Pre-Calculus   Name: _____

---

1) Which transformation best describes the graphical relationship between $f(x) = 2^x$ and $g(x) = (½)^x$?

   (A) reflection in the line $y = x$
   (B) reflection in the origin
   (C) reflection in the x-axis
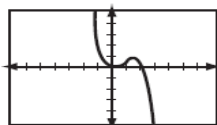   **(D)** reflection in the y-axis
   (E) None of these

2) If $a > 0$, which function represents the reflection of $y = a^x$ in the x-axis?

   (A) $y = -a^x$
   (B) $y = (1/a)^{-x}$
   (C) $x = a^y$
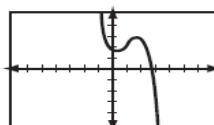   **(D)** $y = (1/a)^x$
   (E) None of these

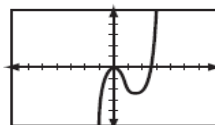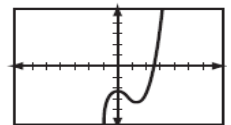3) The accompanying graph represents the equation $y = f(x)$. Which graph represents $g(x)$ if $g(x) = -f(x)$?
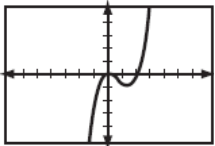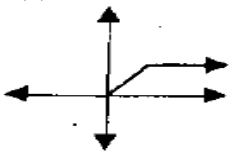
   (A)   **(B)**   **(C)**   **(D)**

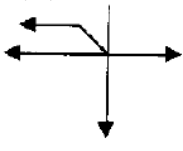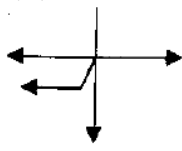
4) The graph below represents $f(x)$. Which of the following is the graph of $f(-x)$?

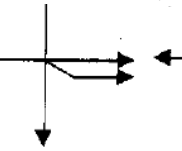$f(x)$ **(A)**   **(B)**   **(C)**   **(D)**

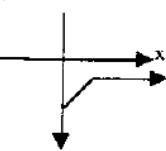
Write an equation for the indicated basic function with the transformations stated. Write the transformations BOTH with the function notation AND the actual function. For example "The absolute value function horizontally stretched by a factor of 3 and translated up 5 units" your answer should look like this:

$$f(x) = |x| \quad \rightarrow \quad f\left(\frac{x}{3}\right) + 5 = \left|\frac{x}{3}\right| + 5)$$

5) The greatest integer function vertically compressed (aka "shrunk") by a factor of ⅔, reflected over the y-axis, then translated left 27 units and down 19 units.

6) The cosine function horizontally compressed (aka "shrunk") by a factor of ¼, reflected over the x-axis, then translated right 24 units.

7) The logistic function is vertically stretched by a factor of 5, reflected over the y-axis, then translated left 11 and down 21.

8) The exponential function is reflected over the y-axis, horizontally stretched by a factor of 7, then translated right 15 units.

Each function below is a transformation of one of the 12 basic functions. Describe the transformations.
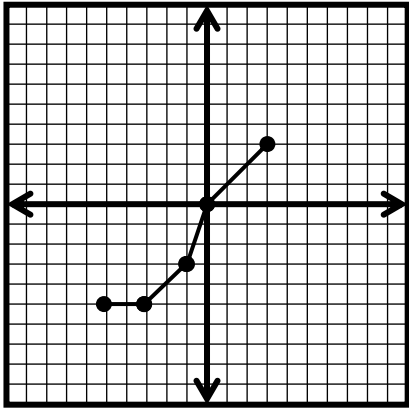
9) $f(x) = e^{-2x+8} - 7$

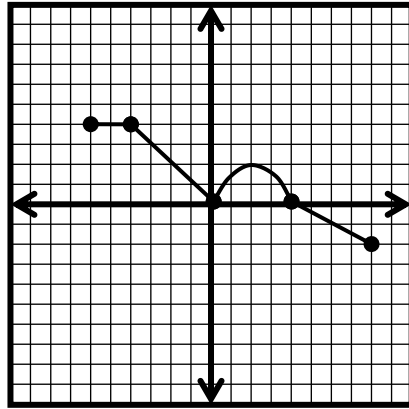10) $g(x) = \dfrac{1}{2 + 2e^{-x+5}}$

11) $f(x) = 9\cos(2x) - 11$

Given the graph of $f(x)$ (already graphed for you on the given coordinate plane) sketch the graph of the transformation indicated.
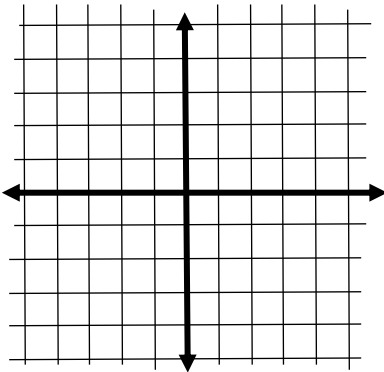
12) $2f(-x)+3$

13) $-f(2x+2)+4$

Each of the following functions is a transformation of one of the 12 basic functions. Sketch each of them on the grid provided, describe the transformations applied to the basic function, and then state the domain and range.
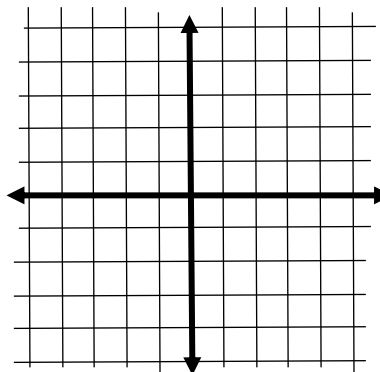
14) $f(x) = 3\sqrt{-x} + 1$

Domain: _____

Range: _____

Transformations: _____

_____

15) $f(x) = \dfrac{-4}{1+e^{-x}} + 2$

Domain: _____
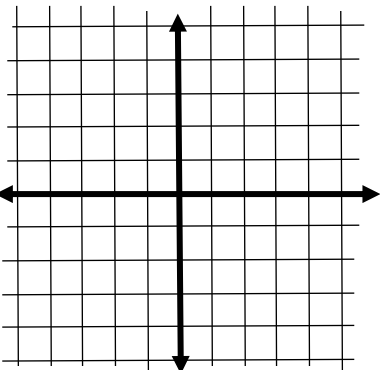
Range: _____

Transformations: _____

_____

16) $f(x) = \ln(-x+4) - 2$

Domain: _____

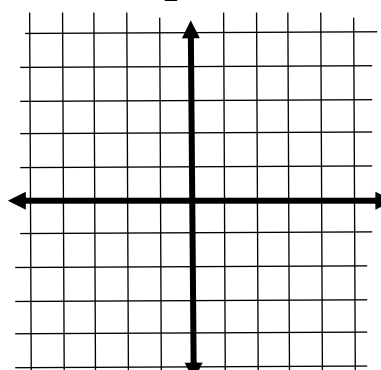Range: _____

Transformations: _____

_____

17) $f(x) = \dfrac{1}{2}(x+2)^3 - 3$

Domain: _____

Range: _____

Transformations: _____

_____