

1. Find the composition of the following functions: $f(x) = x^2 - 2x + 5$ and $g(x) = x - 3$

a) $(g \circ f)(1)$

$$\begin{aligned} & g(f(1)) \\ & = g(4) \\ & = 4 - 3 \\ & = \boxed{1} \end{aligned}$$

b) $(f \circ g)(x)$ (Simplify your answer)

$$\begin{aligned} & = f(g(x)) \\ & = (x-3)^2 - 2(x-3) + 5 \\ & = x^2 - 6x + 9 - 2x + 6 + 5 \\ & = \boxed{x^2 - 8x + 20} \end{aligned}$$

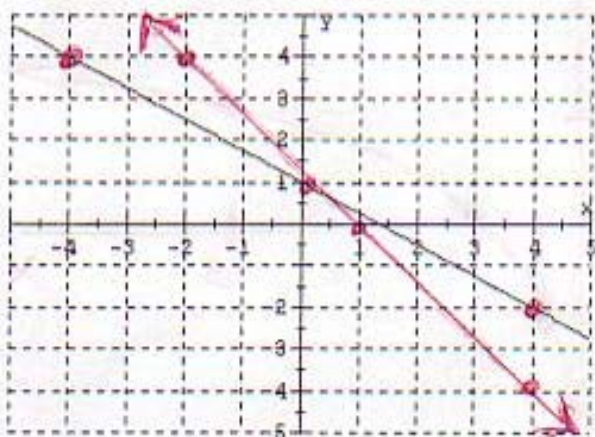
2. Find the inverse of the following functions:

a) Fill in the t-chart

x	f(x)
0	20
3	13
6	8
9	4

x	f ⁻¹ (x)
20	0
13	3
8	6
4	9

b) Given the graph of $y = f(x)$, sketch the graph of the inverse



x	f(x)
-4	4
0	1
4	-2

x	f ⁻¹ (x)
4	-4
1	0
-2	4

c) Find the inverse. Use the $f^{-1}(x)$ notation in writing your final answer.

$$f(x) = 3x - 2$$

$$y = 3x - 2$$

$$x = 3y - 2$$

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

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

3. Graph $f(x) = 2^x$ by constructing a t-chart. Your t-chart must contain some negative values for x.

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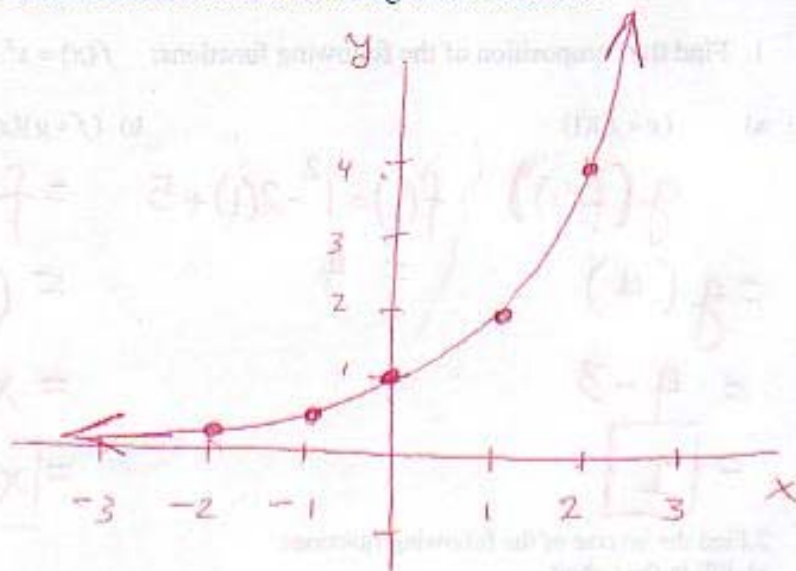
$$-2 \quad 2^{-2} = \frac{1}{2^2} = \frac{1}{4}$$

$$-1 \quad 2^{-1} = \frac{1}{2}$$

$$0 \quad 2^0 = 1$$

$$1 \quad 2^1 = 2$$

$$2 \quad 2^2 = 4$$



What is the domain of f ? $(-\infty, \infty)$ also can write as $\{x \mid x \text{ is real}\}$

What is the range of f ? $(0, \infty)$ also can write as $\{y \mid y > 0\}$

4. Graph $f(x) = \log_3(x)$ by constructing a t-chart. Your t-chart must contain some negative values for y.

$$y = \log_3 x$$

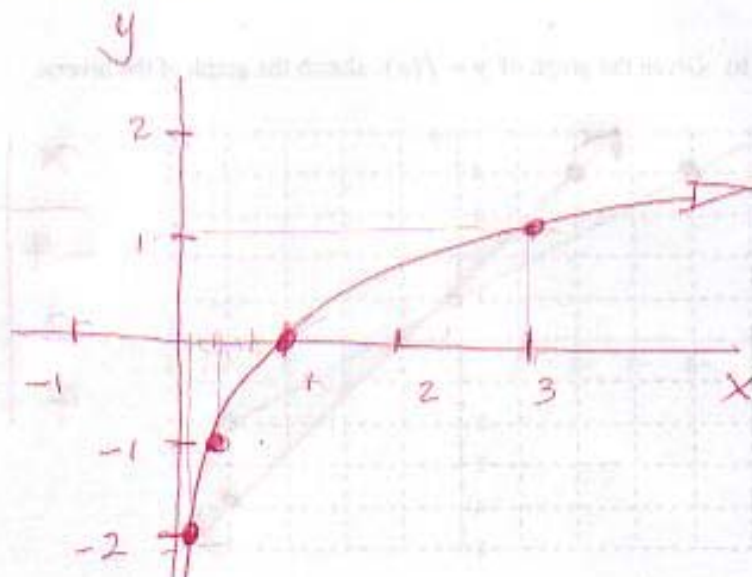
$$\Rightarrow 3^y = x$$

x	y
$3^{-2} = 1/9$	-2
$3^{-1} = 1/3$	-1
$3^0 = 1$	0
$3^1 = 3$	1

$$3^{-1} = 1/3 \quad -1$$

$$3^0 = 1 \quad 0$$

$$3^1 = 3 \quad 1$$



What is the domain of f ? $(0, \infty)$ OR $\{x \mid x > 0\}$

What is the range of f ? $(-\infty, \infty)$ OR $\{y \mid y \text{ is real}\}$