

Confusing Transformations

Describe the geometrical transformations of the graph of $y = e^x$ to the following graphs...

$$y = 3e^x$$

$$y = e^{2x}$$

$$y = e^{x-1}$$

$$y = e^{2x-1}$$

$$y = -3e^{-x}$$

$$y = \ln x$$

$$y = \ln x + 4$$

$$y = \ln\left(\frac{x}{5} + 6\right)$$

In particular, for question four here, which of the following is the correct answer?...

- a. Stretch horizontal, SF $\frac{1}{2}$, then translate $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$
- b. Stretch horizontal, SF $\frac{1}{2}$, then translate $\begin{pmatrix} \frac{1}{2} \\ 0 \end{pmatrix}$
- c. Stretch horizontal, SF $\frac{1}{2}$, then translate $\begin{pmatrix} 2 \\ 0 \end{pmatrix}$
- d. Translate $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$ then stretch horizontal, SF $\frac{1}{2}$
- e. Translate $\begin{pmatrix} 2 \\ 0 \end{pmatrix}$ then stretch horizontal, SF $\frac{1}{2}$
- f. Translate $\begin{pmatrix} \frac{1}{2} \\ 0 \end{pmatrix}$ then stretch horizontal, SF $\frac{1}{2}$

Confusing Transformations - Answers

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$$y = \ln\left(\frac{x}{5} + 6\right)$$

a) Stretch vertical, scale factor 3

b) Stretch horizontal, scale factor $\frac{1}{2}$

c) Translation $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$

d) Stretch horizontal, SF $\frac{1}{2}$, then translate $\begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix}$, or...

Translate $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$ then stretch horizontal, SF $\frac{1}{2}$

e) Reflect horizontal, stretch vertical scale factor -3 (or stretch vertical scale factor 3 and reflect vertical)

f) Reflect in line $y = x$

g) Reflect in line $y = x$, then translate $\begin{pmatrix} 0 \\ 4 \end{pmatrix}$

h) Reflect in line $y = x$, then translate $\begin{pmatrix} -6 \\ 0 \end{pmatrix}$, then stretch horizontal scale factor 5