

Notes Section 3.2 - Logarithmic functions

logarithmic form

$$\log_b x = y$$

exponential form

$$b^y = x$$

if $b > 0, b \neq 1$
and $x > 0$

• evaluate.

$$1. \log_2 16 \rightarrow 2^x = 16$$
$$2^x = 2^4$$
$$\boxed{x = 4}$$

$$2. \log_5 \frac{1}{125} \rightarrow 5^x = \frac{1}{125}$$
$$5^x = 5^{-3}$$
$$\boxed{x = -3}$$

$$3. \log_{17} 17 \rightarrow 17^x = 17^1$$
$$\boxed{x = 1}$$

$$4. 22^{\log_{22} 15.2} = \boxed{15.2}$$

$$5. 10^{\log 12} = \boxed{12}$$

$$6. \log 14 = \boxed{1.15}$$

$$7. \log(-11) \rightarrow \text{no solution}$$

$$8. \ln e^{4.6} = \boxed{4.6}$$

$$9. e^{\ln 4} = \boxed{4}$$

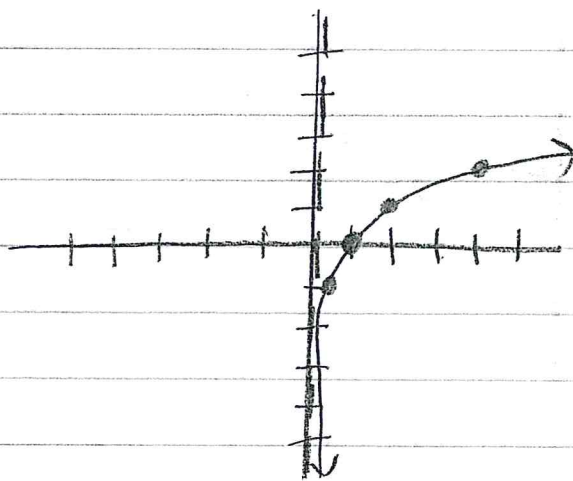
$$10. \ln 7 = \boxed{1.95}$$

• sketch and analyze the graph. describe the domain, range, intercepts, asymptotes, end behavior, and increasing/decreasing.

$$1. f(x) = \log_2 x$$

$$\boxed{2^y = x}$$

| x | y |
|-----|----|
| 1 | 0 |
| 2 | 1 |
| 4 | 2 |
| 1/2 | -1 |



$$D: (0, \infty)$$

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

$$x\text{-int}: (1, 0)$$

$$VA: x = 0$$

$$\text{as } x \rightarrow \infty, y \rightarrow \infty$$

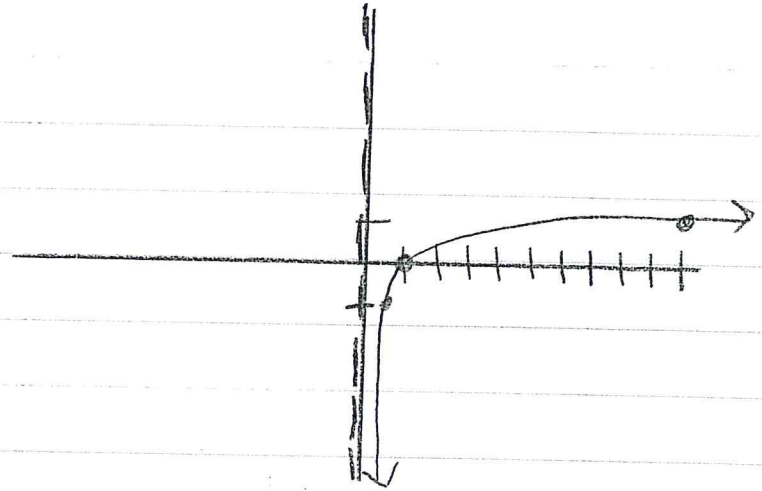
$$\text{as } x \rightarrow 0, y \rightarrow -\infty$$

$$\text{increasing}: (0, \infty)$$

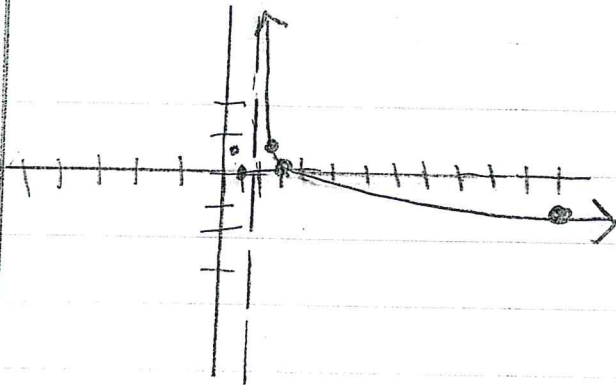
2. $f(x) = \log x$

$10^y = x$

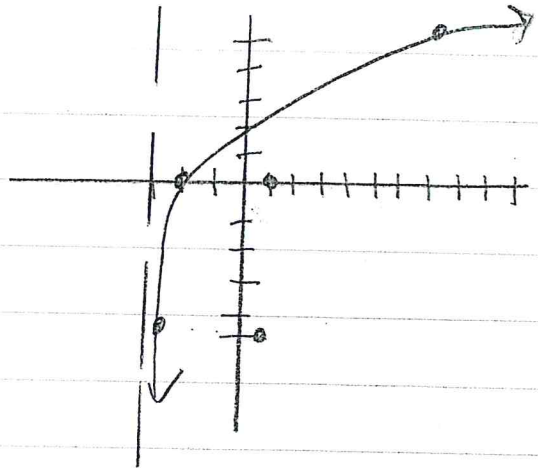
| x | y |
|------|----|
| 10 | 1 |
| 1 | 0 |
| 1/10 | -1 |



a) $f(x) = -\log(x-2)$
 VR, right 2



b) $f(x) = 5 \log(x+3)$
 VS 5, left 3



3. $f(x) = \ln x$

$e^y = x$

| x | y |
|-----|---|
| 1 | 0 |
| 2.7 | 1 |

