x-3$$

$$13x = -9$$

$$x = -9/13$$

4)  $4^{3x^2} = 8^{-6x}$

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

$$6x^2 = -18x$$

$$6x^2 + 18x = 0$$

$$6x(x+3) = 0$$

$$x = 0, -3$$

6)  $3^{x^2-8} = \left(\frac{1}{3}\right)^{-2x}$

$$3^{x^2-8} = 3^{-1(-2x)}$$

$$x^2 - 8 = 2x$$

$$x^2 - 2x - 8 = 0$$

$$(x-4)(x+2) = 0$$

$$x = 4, -2$$

$$7) e^{-x^2+6} = e^{5x}$$

$$x^2+6=5x$$

$$x^2-5x+6=0$$

$$(x-2)(x-3)=0$$

$$\boxed{x=2, 3}$$

$$9) 16^{3p} = 64$$

$$4^{2(3p)} = 4^3$$

$$6p = 3$$

$$\boxed{p = \frac{1}{2}}$$

$$11) \left(\frac{1}{2}\right)^{-x-3} = 4^{x^2}$$

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

$$x+3 = 2x^2$$

$$2x^2 - x - 3 = 0$$

$$(2x-3)(x+1) = 0$$

$$\boxed{x = \frac{3}{2}, -1}$$

$$8) 64^{3x} = 4^{-3x}$$

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

$$9x = -3x$$

$$12x = 0$$

$$\boxed{x = 0}$$

$$10) \left(\frac{1}{3}\right)^{2-3x} = 9^{2x+2}$$

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

$$-2+3x = 4x+4$$

$$\boxed{-6 = x}$$

$$12) 8^{x^2+9} = 32^{-6x}$$

$$2^{3(x^2+9)} = 2^{5(-6x)}$$

$$3x^2+27 = -30x$$

$$3x^2+30x+27=0$$

$$3(x^2+10x+9)=0$$

$$3(x+1)(x+9)=0$$

$$\boxed{x = -1, -9}$$