$\sqrt{x^2-6x+9} = |x-3|$

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- Função exponencial:

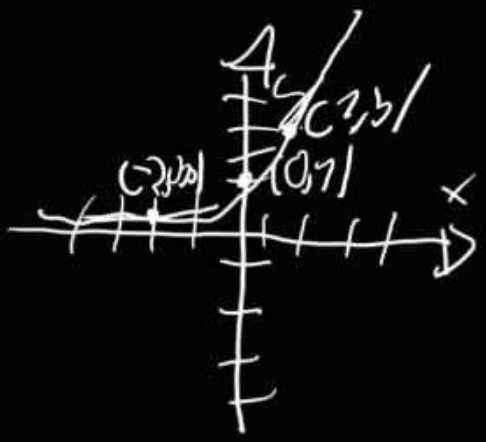
- Exercícios:

60) a) $y = 3^x$

$x = 0 \quad (0,1)$

$x = 1 \quad (1,3)$

$x = -2 \quad (-2, 0,11)$



b) $y = \left(\frac{1}{3}\right)^x$

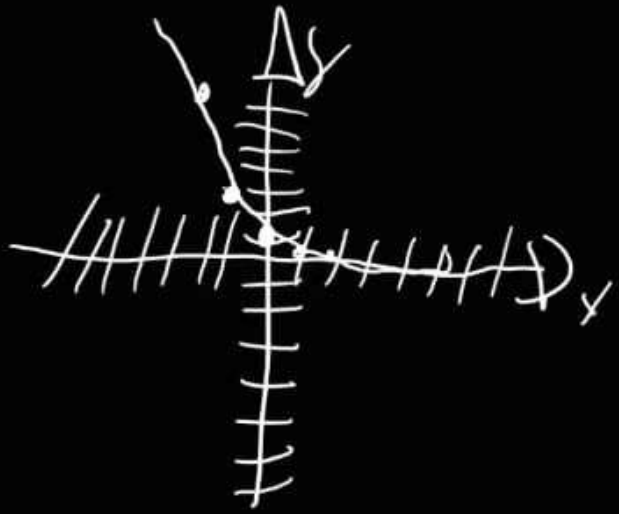
$x = 0 \quad (0,1)$

$x = 1 \quad (1, 0.33)$

$x = 2 \quad (2, 0.11)$

$x = 2 \quad (-2, 9)$

$x = 1 \quad (-1, 3)$



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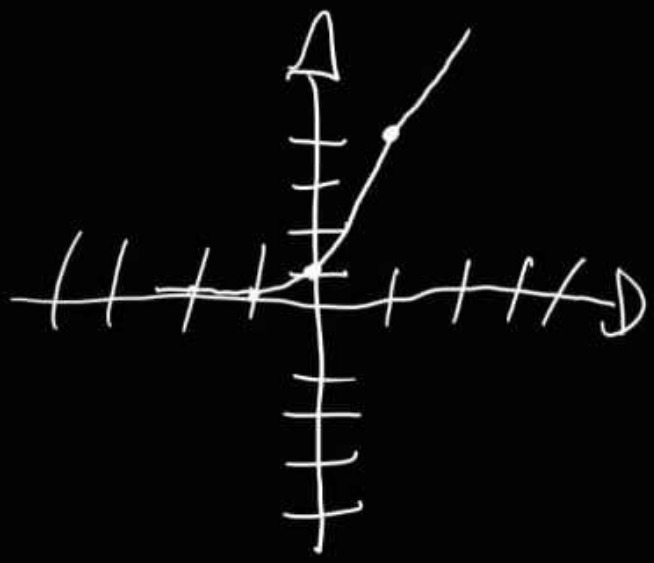
c) $y = 9^x$

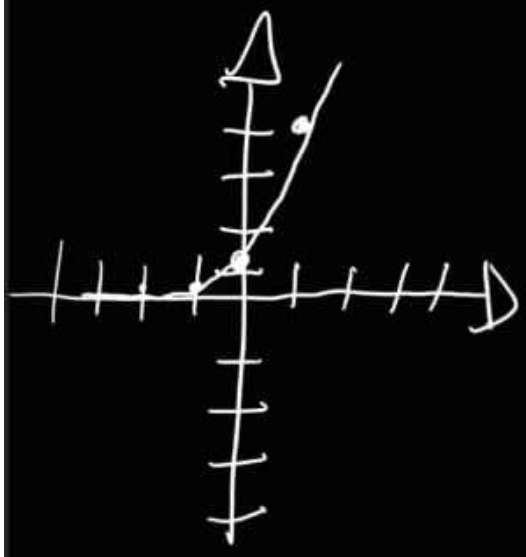
$x = 0 \quad (0,1)$

c) $y = 4^x$



$x = 0 \quad (0,1)$
$x = 1 \quad (1,4)$
$x = -1 \quad (-1, 0,25)$
$x = -2 \quad (-2, 0,06)$

d) $y = 70^x$



$x = 0 \quad (0,1)$
$x = 1 \quad (1,70)$
$x = 2$
$x = -1 \quad (-1,07)$
$x = -2 \quad (-2,005)$

$f(x) = e^{x^2}$

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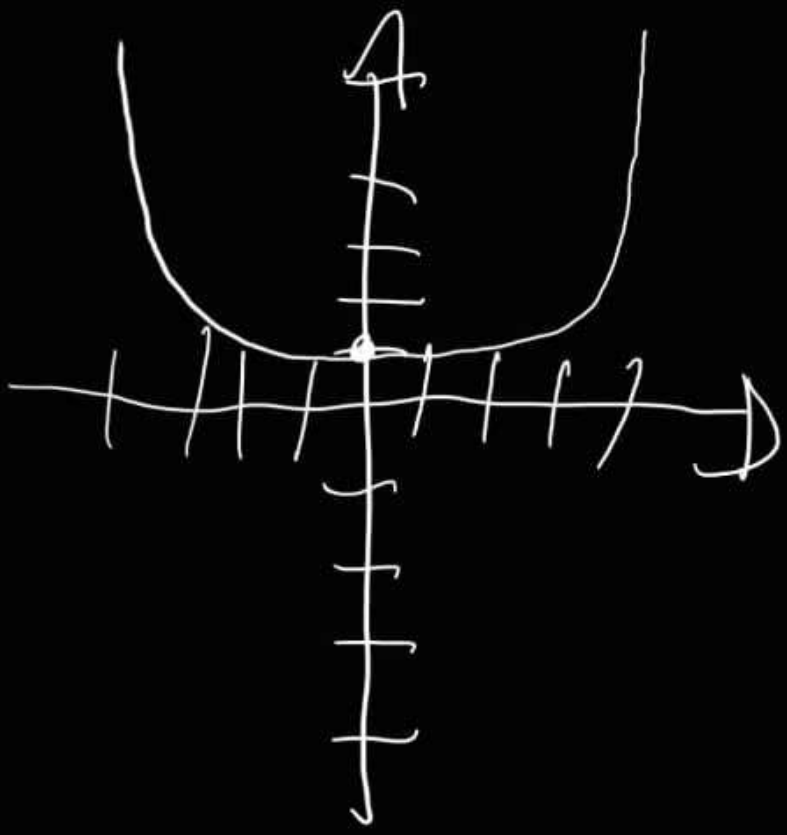
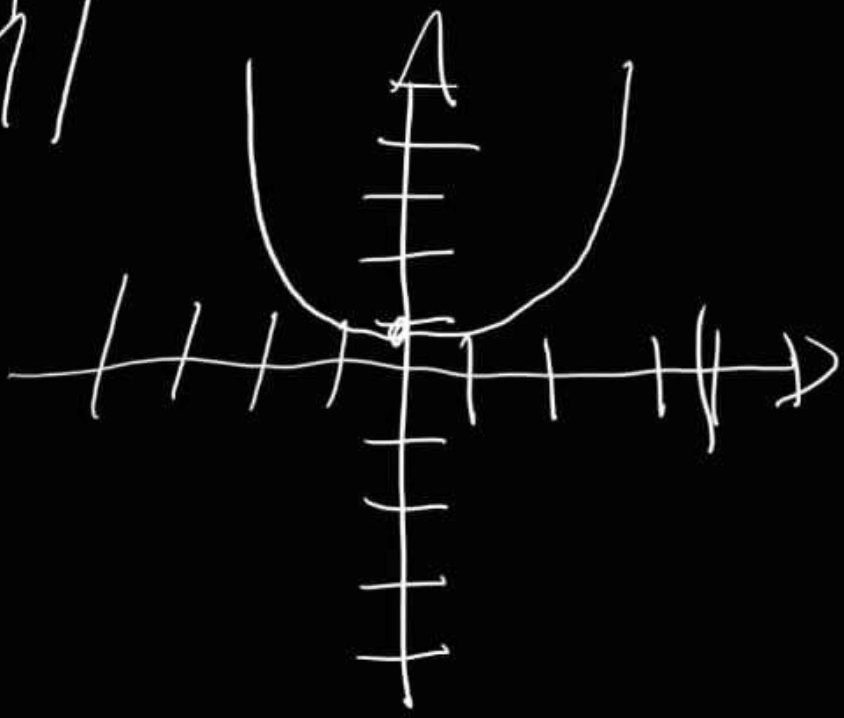
63) $f(x) = e^{x^2}$



64)



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77) $y = 2x - 7$

77/a) $2^x = 128 \iff x = 7$

$S = \{7\}$

b) $3^x = 243 \iff 3^5$

b) $S = \{5\}$

c) $2^x = \frac{1}{16} \iff x = -4$

$S = \{-4\}$

d) $\left(\frac{1}{5}\right)^x = 125 \iff x = -3$

$S = \{-3\}$

78) $4^{x+2} = 4^{9x} = 4^{72}$

73) $9^{x^2+9x} = 9^{72}$

$x^2 + 9x = 72$

$x^2 + 9x - 72 = 0$

$x^2 + 6x - 2x - 72 = 0$

$x(x+6) - 2(x+6) = 0$

$(x+6) \times (x-2) = 0$

$x + 6 = 0$

$x - 2 = 0$

$x = -6$

$x = 2$

$S = \{x_1 = -6 \text{ e } x_2 = 2\}$

76) $\log_4 (x)^{x+9} = 32$

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76 a) $(2^x)^{x+4} = 32$

$32 = 2^5$

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

$x(x+4) = 5$

$x^2 + 4x - 5 = 0$

$(x+5)(x-1) = 0$

$x + 5 = 0 \Rightarrow x = -5$

$x - 1 = 0 \Rightarrow x = 1$

$x = -5$ ou $x = 1$

b) $(9^{x+1})^{x-1} = 3^{x^2+x+4}$

$9 = 3^2$

$(3^2)^{(x+1)(x-1)} = 3^{x^2+x+4}$

$3^{2(x^2-1)} = 3^{x^2+x+4}$

$2x^2 - 2 = x^2 + x + 4$

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

$x^2 - x - 6 = 0$

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

$x - 3 = 0 \Rightarrow x = 3$

$x + 2 = 0 \Rightarrow x = -2$

$x = 3$ ou $x = -2$

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c) $2^{3x-7} \cdot 9^{2x+3} = 8^{5-x}$

c) $2^{3x-7} \cdot 9^{2x+3} = 8^{3-x}$

$9 = 2^3$

$8 = 2^3$

$2^{3x-7} \cdot (2^3)^{2x+3} = (2^3)^{3-x}$

$2^{3x-7} \cdot 2^{3(2x+3)} = 2^{3(3-x)}$

$2^{3x-7} \cdot 2^{6x+6} = 2^{9-3x}$

$2^{(3x-7)+(6x+6)} = 2^{9-3x}$

$2^{9x-1} = 2^{9-3x}$

$9x-1 = 9-3x$

$9x+3x = 9+1$

$12x = 10$

$x = \frac{5}{6}$

$27 \cdot (9^{3-x})^{2-x} = 1$

$x = 2$

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$77|(9^3 - x)^{2-x} = 1$

$9^3 = 69 \Rightarrow (69 - x)^{2-x} = 1$

$69 - x = 1 \Rightarrow x = 63$

$2 - x = 0 \Rightarrow x = 2$

$(69 - 63)^{2-63} = 7^{2-63} = 1$

$(69 - 2)^{2-2} = 67^0 = 1$

$x = 63$ e $x = 2$

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$77|a|3^{x-1} - 3^x + 3^{x+1} + 3^{x+2} = 306$

7) a) $3^{x-1} - 3^x + 3^{x+1} + 3^{x+2} = 306$

$3^x(\frac{1}{3} - 1 + 3 + 9) = 306$

$3^x(\frac{1}{3} - \frac{3}{3} + \frac{9}{3} + \frac{27}{3}) = 306$

$3^x(\frac{34}{3}) = 306$

$3^x = \frac{306 \cdot 3}{34}$

$3^x = 27$

$x = \log_3 27$

b) $5^{x-1} - 5 + 5^{x+1} = 505$

$5^{x-1}(\frac{1}{5} - 1 + 25) = 505$

$5^{x-1}(\frac{1}{5} - \frac{5}{5} + \frac{125}{5}) = 505$

$5^{x-1}(\frac{121}{5}) = 505$

$5^{x-1} = \frac{505 \cdot 5}{121}$

$5^{x-1} = 5$

$x - 1 = 1 \Rightarrow x = 2$

8) a) $4^x - 2^3 - 2 = 0$

$x-1=1 \Rightarrow x=2$

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87) a) $4^x-2^3-2=0$

$2^x=y$

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

$y^2-y-2=0$

$y=2$ ou $y=-1$

$y=2^x=2$

$x=1$

b) $9^x+3^x=90$

$3^x=y$

$(3^2)^x+3^x=90$

$y^2+y=90$

$y^2+y-90=0$

$y=9 \Rightarrow 3^x=9 \Rightarrow x=2$

$y=\frac{-(-1)\pm\sqrt{(-1)^2+4\cdot1\cdot2}}{2\cdot1}$

$y=\frac{1\pm\sqrt{9}}{2}$

$y=\frac{1\pm3}{2}$

$y=\frac{1\pm\sqrt{1+4\cdot90}}{2}$

$y=\frac{-1\pm\sqrt{361}}{2}$

$y=\frac{-1\pm19}{2}$

$y=9$ ou $y=-10$

$y=-10 \Rightarrow x=?$

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92 a) $x^2 - 3x = 1$

$2 - 3x = 0$

$3x = 2$

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

$7^{2-3(1)} = 1$

$(-1)^0 = 1$

$x = \frac{2}{3}$ ou $x = 1$

b) $2x + 5 = 0$

$2x = -5$

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

$1^{2x+5} = 1$

$(-1)^{2x+5} = 1$

$2x + 5 = 2k$

$2x = 2k - 5$

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

$x = -\frac{5}{2}$, $x = 1$, $x = k - \frac{5}{2}$

700

a) $\begin{cases} 4^x = 16^y \\ 2^{x+1} = 4^y \end{cases}$

$(2^2)^x = 2^{4y}$

$2^{x+1} = (2^2)^y$

$4 = 2^2$

$16 = 2^4$

$2^{2y} = 2^{4y}$

$2^{x+1} = 2^{2y}$

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

$2^{2x} = 2^4 \cdot 2^{x-1}$

$2^{2x} = 2^{4+x-1}$

$2^{2x} = 2^{x+3}$

$2x = x + 3$

$2x - x = 3$

$x = 3$

$y = 2^{3-1} = 2^2 = 4$

$S = (3, 4)$

b) $\begin{cases} 2^{2(x^2-y)} = 100 \cdot 5^{2(y-x^2)} \\ x + y = 5 \end{cases}$

$2^{2(x^2-y)} = 2^2 \cdot 5^2 \cdot 5^{2(y-x^2)}$

$2^{2(x^2-y)} \cdot 5^{2(x^2-y)} = 2^2 \cdot 5^2$

$(2 \cdot 5)^{2(x^2-y)} = 2^2 \cdot 5^2$

$10^{2(x^2-y)} = 10^2$

$2(x^2 - y) = 2 \Rightarrow x^2 - y = 1$

$(x, y) = (2, 3)$ e $(-3, 8)$