

Section 5.3:

Dr. ZABDAWI

#55) $3^{x^3} = 9^x \Rightarrow 3^{x^3} = (3^2)^x = 3^{2x}$
 $3^{x^3} = 3^{2x}$

$\Rightarrow x^3 = 2x$
 $x^3 - 2x = 0 \Rightarrow x(x^2 - 2) = 0$

$x = 0 \quad | \quad x^2 - 2 = 0$
 $x^2 = 2 \Rightarrow x = \pm\sqrt{2}$

∴ Sol. set $x = \{0, \pm\sqrt{2}\}$

#60) $(\frac{1}{2})^{1-x} = 4$
 $\Rightarrow (2)^{x-1} = 2^2 \Rightarrow x-1=2 \Rightarrow \boxed{x=3}$

#65) $e^{x^2} = e^x \cdot \frac{1}{e^2} = e^{3x-2}$
 $\Rightarrow x^2 = 3x-2$
 $x^2 - 3x + 2 = 0 \Rightarrow (x-2)(x-1) = 0$

$x-2=0 \quad | \quad x-1=0$
 $x=2 \quad | \quad x=1.$

Sol. set $x = \{1, 2\}$

#70) $5^{-x} = 3$
 $\Rightarrow (\frac{1}{5})^x = 3 \Rightarrow \frac{1^x}{5^x} = 3 \quad ; \quad 1^x = 1$

$\Rightarrow \frac{1}{5^x} = 3 \Rightarrow 5^x = \frac{1}{3}$

$\Rightarrow 5^{3x} = (\frac{1}{3})^3 = \frac{1}{27}$

∴ $\boxed{5^{3x} = \frac{1}{27}}$