

Exponential General Form

$$f(x) = a(b)^{x-h} + k$$

What we already know:

- a is the slope
 - between 0 and 1 is _____
 - greater than 1 is _____
- B is growth and decay
 - between 0 and 1 is _____
 - greater than 1 is _____

(-) is _____

Exponential Horizontal Shift

$$f(x) = a(b)^{x-h} + k$$

Moves the graph: _____

+ moves the graph _____

- moves the graph _____

Exponential Vertical

$$f(x) = a(b)^{x-h} + k$$

Moves the graph: _____

Asymptote: $y =$ _____ + moves the graph _____

- moves the graph _____

Quick trick Growth



Starts small, grows big



When "a" is negative

Quick trick decay: Loser!

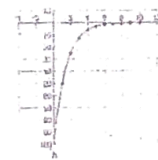
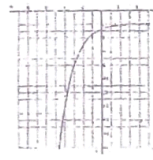
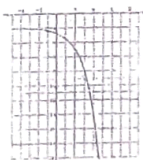
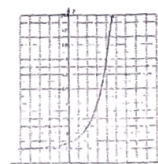
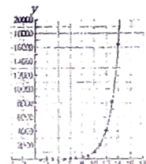
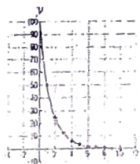


Starts big, gets small



When "a" is negative

Growth or decay?



Explain the transformation

$$f(x) = -2(4)^{x-3} - 1$$

1. Horizontal Shift? _____
2. Vertical Shift? _____
3. Asymptote? _____

Explain the transformation

$$f(x) = 3(2)^{x+2} - 3 \quad f(x) = \frac{3}{4}(4)^{x+2} - 10$$

- | | |
|-------------------|-------------------|
| Horizontal Shift? | Horizontal Shift? |
| Vertical Shift? | Vertical Shift? |
| Asymptote? | Asymptote? |

Explain the transformation

$$f(x) = -4\left(\frac{1}{2}\right)^{x-9} + 2$$

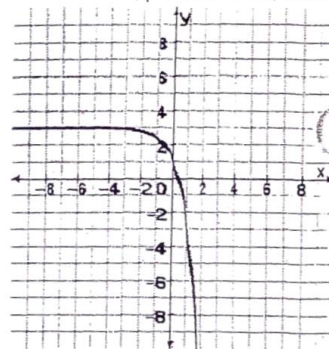
$$f(x) = \frac{3}{2}\left(\frac{1}{2}\right)^x + 8$$

- Horizontal Shift?
Vertical Shift?
Asymptote?

- Horizontal Shift?
Vertical Shift?
Asymptote?

Match graph to equation

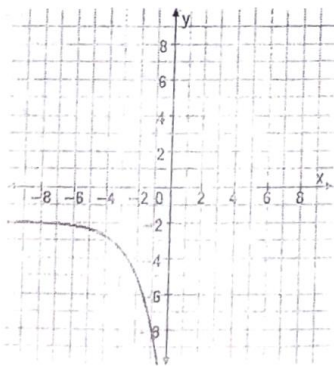
- $f(x) = -3\left(\frac{1}{2}\right)^{x+2} - 3$
- $4f(x) = -2(3)^x + 3$
- $f(x) = 2(2)^{x-6} + 1$
- $f(x) = -\frac{1}{4}(4)^x - 2$



Domain: _____
Range: _____

Match graph to the equation

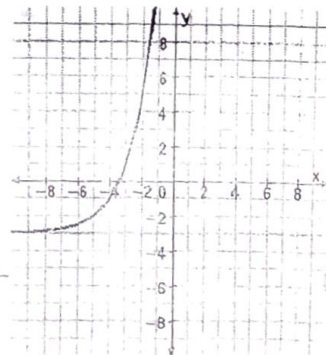
- $f(x) = -\frac{1}{3}\left(\frac{1}{2}\right)^{x-3} + 4$
- $f(x) = -\frac{3}{2}(2)^{x+3} - 2$
- $f(x) = -3(2)^x + 3$
- $f(x) = -\frac{1}{3}(4)^{x+4} + 2$



Domain: _____
Range: _____

Match graph to the equation

- $f(x) = -2\left(\frac{1}{4}\right)^{x-3} - 3$
- $f(x) = 4(2)^{x+3} - 3$
- $f(x) = 3\left(\frac{1}{3}\right)^{x-1} - 4$
- $f(x) = -3(3)^{x+5} - 3$



Domain: _____
Range: _____