Lista 8 de CM300

1. Calcule o valor da função nos pontos x_1 e x_2 indicados.

(a) $f(x) = 2^x, \quad x_1 = 3, \;\; x_2 = -4.$

(b) $g(x) = 3\left(\dfrac{1}{2}\right)^x, \quad x_1 = 2, \;\; x_2 = 0.$

(c) $h(x) = 5 \cdot 4^x, \quad x_1 = -\dfrac{1}{2}, \;\; x_2 = 3.$

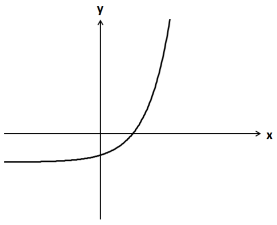
(d) $u(x) = -9 \cdot 3^x, \quad x_1 = \dfrac{1}{3}, \;\; x_2 = -2.$

2. Associe a cada gráfico a função exponencial que o define. Obs: todos os eixos x estão na mesma escala, bem como os eixos y, porém a escala dos eixos x é diferente da dos eixos y.

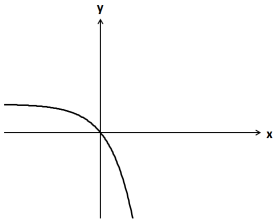
(a) $a(x) = 2^x$ (b) $b(x) = \left(\dfrac{1}{2}\right)^x$ (c) $c(x) = -2^x$ (d) $d(x) = -\left(\dfrac{1}{2}\right)^x$ (e) $e(x) = 2^x + 1$

(f) $f(x) = 2^x - 4$ (g) $g(x) = 2^{x+2} - 4$ (h) $h(x) = \left(\dfrac{1}{2}\right)^{x-3}$ (i) $i(x) = -\left(\dfrac{1}{2}\right)^{x+3}$ (j) $j(x) = -2^{x+2} + 4$

(1)



(2)



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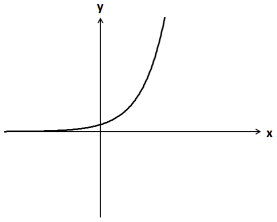

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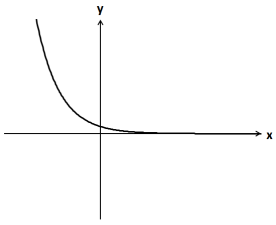

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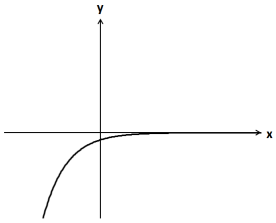

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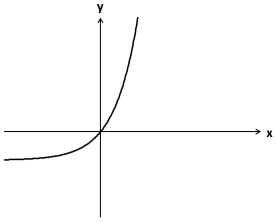

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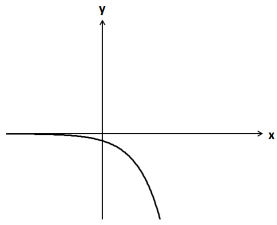

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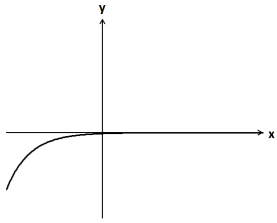

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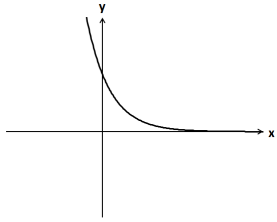

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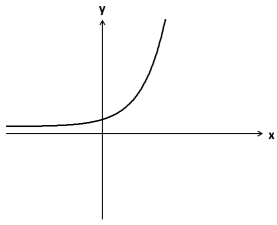


3. Sem o uso de calculadora, encontre o valor dos logaritmos abaixo.

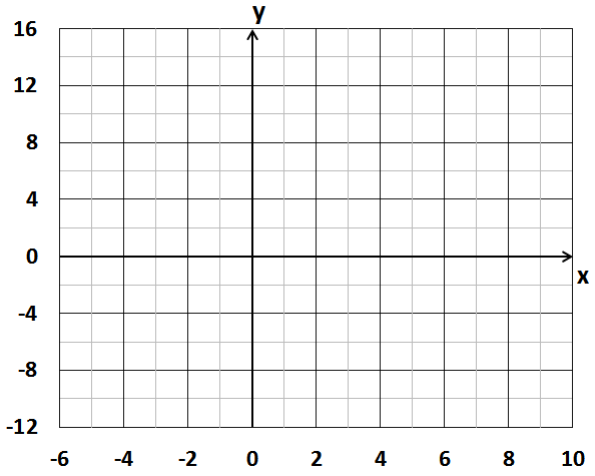
(a) $\log_2 8$ (b) $\log_2 \dfrac{1}{4}$ (c) $\log_{\frac{1}{3}} 9$ (d) $\log_{\frac{1}{4}} 2$

(e) $\log_{16} 2$ (f) $\log_8 32$ (g) $\log_8 \dfrac{1}{4}$ (h) $\log_9 \dfrac{1}{27}$

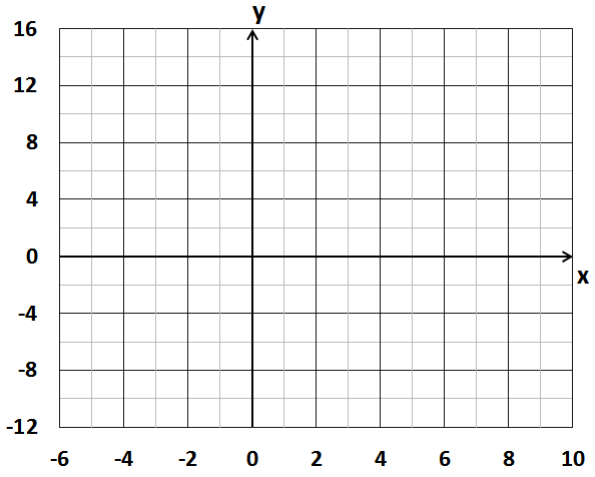
(i) $\log_5 \dfrac{1}{125}$ (j) $\log_{125} \dfrac{1}{5}$ (k) $\log_{16} 64$ (l) $\log_{\frac{1}{9}} \dfrac{1}{3}$

4. Esboce os gráficos das funções abaixo. Obs: note que os eixos x e y não estão na mesma escala. Isso ajuda a representar melhor os gráficos das exponenciais.

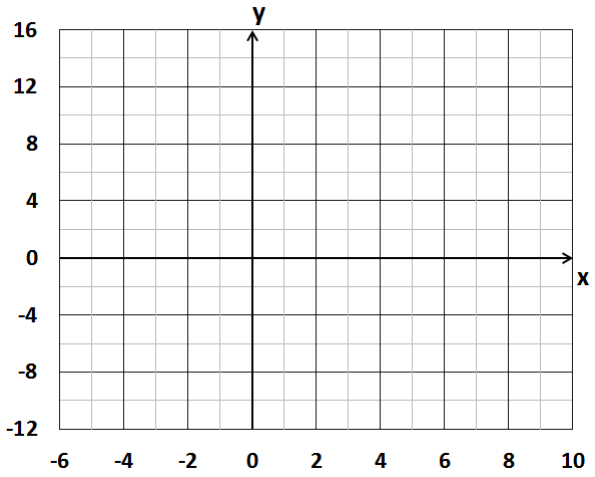
(a) $f(x) = 2^x - 4$



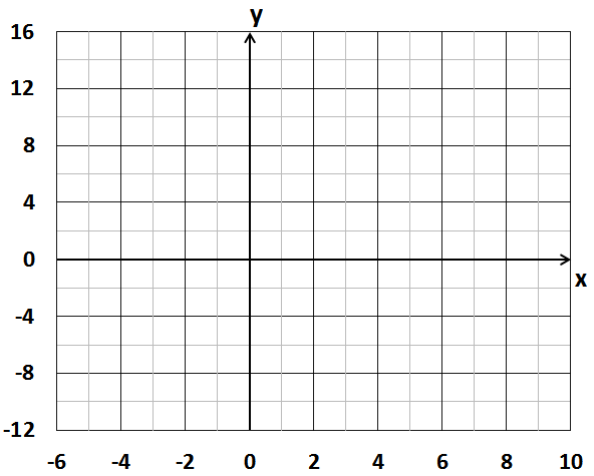
(b) $f(x) = -3 \cdot 2^x + 8$



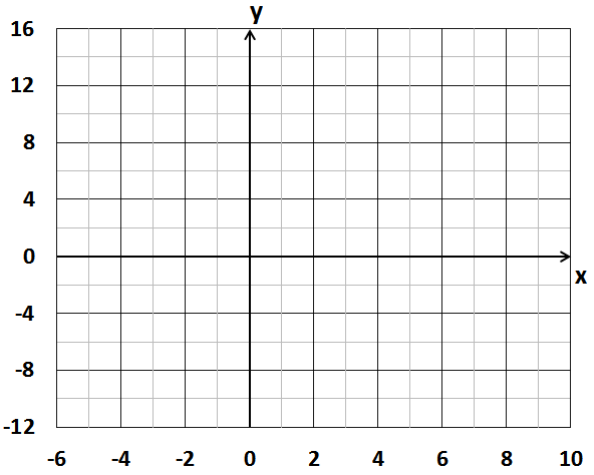
(c) $f(x) = -2\left(\frac{1}{3}\right)^x + 6$



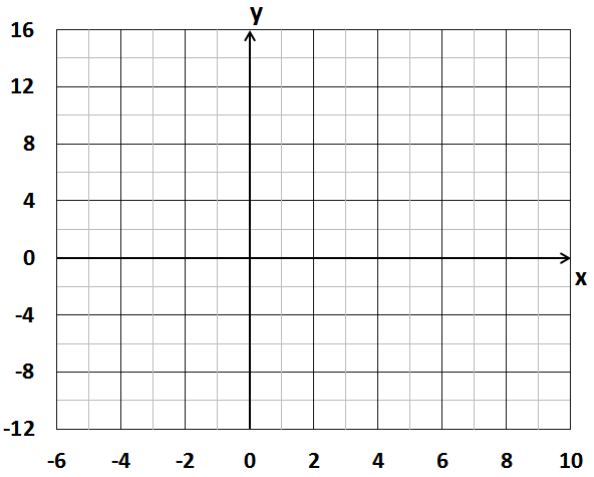
(d) $f(x) = -2^{x-4}$



(e) $f(x) = 4^{x-4} - 8$



(f) $f(x) = \dfrac{1}{2^x} - 8$



5. Utilizando uma calculadora, encontre o valor aproximado dos logaritmos abaixo com 3 casas decimais.

(a) $\log_3 5$ (b) $\log_3 \dfrac{1}{5}$ (c) $\log_{\frac{1}{3}} 5$ (d) $\log_5 3$

(e) $\log_2 10$ (f) $\log_{\frac{1}{2}} \dfrac{1}{10}$ (g) $\ln 5$ (h) $\ln \dfrac{1}{2}$

6. Encontre as soluções das equações abaixo.

(a) $2^x = 16$ (b) $2^{2x+1} = 16$ (c) $3^{3x-2} = 4$ (d) $2 \cdot 3^{x+5} = 5$

(e) $5^{2x+1} = 2^x$ (f) $4^{3x-2} = 2^{3x}$ (g) $7^{-2x+3} = 10$ (h) $2 \cdot 3^x = 3 \cdot 2^x$

(i) $2 \cdot 3^x = 3 \cdot 2^{x+1}$ (j) $2^{x^2} = 2^x$ (k) $2^{x^2} = 3$ (l) $5^{3+x} = \dfrac{1}{125}$

Respostas:

1. (a) $f(3) = 8, \quad f(-4) = \dfrac{1}{16}.$

(b) $g(2) = \dfrac{3}{4}, \quad g(0) = 3.$

(c) $h\left(-\dfrac{1}{2}\right) = \dfrac{5}{2}, \quad h(3) = 320.$

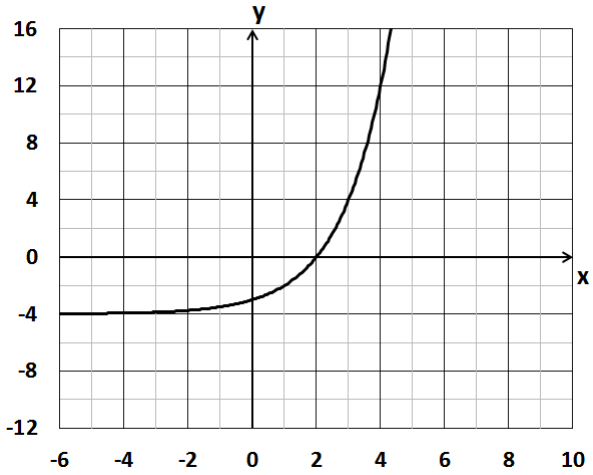
(d) $u\left(\dfrac{1}{3}\right) - 9\sqrt[3]{3}, \quad u(-2) = -1.$

2. 1-f 2-j 3-a 4-b 5-d 6-g 7-c 8-i 9-h 10-e.

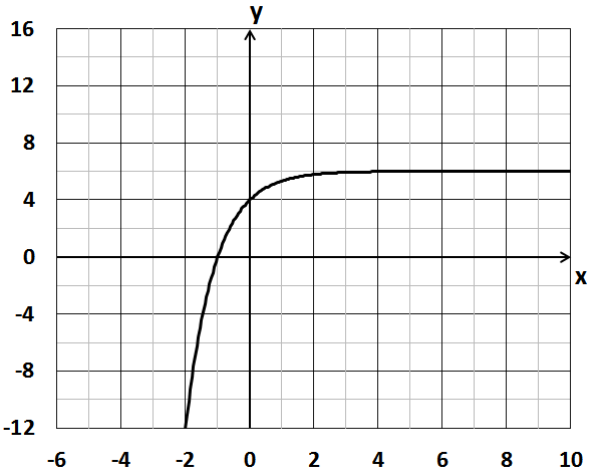
3. (a) 3 (c) -2 (e) $\dfrac{1}{4}$ (g) $-\dfrac{2}{3}$ (i) -3 (k) $\dfrac{3}{2}$

(b) -2 (d) $-\dfrac{1}{2}$ (f) $\dfrac{5}{3}$ (h) $-\dfrac{3}{2}$ (j) $-\dfrac{1}{3}$ (l) $\dfrac{1}{2}$

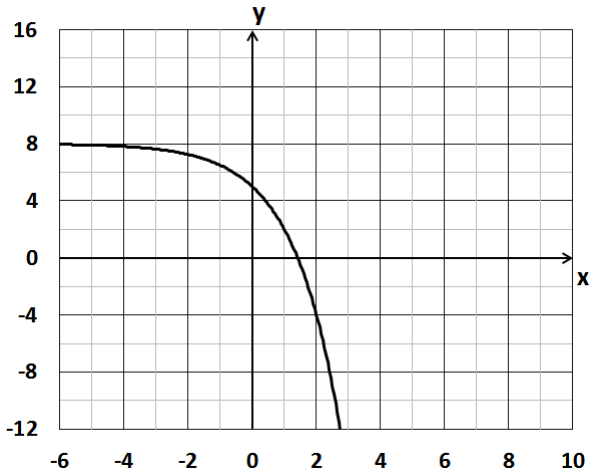
4. (a)



(c)



(b)



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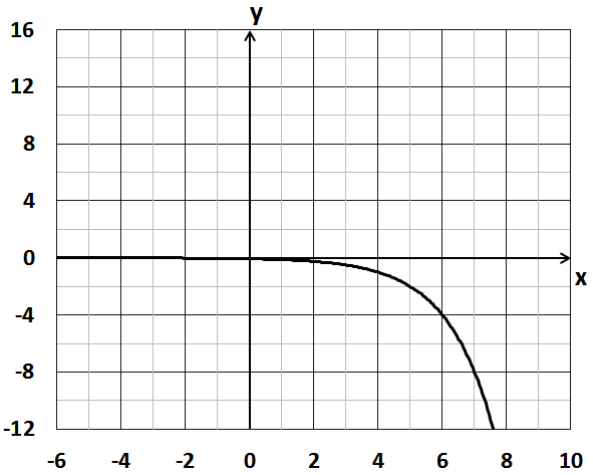

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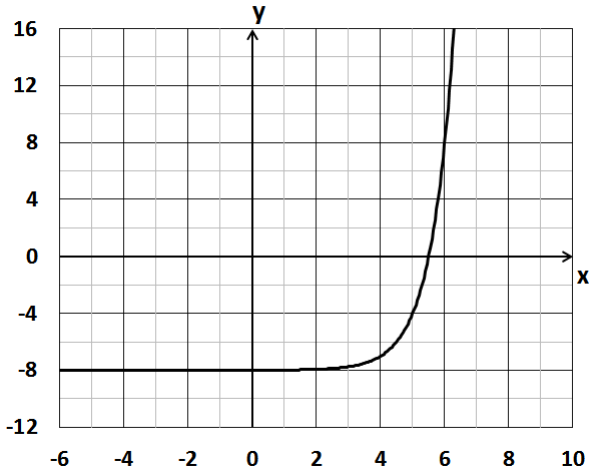
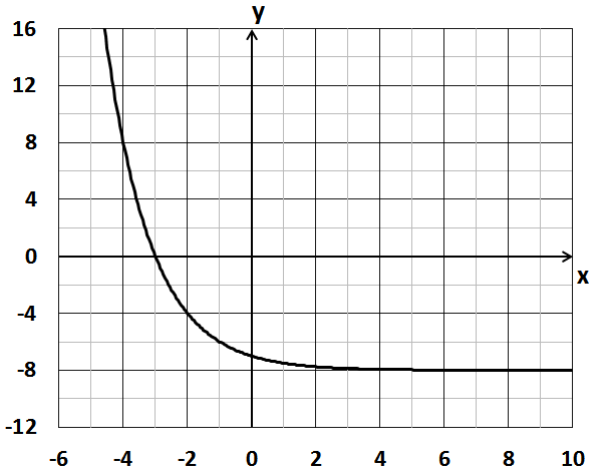


(f)



5. (a) $1,465$

(b) $-1,465$

(c) $-1,465$

(d) $0,683$

(e) $3,322$

(f) $3,322$

(g) $1,609$

(h) $-0,693$

6. (a) $x = 4$

(b) $x = \dfrac{3}{2}$

(c) $x = \dfrac{\log_3 4 + 2}{3}$

(d) $x = \log_3\left(\dfrac{5}{2}\right) - 5$

(e) $x = \dfrac{1}{\log_5 2 - 2}$

(f) $x = \dfrac{4}{3}$

(g) $x = \dfrac{3 - \log_7 10}{2}$

(h) $x = 1$

(i) $x = \dfrac{1}{1 - \log_3 2}$

(j) $x = 0$ ou $x = 1$

(k) $x = \pm\sqrt{\log_2 3}$

(l) $x = -6$