

Key

Use when you get it right all by yourself  
*S* Use when you did it all by yourself, but made a silly mistake  
*H* Use when you could do it alone with a little help from teacher or peer  
*G* Use when you completed the problem in a group  
*X* Use when a question was attempted but wrong (get help)  
*N* Use when a question was not even attempted

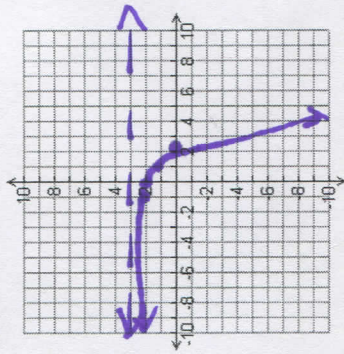
CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Sketching exponential functions		1 - 6	
Sketching logarithmic functions		15 - 22	7 - 14
Creating t-charts	1 - 6	7 - 14	
Describing domain & range in interval notation	1 - 10		
Identifying the y-intercept	1 - 6	7 - 14	
Identifying the pivot point (PP)/common point	1 - 6	1 - 6	7 - 14
Identifying the horizontal (HA) or vertical (VA) asymptote	1 - 6	7 - 14	
Transformations of exponential functions		1 - 6	
Transformations of logarithmic functions	15 - 22	7 - 14	24
Increasing VS Decreasing		23	

Sketch the following without the use of a graphing calculator by creating a T-chart. Identify the domain and range in interval notation, y-intercept, pivot point (PP), and the horizontal asymptote.

1)  $y = -2^x + 3$

$R_x; \uparrow 3u$

x	y
-1	2.5
0	2
1	1
2	-1
3	-5

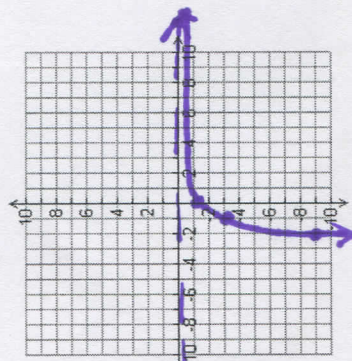


D:  $(-\infty, \infty)$  R:  $(-\infty, 3)$   
 as  $x \rightarrow -\infty; y \rightarrow 3$   
 as  $x \rightarrow \infty; y \rightarrow -\infty$   
 y intercept  $(0, 2)$   
 PP  $(0, 2)$  HA:  $y = 3$

2)  $y = -3^{-x}$

$R_y; R_x$

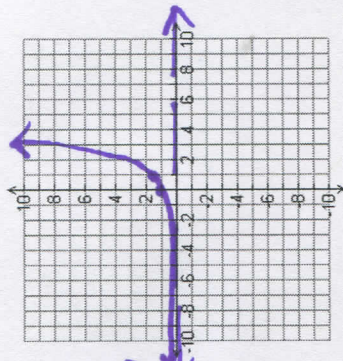
x	y
-2	-9
-1	-3
0	-1
1	-0.333



D:  $(-\infty, \infty)$  R:  $(-\infty, 0)$   
 as  $x \rightarrow -\infty; y \rightarrow -\infty$   
 as  $x \rightarrow \infty; y \rightarrow 0$   
 y intercept  $(0, -1)$   
 PP  $(0, -1)$  HA:  $y = 0$

3)  $y = \left(\frac{2}{3}\right)^{-x}$

x	y
-2	0.444
-1	0.667
0	1
1	1.5

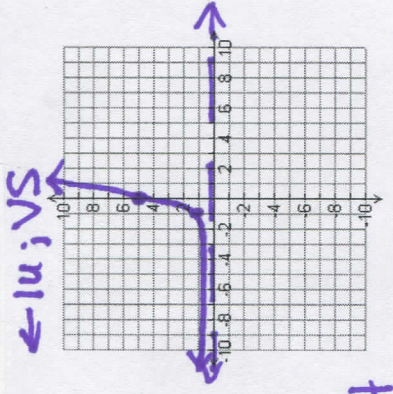


D:  $(-\infty, \infty)$  R:  $(0, \infty)$   
 as  $x \rightarrow -\infty; y \rightarrow 0$   
 as  $x \rightarrow \infty; y \rightarrow \infty$   
 y intercept  $(0, 1)$   
 PP  $(0, 1)$  HA:  $y = 0$



4)  $y = 5^{x+1}$

x	y
-2	0.2
-1	1.0
0	5
1	25
-3	0.04



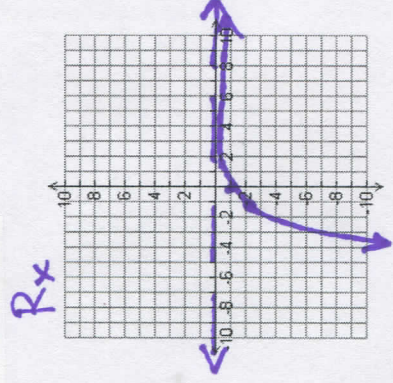
D:  $(-\infty, \infty)$  R:  $(0, \infty)$

as  $x \rightarrow -\infty$ ;  $y \rightarrow 0$   
as  $x \rightarrow \infty$ ;  $y \rightarrow \infty$

y intercept  $(0, 5)$   
pp  $(-1, 1)$  ha  $y = 0$

5)  $y = -\left(\frac{1}{2}\right)^x$

x	y
-3	-8
-2	-4
-1	-2
0	-1
1	-1/2



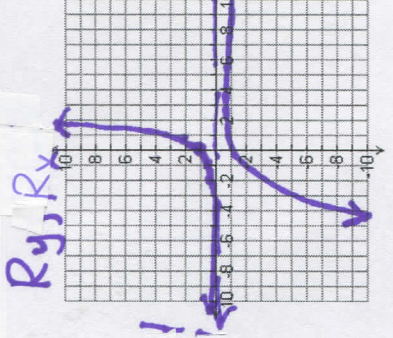
D:  $(-\infty, \infty)$  R:  $(-\infty, 0)$

as  $x \rightarrow -\infty$ ;  $y \rightarrow -\infty$   
as  $x \rightarrow \infty$ ;  $y \rightarrow 0$

y intercept  $(0, -1)$   
pp  $(0, -1)$  ha  $y = 0$

6)  $f(x) = -2^{-x}$

x	y
3	-8
-1	-2
0	-1
1	-1/2



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

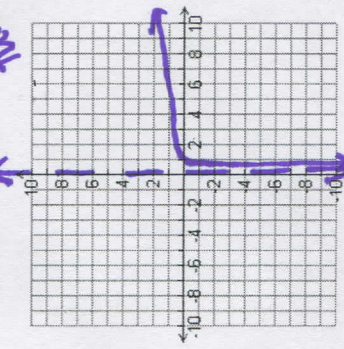
as  $x \rightarrow -\infty$ ;  $y \rightarrow -\infty$   
as  $x \rightarrow \infty$ ;  $y \rightarrow 0$

y intercept  $(0, 1)$   
pp  $(0, 1)$  ha  $y = 0$

Sketch the following functions. Identify the domain and range in interval notation, pivot point (PP), and the vertical asymptote.

7)  $f(x) = \log x$

x	y
1	0
2	0.301
3	0.477
4	0.602



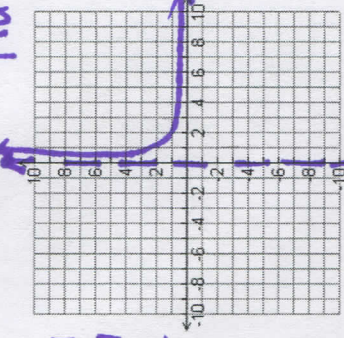
D:  $(0, \infty)$  R:  $(-\infty, \infty)$

as  $x \rightarrow 0$ ;  $y \rightarrow -\infty$   
as  $x \rightarrow \infty$ ;  $y \rightarrow \infty$

PP  $(1, 0)$  VA  $x = 0$

8)  $y = -\log x + 1$

x	y
1	1
2	0.699
3	0.523
4	0.398



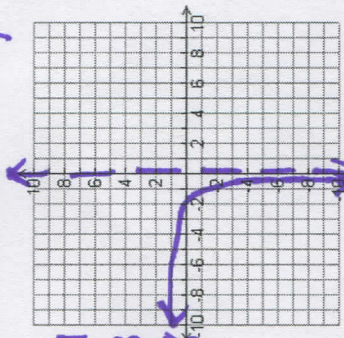
D:  $(0, \infty)$  R:  $(-\infty, \infty)$

as  $x \rightarrow 0$ ;  $y \rightarrow \infty$   
as  $x \rightarrow \infty$ ;  $y \rightarrow -\infty$

PP  $(1, 1)$  VA  $x = 0$

9)  $f(x) = \log(-x)$

x	y
-1	0
-2	0.301
-3	0.477
-4	0.602



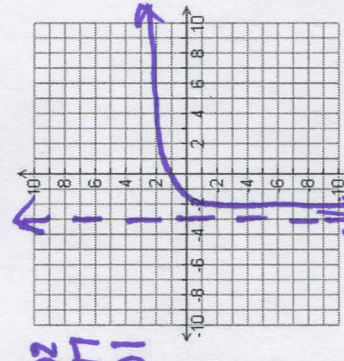
D:  $(-\infty, 0)$  R:  $(-\infty, \infty)$

as  $x \rightarrow -\infty$ ;  $y \rightarrow \infty$   
as  $x \rightarrow 0$ ;  $y \rightarrow -\infty$

PP  $(-1, 0)$  VA:  $x = 0$

10)  $f(x) = \log(x+3)$

x	y
-2	0
-1	0.301
0	0.477
1	0.602



D:  $(-3, \infty)$  R:  $(-\infty, \infty)$

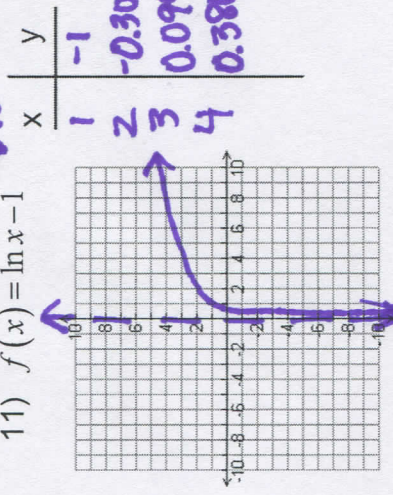
as  $x \rightarrow -3$ ;  $y \rightarrow -\infty$   
as  $x \rightarrow \infty$ ;  $y \rightarrow \infty$

PP  $(-2, 0)$  VA:  $x = -3$



↓lu

11)  $f(x) = \ln x - 1$



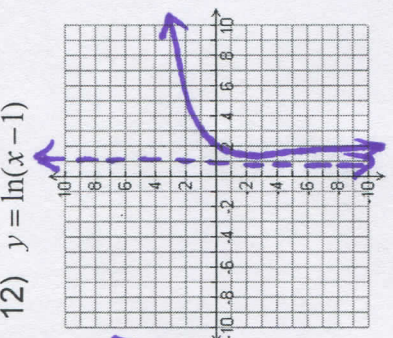
D:  $(0, \infty)$  R:  $(-\infty, \infty)$

as  $x \rightarrow 0$ ;  $y \rightarrow -\infty$   
as  $x \rightarrow \infty$ ;  $y \rightarrow \infty$

pp  $(1, -1)$  va  $x=0$

→lu

12)  $y = \ln(x-1)$



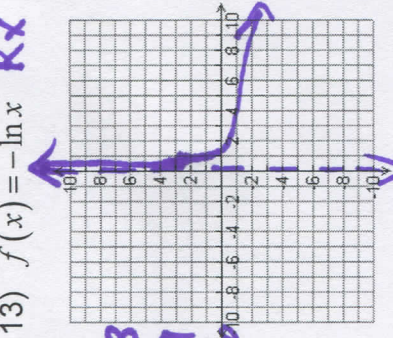
D:  $(1, \infty)$  R:  $(-\infty, \infty)$

as  $x \rightarrow 1$ ;  $y \rightarrow -\infty$   
as  $x \rightarrow \infty$ ;  $y \rightarrow \infty$

pp  $(2, 0)$  va  $x=1$

Rx

13)  $f(x) = -\ln x$



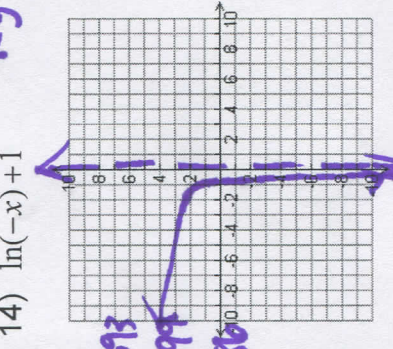
D:  $(0, \infty)$  R:  $(-\infty, \infty)$

as  $x \rightarrow 0$ ;  $y \rightarrow \infty$   
as  $x \rightarrow \infty$ ;  $y \rightarrow -\infty$

pp  $(1, 0)$  va  $x=0$

Ry ↑lu

14)  $\ln(-x) + 1$



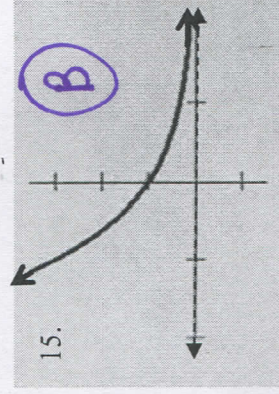
D:  $(-\infty, 0)$  R:  $(-\infty, \infty)$

as  $x \rightarrow -\infty$ ;  $y \rightarrow \infty$   
as  $x \rightarrow 0$ ;  $y \rightarrow -\infty$

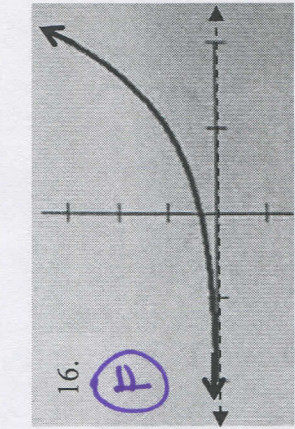
pp  $(-1, 1)$  va  $x=0$

For #15 - 22, match the equation to the correct graph.

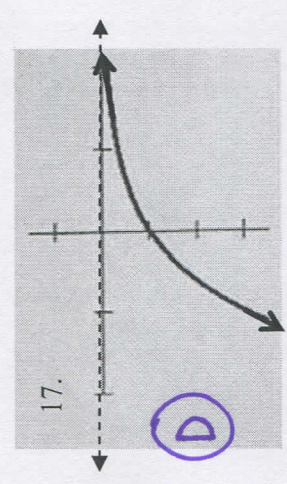
- A.  $y = 3^x$     B.  $y = 3^{-x}$     C.  $y = -3^x$     D.  $y = -3^{-x}$     E.  $y = 3^x - 1$     F.  $y = 3^{-x} - 1$     G.  $y = 3^{1-x}$     H.  $y = 1 - 3^x$



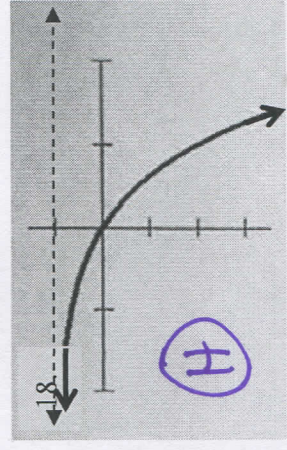
15. (B)



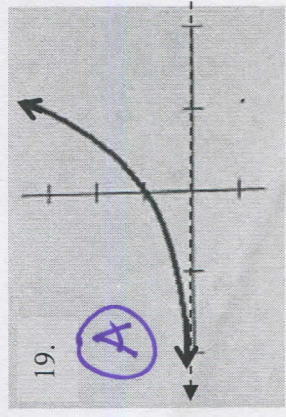
16. (F)



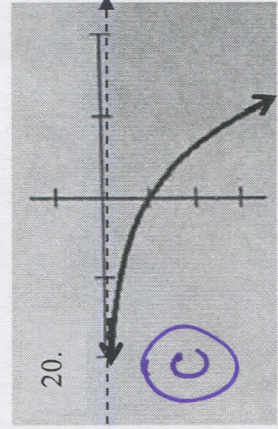
17. (D)



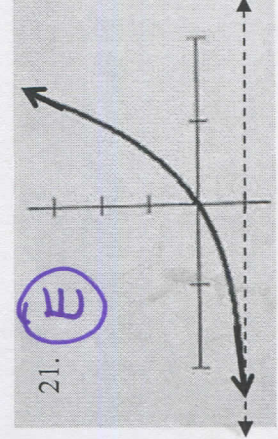
(H)



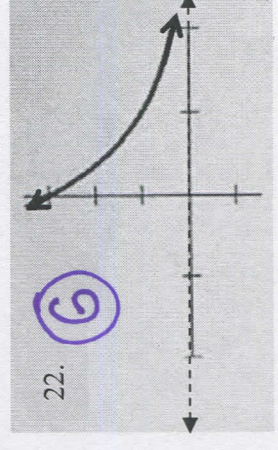
19. (A)



20. (C)



21. (E)



22. (G)



23. Which functions, in questions 15 – 22, must be increasing?

↳ growth

16F; 17D; 19A; 21E

24. What type of transformation makes the logarithmic curve move below the horizontal asymptote?

$R_x \rightarrow$  Reflection over the x-axis

**CYU Reflection:** How far can you go: basic, intermediate, or advanced?

**Rate your mastery level!**

How confident are you with the skills this CYU covered? Circle the score you would give yourself.

