

# Unit 9 Obj. 3

## Part 1 - Problems 1-12

Key: Common Base

#6  $3^{-(x+5)} = 9^{4x}$

$9 = 3^2$

$$3^{-x-5} = 3^{2 \cdot 4x}$$

$$3^{-x-5} = 3^{8x}$$

$$\begin{array}{r} -x-5 = 8x \\ +x \quad \quad +x \\ \hline \end{array}$$

$$\frac{-5}{9} = \frac{9x}{9}$$

$x = \frac{-5}{9}$

#10

$$5^x = \sqrt{125}$$

$125 = 5^3$

$$5^x = \sqrt{5^3}$$

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

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

#12

$$49^{x-2} = 7\sqrt{7}$$

$49 = 7^2$

$$7^{2(x-2)} = 7^1 \cdot 7^{\frac{1}{2}}$$

$$7^{2x-4} = 7^{1\frac{1}{2}}$$

$$7^{2x-4} = 7^{\frac{3}{2}}$$

$$2x - 4 = \frac{3}{2}$$

$$4x - 8 = 3$$

$$4x = 11$$

$x = \frac{11}{4}$

# Unit 9 Obj. 3 (cont.)

## Problems 13-24

Key: convert from log to exponential

$$\log_a b = x \leftarrow \text{log form}$$

$$a^x = b \leftarrow \text{exponential form}$$

# 18  $\log_3 \sqrt[5]{9} = x$

$$3^x = \sqrt[5]{9}$$

$$3^x = \sqrt[5]{3^2}$$

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

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

# 23  $\log_8 \sqrt[3]{4} = x$

$$8^x = \sqrt[3]{4}$$

$$2^{3x} = \sqrt[3]{2^2}$$

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

$$\left(\frac{1}{3}\right) 3x = \frac{2}{3} \left(\frac{1}{3}\right)$$

$$x = \frac{2}{9}$$

$$8 = 2^3$$

$$4 = 2^2$$

# Unit 9 Obj. 3 (Continued)

## Problems 25-40

#32  ~~$\log x^{\frac{5}{3}} = \log 32$~~

$$x^{\frac{5}{3}} = 32$$

$$x = (\sqrt[5]{32})^3$$

$$x = 2^3 = \boxed{x = 8}$$

#35  $\log_5 (2x-7) = 0$

$$5^0 = 2x-7$$

$$1 = 2x-7$$

$$\frac{8}{2} = \frac{2x}{2}$$

$$\boxed{x = 4}$$

#39  $\ln (x-9) = 1$

$$e^1 = x-9$$

$$e = x-9$$

$$+9$$

$$+9$$

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$$\boxed{e+9 = x}$$