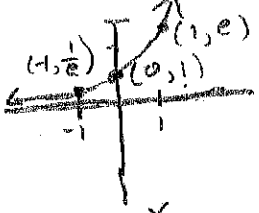
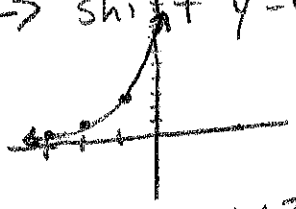
4.3 - Solutions to 47, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73

47.) $F(x) = e^{x+2}$ → shift $y = e^x$ left 2 [subtract 2 from each x coordinate & keep the y-coordinate]



$y = e^x$



$y = e^{x+2}$

D: $(-\infty, \infty)$

R: $y > 0$

* Also, plug '0' in for x to find the y-intercept

x	y
-3	$\frac{1}{e}$
-2	1
-1	e
0	e^2

55.) $3^{x^3} = 9^x \rightarrow 3^{x^3} = (3^2)^x \rightarrow 3^{x^3} = 3^{2x} \rightarrow x^3 = 2x$

$x^3 - 2x = 0$

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

$x = 0$

$x^2 - 2 = 0$

$x^2 = 2$

$x = \pm\sqrt{2}$

* you have to try & make the bases the same. Simplify exponents & set them equal to each other.

$\boxed{x = 0, x = \pm\sqrt{2}}$

57.) $8^{x^2-2x} = \frac{1}{2} \rightarrow (2^3)^{(x^2-2x)} = 2^{-1} \rightarrow 3(x^2-2x) = -1 \rightarrow 3x^2 - 6x = -1$

* make bases equal.

$3x^2 - 6x + 1 = 0$ * use quadratic Formula

$\frac{-(-6) \pm \sqrt{(-6)^2 - 4(3)(1)}}{2(3)} = \frac{6 \pm \sqrt{24}}{6}$

$= \frac{6 \pm 2\sqrt{6}}{6} = \boxed{\frac{1 \pm \sqrt{6}}{3}}$

59.) $2^x \cdot 8^{-x} = 4^x \rightarrow 2^x \cdot (2^3)^{-x} = (2^2)^x \rightarrow 2^x \cdot 2^{-3x} = 2^{2x}$

$x - 3x = 2x \rightarrow x - 3x - 2x = 0 \rightarrow \frac{-4x}{-4} = \frac{0}{-4} \rightarrow \boxed{x = 0}$

61.) $\left(\frac{1}{5}\right)^{2-x} = 25 \rightarrow (5^{-1})^{(2-x)} = 5^2 \rightarrow -1(2-x) = 2 \rightarrow -2 + x = 2$

$\boxed{x = 4}$

63.) $4^x = 8 \rightarrow (2^2)^x = 2^3 \rightarrow \frac{2x}{2} = \frac{3}{2} \rightarrow \boxed{x = \frac{3}{2}}$

65.) $e^{x^2} = (e^{3x}) \cdot \frac{1}{e^2} \Rightarrow e^{x^2} = (e^{3x})(e^{-2}) \rightarrow x^2 = 3x - 2$

$x^2 - 3x + 2 = 0 \rightarrow (x-2)(x-1) = 0 \rightarrow \boxed{x = 2, 1}$

67.) If $4^x = 7$, then $4^{-2x} = ? \rightarrow (4^x)^{-2} = \underline{7^{-2}} \rightarrow 4^{-2x} = \boxed{\frac{1}{49}}$

69.) If $3^{-x} = 2$, then $3^{2x} = ? \rightarrow (3^{-x})^{-2} = \underline{2^{-2}} \rightarrow 3^{2x} = \boxed{\frac{1}{4}}$

71.) To find A, ask yourself "what is y when $x = 1$?

- $y = 3$ when $x = 1$, so $A = 3 \rightarrow y = A^x \rightarrow \boxed{y = 3^x}$

* Since the graph is above the x-axis, you know A is positive

73.) $y = -6$ when $x = 1$, so $A = -6 \rightarrow \boxed{y = -6^x}$

* Since the graph is below the x-axis, you know A is negative