1) Describe the transformations, in order, that are being done to the function f(x).

a) \( g(x) = -4f(x) \)

b) \( g(x) = f(3x) \)

c) \( g(x) = \frac{1}{2}f(-x) \)

d) \( g(x) = -\frac{1}{3}f\left[\frac{1}{2}(x + 1)\right] \)

e) \( g(x) = 5f[-2(x - 4)] \)

f) \( g(x) = -2f(8x) + 4 \)

h) \( g(x) = -\frac{1}{4}f[-3(x - 1)] - 5 \)

i) \( g(x) = 4f\left[-\frac{1}{2}(x + 2)\right] - 1 \)
2) For the graph of \( f(x) \) given, sketch the graph of \( g(x) \) after the given transformation.

a) \( g(x) = 2f(x) - 2 \)

b) \( g(x) = \frac{1}{2} f(x - 1) + 1 \)
Answers

1) a) vertical reflection over the x-axis and vertical stretch bafo 4 \((-4y)\)

b) horizontal compression bafo \(\frac{1}{3} \left(\frac{x}{3}\right)\)

c) vertical compression bafo \(\frac{1}{2} \left(\frac{y}{2}\right)\), horizontal reflection over the y-axis \((-x)\)

d) vertical reflection over the x-axis and vertical compression bafo \(\frac{1}{3} \left(\frac{y}{-3}\right)\), horizontal stretch bafo 2 \((2x)\), phase shift left 1 unit \((x - 1)\)

e) vertical stretch bafo 5 \((5y)\), horizontal reflection over the y-axis and horizontal compression bafo \(\frac{1}{2} \left(\frac{x}{-2}\right)\), phase shift right 4 units \((x + 4)\)

f) vertical reflection over the x-axis and vertical stretch bafo 2 \((-2y)\), horizontal compression bafo \(\frac{1}{8} \left(\frac{x}{8}\right)\), shift up 4 units \((y + 4)\)

h) vertical reflection over the x-axis and vertical compression bafo \(\frac{1}{4} \left(\frac{y}{-4}\right)\), horizontal reflection over the y-axis and horizontal compression bafo \(\frac{1}{3} \left(\frac{x}{-3}\right)\), phase shift right 1 unit \((x + 1)\), shift down 5 units \((y - 5)\)

i) vertical stretch bafo 4 \((4y)\), horizontal reflection over the y-axis and horizontal stretch bafo 2 \((-2x)\), phase shift left 2 units \((x - 2)\), shift down 1 unit \((y - 1)\)

2) a)  

![Graph a)

b)  

![Graph b)
1) For each of the following graphs:
   
   i) describe the transformations in order (a \(\rightarrow\) k \(\rightarrow\) d \(\rightarrow\) c)
   ii) create a table of values for the transformed function
   iii) graph the transformed function

a) \(y = -x^2 + 2\)

b) \(y = (x - 3)^2 + 1\)
c) $y = 2x^2 - 5$

d) $y = -3(x + 1)^2$

e) $y = -(x + 2)^2 + 4$

f) $y = -\frac{1}{2}x^2$
2) For each function $g(x)$:

i) describe the transformations from the parent function $f(x) = x^2$
ii) create a table of values of image points for the transformed function
iii) graph the transformed function and write its equation

a) $g(x) = -2f\left[\frac{1}{2}(x + 2)\right]$

b) $g(x) = 4f(x - 3) - 2$
c) \( y = 2f(x + 4) - 3 \)

d) \( y = \frac{1}{2}f[-2(x + 2)] - 3 \)
1) 1) State the transformations to the parent function $f(x) = \sqrt{x}$ in the order that you would do them.

a) $g(x) = 2\sqrt{x}+1 - 3$

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

c) $g(x) = -\frac{1}{2} \sqrt{3(x) - 6}$
2) Graph the parent function, \( f(x) = \sqrt{x} \). Describe the transformations in order, make a table of values of image points, write the equation of the transformed function and graph it.

a) \( g(x) = f[3(x + 5)] \)

b) \( g(x) = \frac{1}{4} f(-x) \)
3) Use the description to write the transformed function, \( g(x) \).

a) The parent function \( f(x) = \sqrt{x} \) is compressed vertically by a factor of \( \frac{1}{3} \) and then translated (shifted) 3 units left.

b) The parent function \( f(x) = \sqrt{x} \) is reflected over the x-axis, stretch horizontally by a factor of 3 and then translated 1 unit left and 4 units down.
1) State the transformations to the parent function \( f(x) = \frac{1}{x} \) in the order that you would do them.

a) \( g(x) = \frac{2}{3(x-1)} \)  

b) \( g(x) = \frac{-1}{x+2} - 1 \)  

c) \( g(x) = \frac{1}{\frac{2}{x+1}} - 0.5 \)
2) Describe the transformations to the parent function $f(x) = \frac{1}{x}$ in order, make a table of values of image points, write the equation of the transformed function and graph it.

a) $g(x) = f\left[\frac{1}{2}(x + 1)\right]$

b) $g(x) = 2f(-x)$
3) Use the description to write the transformed function, \( g(x) \).

a) The parent function, \( f(x) = \frac{1}{x} \), is compressed vertically by a factor of \( \frac{1}{3} \) and then translated (shifted) 3 units left.

b) The parent function, \( f(x) = \frac{1}{x} \), is reflected over the x-axis, stretch horizontally by a factor of 3 and then translated 1 unit left and 4 units down.
1) Sketch the graph of the inverse of each function. Is the inverse of \( f(x) \) a function? Explain.

a) 

\[ f(x) = x^2 + 6 \]

b) 

\[ f(x) = (x + 8)^2 \]

2) Determine the equation of the inverse of each function.

a) \( f(x) = 2x \) 

b) \( f(x) = 6x - 5 \) 

c) \( f(x) = \frac{2x + 4}{5} \)
4) For each quadratic function, complete the square and then determine the equation of the inverse.

   a) \( f(x) = x^2 + 6x + 15 \)
   b) \( f(x) = 2x^2 + 24x - 3 \)

5) Determine if the two relations shown are inverses of each other. Justify your conclusion.

   a) 
   b) 

6) For the function \( f(x) = -5x + 6 \)

   a) determine \( f^{-1}(x) \)
   b) Graph \( f(x) \) and its inverse
7) Use transformations to graph the function \( f(x) = 2(x - 2)^2 + 1 \). Find the inverse function \( f^{-1}(x) \) and graph it by reflecting \( f(x) \) over the line \( y = x \) (switch x and y co-ordinates).

8) Determine the equation of the inverse for the given functions and state the domain and range.

a) \( f(x) = \sqrt{x + 3} \)  

b) \( f(x) = \frac{3}{x^2} + 2 \)
Answers

1) a) the inverse is NOT a function  b) inverse is NOT a function

2) a) $f^{-1}(x) = \frac{x}{2}$  b) $f^{-1}(x) = \frac{x+5}{6}$  c) $f^{-1}(x) = \frac{5x-4}{2}$

3) a) $f^{-1}(x) = \pm \sqrt{x-6}$  b) $f^{-1}(x) = \pm \sqrt{x} - 8$

4) a) $f^{-1}(x) = \pm \sqrt{x-6} - 3$  b) $f^{-1}(x) = \pm \sqrt{\frac{x+75}{2}} - 6$

5) a) yes  b) no

6) a) $f^{-1}(x) = \frac{-x+6}{5}$  b) 

7) $f^{-1}(x) = 2 \pm \sqrt{\frac{x-1}{3}}$

8) a) $f^{-1}(x) = x^2 - 3$; Domain for $f(x)$: $X \in \mathbb{R}|x \geq -3$, Range for $f(x)$: $Y \in \mathbb{R}|y \geq 0$  
   Domain for $f^{-1}(x)$: $X \in \mathbb{R}|x \geq 0$, Range for $f(x)$: $Y \in \mathbb{R}|y \geq -3$

   b) $f^{-1}(x) = \frac{3}{x-2} + 2$; Domain for $f(x)$: $X \in \mathbb{R}|x \neq 2$, Range for $f(x)$: $Y \in \mathbb{R}|y \neq 2$  
   Domain for $f^{-1}(x)$: $X \in \mathbb{R}|x \neq 2$, Range for $f(x)$: $Y \in \mathbb{R}|y \neq 2$