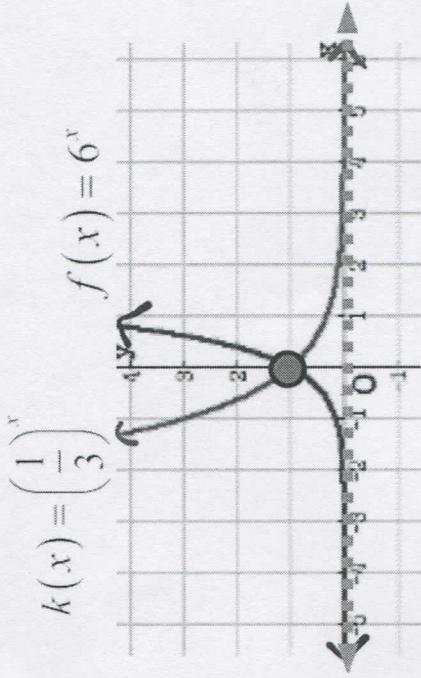


OBJECTIVE 1: Exponential Functions
(Inverse of Logarithmic Functions)



TASK 2: Fill in the blanks below based on the graph above.
If the base > 1 , it is a continuous function with a(n) increasing curve.

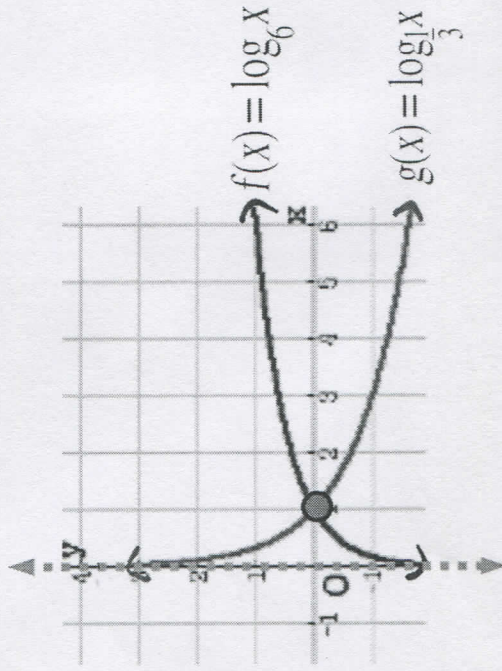
If $0 < \text{base} < 1$, it is a continuous function with a(n) decreasing curve.

$k(x)$ Domain: $(-\infty, \infty)$
 $k(x)$ Range: $(0, \infty)$

$f(x)$ Domain: $(-\infty, \infty)$
 $f(x)$ Range: $(0, \infty)$

Horizontal Asymptote: $y = 0$
Common Point or Pivot Point (PP): $(0, 1)$

OBJECTIVE 2: Logarithmic Functions
(Inverse of Exponential Function)



TASK 3: Fill in the blanks below based on the graph above.
If the base > 1 , it is a continuous function with a(n) increasing curve.

If $0 < \text{base} < 1$, it is a continuous function with a(n) decreasing curve.

$k(x)$ Domain: $(0, \infty)$
 $k(x)$ Range: $(-\infty, \infty)$

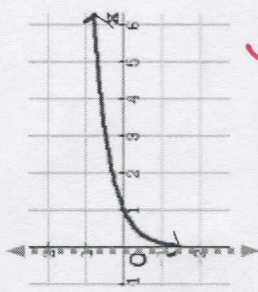
$f(x)$ Domain: $(0, \infty)$
 $f(x)$ Range: $(-\infty, \infty)$

Vertical Asymptote: $x = 0$
Common Point or Pivot Point (PP): $(1, 0)$

TASK 4: Label the graph with its parent function.

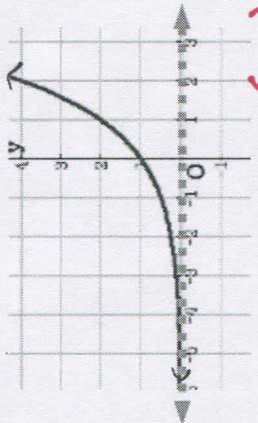
Exponential or Logarithmic and Increasing or Decreasing

A.



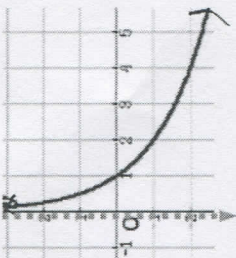
log growth (b > 1)

B.



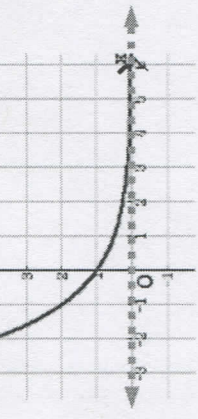
Exp growth (b > 1)

C.



log decay (0 < b < 1)

D.



Exp Decay (0 < b < 1)

Transformation	f(x) Notation	Examples
Horizontal Translation Graph shifts left or right.	$f(x - h)$	$g(x) = 2^{x-3}$ 3 units right $g(x) = 2^{x+2}$ 2 units left
Vertical Translation Graph shifts up or down.	$f(x) + k$	$g(x) = 2^x + 5$ 5 units up $g(x) = 2^x - 1$ 1 unit down
Reflection Graph flips over x- or y-axis.	$f(-x)$ $-f(x)$	$g(x) = 2^{-x}$ over y-axis $g(x) = -2^x$ over x-axis
Horizontal Stretch or Shrink Graph stretches away from or shrinks toward y-axis.	$f(ax)$	$g(x) = 2^{2x}$ shrink by $\frac{1}{2}$ $g(x) = 2^{x/2}$ stretch by 2
Vertical Stretch or Shrink Graph stretches away from or shrinks toward x-axis.	$a \cdot f(x)$	$g(x) = 3(2^x)$ stretch by 3 $g(x) = \frac{1}{4}(2^x)$ shrink by $\frac{1}{4}$

Transformation	f(x) Notation	Examples
Horizontal Translation Graph shifts left or right.	$f(x - h)$	$g(x) = \log(x - 4)$ 4 units right $g(x) = \log(x + 7)$ 7 units left
Vertical Translation Graph shifts up or down.	$f(x) + k$	$g(x) = \log x + 3$ 3 units up $g(x) = \log x - 1$ 1 unit down
Reflection Graph flips over x- or y-axis.	$f(-x)$ $-f(x)$	$g(x) = \log(-x)$ over y-axis $g(x) = -\log x$ over x-axis
Horizontal Stretch or Shrink Graph stretches away from or shrinks toward y-axis.	$f(ax)$	$g(x) = \log(4x)$ shrink by $\frac{1}{4}$ $g(x) = \log(\frac{1}{3}x)$ stretch by 3
Vertical Stretch or Shrink Graph stretches away from or shrinks toward x-axis.	$a \cdot f(x)$	$g(x) = 5 \log x$ stretch by 5 $g(x) = \frac{2}{3} \log x$ shrink by $\frac{2}{3}$

Notes about Exponential Transformations & End Behavior:

TASK 5

HA: STAYS at y=0
PP: STAYS at (0,1)
y-int: STAYS at (0,1)
as x → ∞ y → ∞ *As x → -∞, y → ∞*

Still need help with:

Notes about Logarithmic Transformations & End Behavior:

TASK 6

VA: STAYS at x=0
PP: STAYS at (1,0)
y-int: STAYS at (1,0)
as x → ∞ or -∞, y → ∞
As x → ∞ asymptote, y → ∞