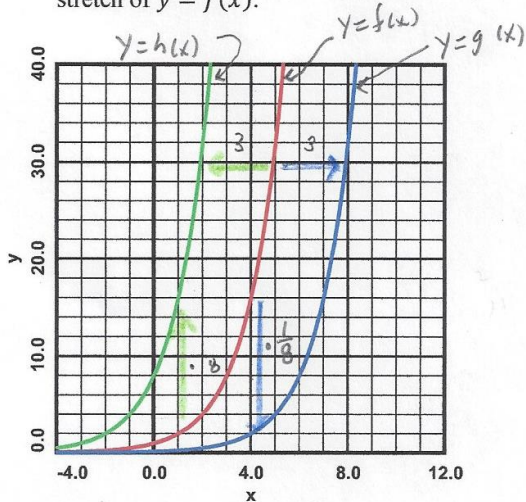


PRE-AP ALGEBRA 2

- 1) Consider the functions $y = f(x) = 2^x$, $y = g(x) = 2^{x-3}$ and $y = h(x) = 2^{x+3}$.
- State the translation that takes $y = f(x)$ to $y = g(x)$.
 - State the translation that takes $y = f(x)$ to $y = h(x)$.
 - Write $y = g(x)$ as a vertical compression of $y = f(x)$. Explain the transformation in words.
 - Write $y = h(x)$ as a vertical stretch of $y = f(x)$. Explain the transformation in words.
 - On the axes below, graph $y = f(x)$, $y = g(x)$ and $y = h(x)$. On the graph, indicate the translations, compression and stretch of $y = f(x)$.



3A.2 CLASSWORK

- 2) Let $y = f(x) = 4^x$.
- Write $y = g(x) = 16^x$ as a horizontal compression of $y = f(x)$. Explain the transformation of $y = f(x)$ to $y = g(x)$ in words.
 - Write $y = h(x) = 2^x$ as a horizontal stretch of $y = f(x)$. Explain the transformation of $y = f(x)$ to $y = h(x)$ in words.
- a) $y = g(x) = 16^x = (4^2)^x = 4^{2x} = f(2x)$
 $y = g(x)$ is a horizontal compression, by a factor of $\frac{1}{2}$, of $y = f(x)$.
- b) $y = h(x) = 2^x = (\sqrt{4})^x = (4^{1/2})^x = 4^{x/2} = f(\frac{1}{2}x)$
 $y = h(x)$ is a horizontal stretch, by a factor of 2, of $y = f(x)$.

(a) $y = g(x) = f(x-3)$ is a translation, by 3 right, of $y = f(x)$.

(b) $y = h(x) = f(x+3)$ is a translation, by 3 left, of $y = f(x)$.

(c) $y = g(x) = 2^{x-3} = 2^x \cdot 2^{-3} = \frac{1}{8} \cdot 2^x = \frac{1}{8} f(x)$

$y = g(x)$ is a vertical compression, by a factor of $\frac{1}{8}$, of $y = f(x)$.

(d) $y = h(x) = 2^{x+3} = 2^x \cdot 2^3 = 8 \cdot 2^x = 8 f(x)$

$y = h(x)$ is a vertical stretch, by a factor of 8, of $y = f(x)$.