

8 $y = \log_5 x$ is the inverse of $y = 5^x$ $\therefore (b, a)$ is a point on $y = \log_5 x$ (simply switch $x \leftrightarrow y$)

#9 $y = -\log_2 x$ is a reflection of the graph of $y = \log_2 x$ about the x-axis (y is replaced with $-y$)
 $\therefore (1, 0) \longrightarrow (1, 0)$

#10 (c, d) is on $y = \log_b a$
 apply the defn of a log to $y = \log_b a$
 this means $(\frac{1}{b})^y = a \longrightarrow (b^{-1})^y = a$
 $\therefore b^{-y} = a \xrightarrow{\text{apply the defn of a log}} -y = \log_b a$
 we can see y has been replaced with $-y$
 $\therefore (c, d) \longrightarrow (c, -d)$

DEF'N of a LOG

if $y = b^x$ then $\log_b y = x$

#11 a) $\log_{10} 1253$ is between $\log_{10} 1000$ and $\log_{10} 10000$

$$\log_{10} 1000 = 3 \rightarrow \text{think... } 10^3 = 1000$$

$$\log_{10} 10000 = 4 \rightarrow 10^4 = 10000$$

$\therefore \log_{10} 1253$ is between 3 and 4

(b) $\log 0.025$ is between $\log_{10} 0.01$ and $\log_{10} 0.001$

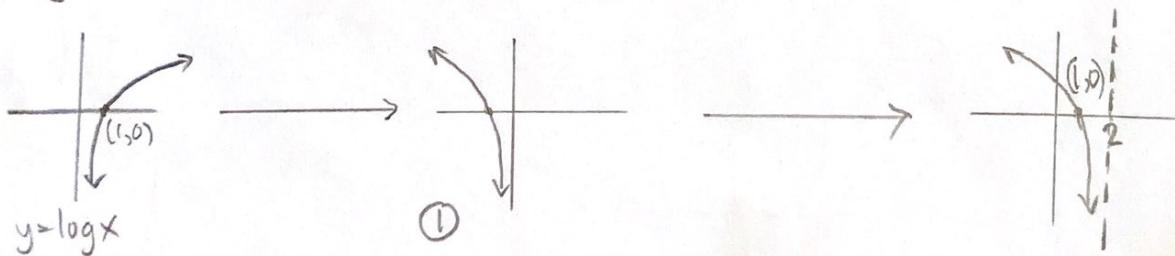
$$\log_{10} 0.01 = -2 \rightarrow \text{think } 10^{-2} = \frac{1}{100} = 0.01$$

$$\log_{10} 0.001 = -3 \rightarrow 10^{-3} = \frac{1}{1000} = 0.001$$

$\therefore \log 0.025$ is between -1 and -2

#12 $y = \log(2-x)$ $\rightarrow y = \log(-x+2)$
 $y = \log(-(x-2))$

This is the graph of $y = \log x$ that has been ① reflected about the y-axis and then ② horizontally translated 2 units RIGHT



13. Switch x & y and then apply the def'n of a log
to the equation

$$(a) \quad y = 8^{x-2} \rightarrow x = 8^{y-2} \rightarrow y-2 = \log_8 x$$
$$y = \log_8 x + 2 \rightarrow f^{-1}(x) = \log_8 x + 2$$

$$(b) \quad f(x) = 5^{4x-1} + 6$$

$$y = 5^{4x-1} + 6 \rightarrow x = 5^{4y-1} + 6$$
$$x-6 = 5^{4y-1}$$

$$\log_5(x-6) = 4y-1$$

$$\frac{1}{4}[\log_5(x-6) + 1] = y$$

$$f^{-1}(x) = \frac{1}{4} \log_5(x-6) + \frac{1}{4}$$

$$(c) \quad y+1 = \log_3(x-2) \rightarrow x+1 = \log_3(y-2)$$

$$\rightarrow 3^{x+1} = y-2 \rightarrow y = 3^{x+1} + 2$$

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

$$d) f(x) = 2 + \log(5x-3)$$

$$y = 2 + \log(5x-3) \longrightarrow x = 2 + \log(5y-3)$$

$$x-2 = \log_{10}(5y-3)$$

$$10^{x-2} = 5y-3$$

$$10^{x-2}+3 = 5y$$

$$\frac{10^{x-2}+3}{5} = y$$

$$f^{-1}(x) = \frac{10^{x-2}+3}{5}$$