

SEND - IN ASSIGNMENT**UNIT 1****Transformations**

Name: _____

Teacher: _____

School: _____

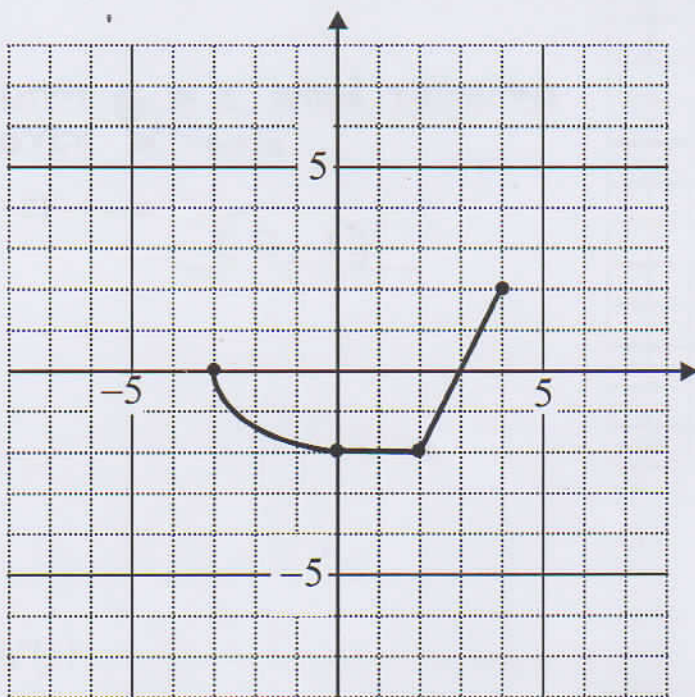
Total _____ = _____ %
51

1. For the function $y = f(x)$ graphed below. Sketch each function on the grid provided.

For each graph: a) explain what change(s) you made to $y = f(x)$.

b) Give the new coordinates of the point provided in each question.

(4 marks for each, 2 marks for graph)

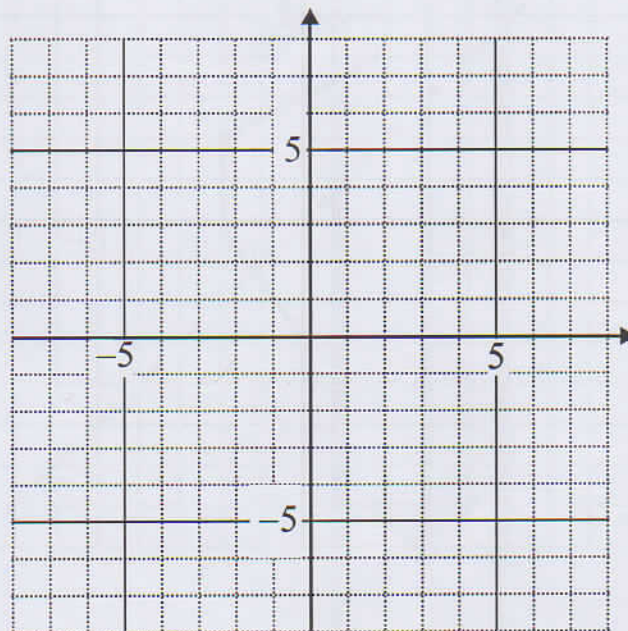


a) $y = f\left(\frac{1}{2}x\right)$

Vertically Compressed by

factors of 0.5 and reflected
over x-axis

$(4, 2) \longrightarrow \underline{(3, 1)}$

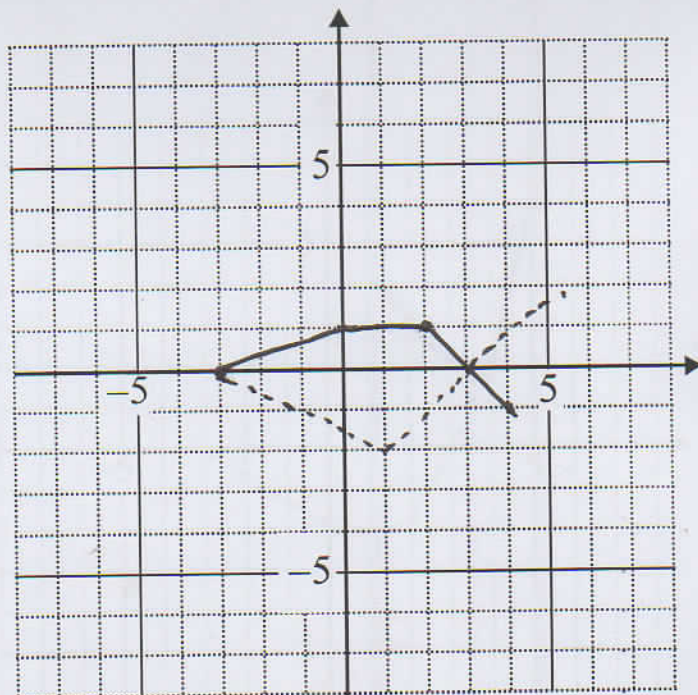


b) $y = -\frac{1}{2}f(x)$

vertically compressed by

factors of 0.5 and reflected
over x-axis

$(2, -2) \rightarrow \underline{(2, 1)}$

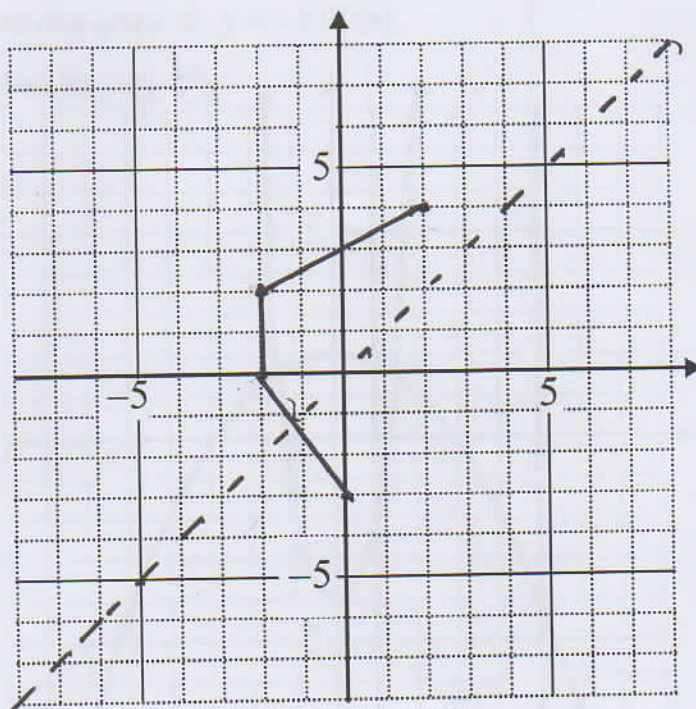


c) $x = f(y)$

The graph is reflected

over the line $y = x$

$(-3, 0) \rightarrow \underline{(0, -3)}$



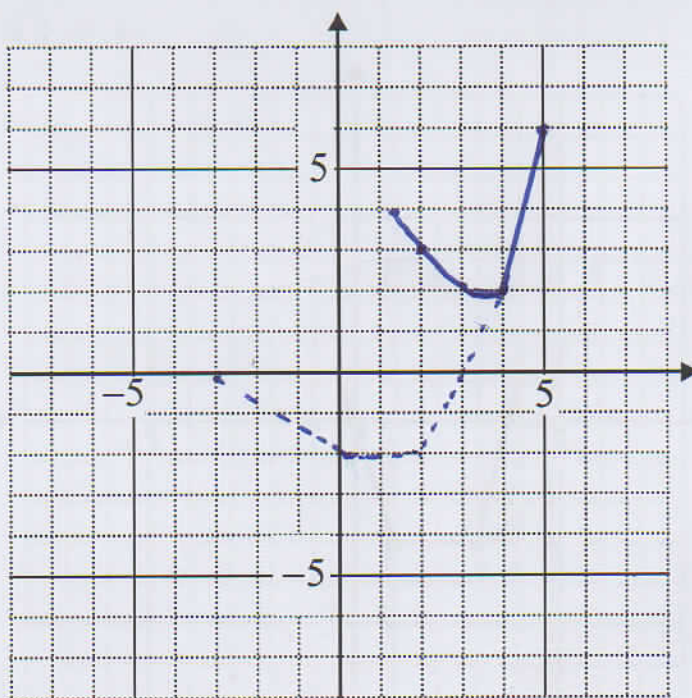
d) $y = f(2x - 6) + 4$

$$y = f(2(x-3)) + 4$$

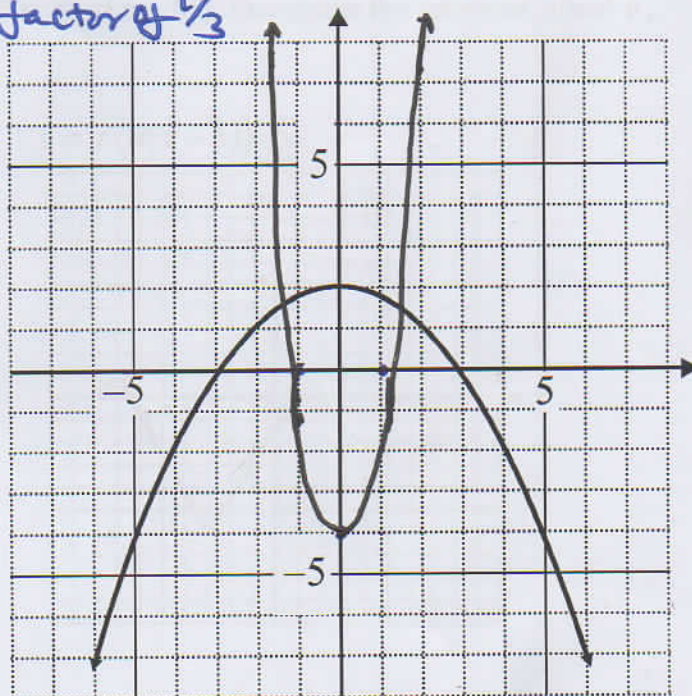
Horizontally compressedby a factor of 0.5 and
translation 4 units up and
3 units right

$(4, 2) \longrightarrow$

$(5, 6)$

2. Given the graph of $y = f(x)$, on the same grid sketch the graph of $y = -2f(3x)$

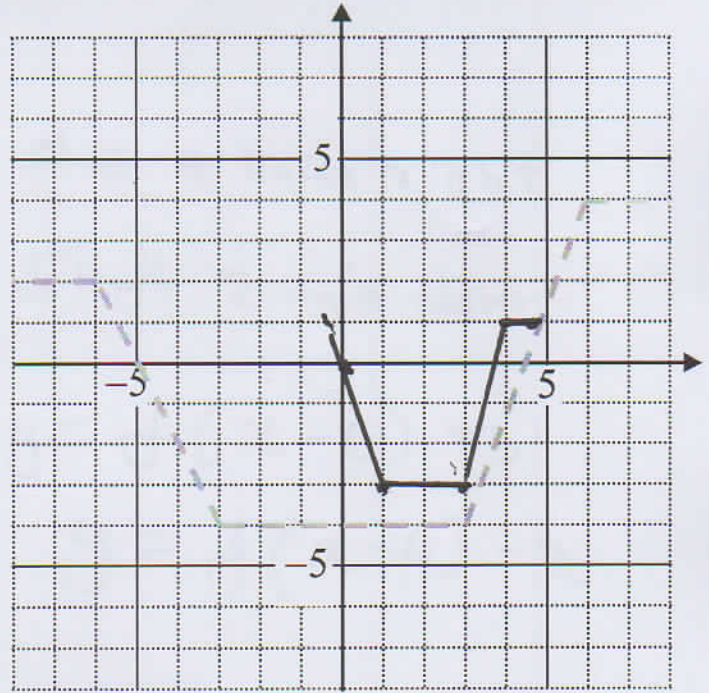
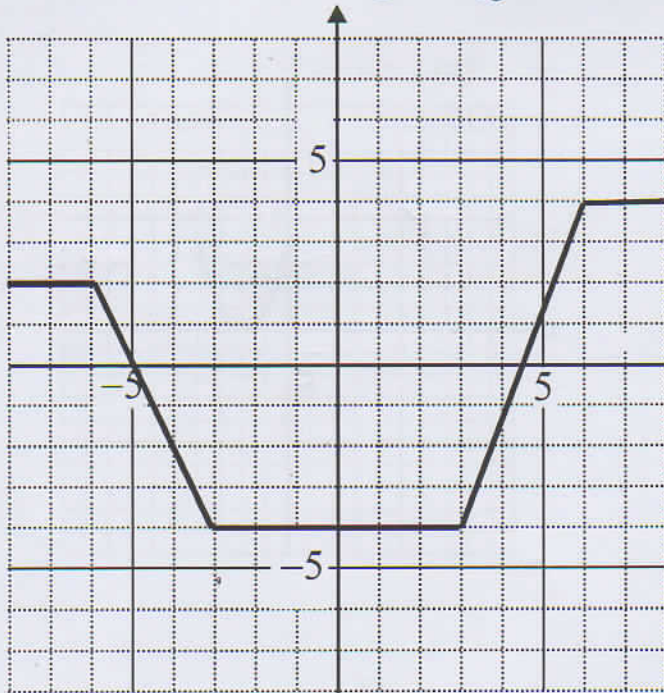
- Horizontal Compression by a factor of $\frac{1}{3}$
- Vertical Stretch by factor 2
- A reflection over x-axis



3 marks

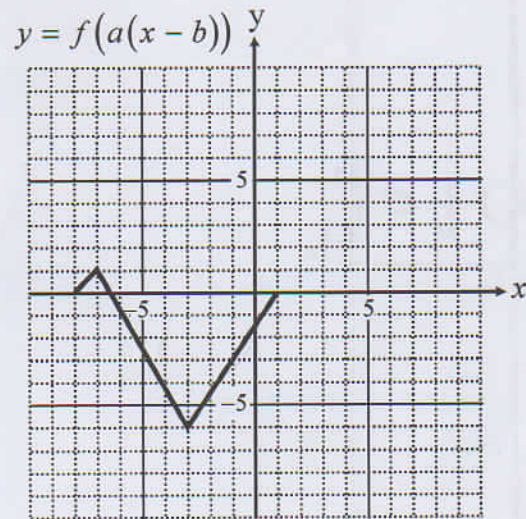
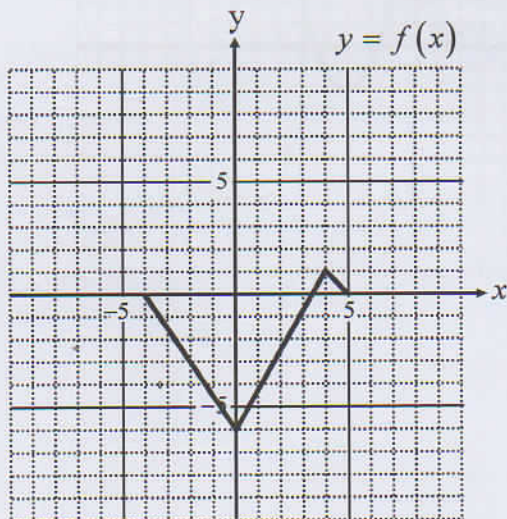
3. Given the graph of the function $y = f(x)$ below, sketch the graph of $2y = f(3x-6) - 2$ on the grid provided.

$$y = \frac{1}{2} f(3(x-2)) - 1$$



3 marks

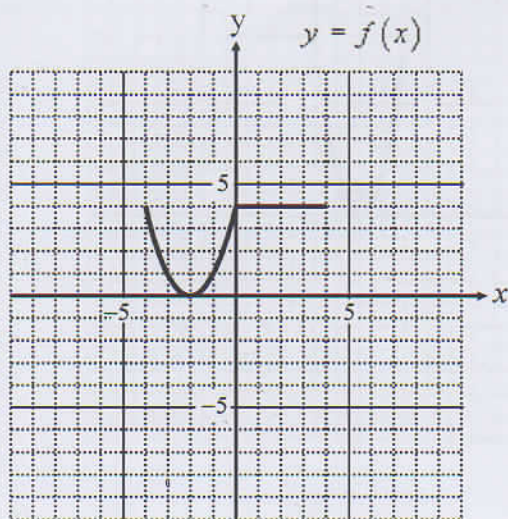
4. Two functions are graphed below. $y = f(x)$ and $y = f(a(x-b))$. Determine the values of a and b .



- Reflection over the
y-axis
Shift 3 units left
 $b = -1$
 $c = -3$

4. $b = -1, c = -3$
2 marks

5. The graph of $y = f(x)$ is shown below. The sketches of transformations of $f(x)$ are given in the following graphs. Write an equation in terms of $f(x)$ to represent the graphs of the transformations.



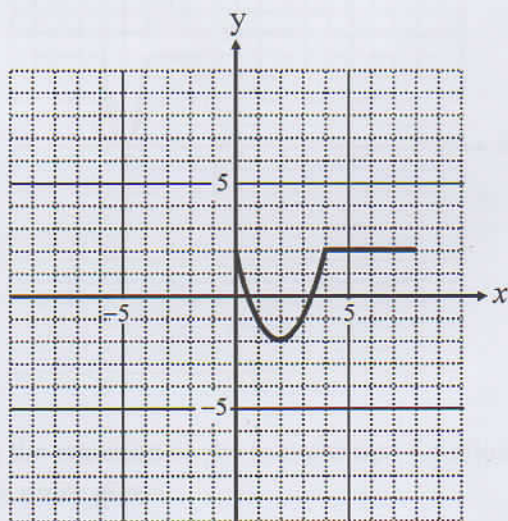
shift 4 units right

shift 2 units down

$$y = f(x - c) + b$$

$$y = f(x - 4) - 2$$

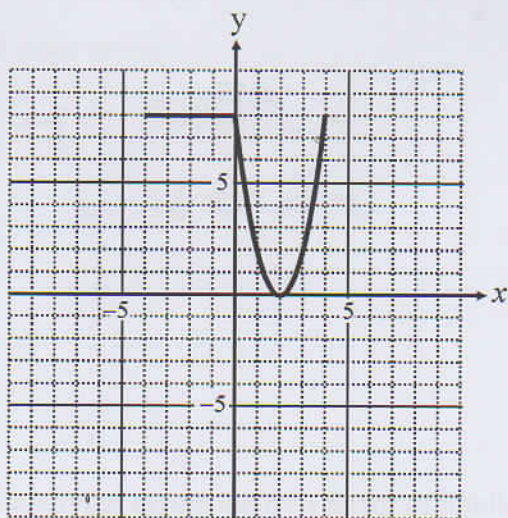
a)



a) $y = f(x - 4) - 2$

2 marks

b)

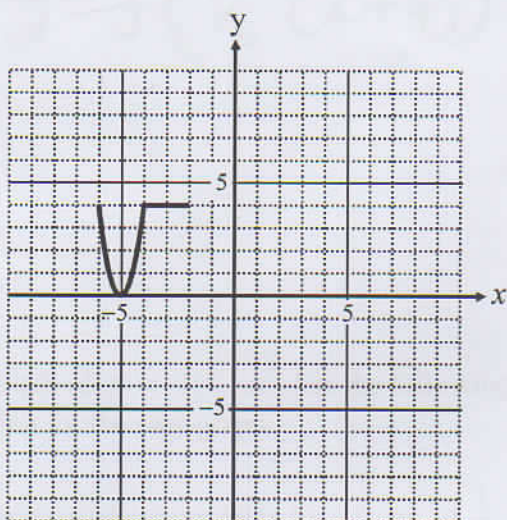


Vertical stretch by factor 2

~~a reflection~~ Reflection over y-axis

b) $y = 2f(-x)$
2 marks

c)



Horizontally Compressed by a factor 0.5

Shift 4 units left

c) $y = f(2(x+4))$
2 marks

6. Write the equation of the transformed function $y = 3x - 6$ after the following transformations in the order given.

a) A vertical compression by a factor of $\frac{1}{3}$ followed by a transformation of 3 units right.

$$y = \frac{1}{3}((x-3)(x-3))$$

a) $y = \frac{1}{3}(x-3)^2$
2 marks

- b) A horizontal compression by a factor of $\frac{1}{4}$, then a reflection in the y -axis followed by 2 units down.

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

$$= 16x^2 - 2$$

b) $y = 2(8x^2 - 1)$
2 marks

- c) A horizontal expansion by a factor of 6 followed by a translation of 4 units left and 5 units up.

$$y = f\left(\frac{1}{6}(x+4)\right)^2 + 5 = f\left(\frac{1}{6}x + \frac{2}{3}\right)^2 + 5$$

c) $y = \left(\frac{1}{6}x + \frac{2}{3}\right)^2 + 5$
2 marks

7. The graph of $y = \sqrt{16 - x^2}$ has the following transformation applied to it. Determine an equation for the new graph.

- a) a horizontal compression by a factor of $\frac{1}{2}$.

$$y = \sqrt{16 - (2x)^2} = \sqrt{16 - 4x^2} = \sqrt{4(4 - x^2)} = 2\sqrt{4 - x^2}$$

a) $y = 2\sqrt{4 - x^2}$
2 marks

b) a vertical expansion by a factor of 3, then reflected in the y -axis.

$$T = 3\sqrt{16 - (-x)^2} = 3\sqrt{16 - x^2}$$

b) $T = 3\sqrt{16 - x^2}$
2 marks

8. If $f(x) = \frac{2-x}{5x}$, determine the equation of $f^{-1}(x)$, the inverse of $f(x)$.

$$T = \frac{2-x}{5x}$$

making x the subject of the formula.

$$x = \frac{2-y}{5y}$$

$$5xy = 2-y$$

$$5xy + y = 2$$

$$y(\cancel{5x+1}) = 2$$

$$\frac{y}{1} = \frac{2}{(5x+1)}$$

$$y = \frac{2}{5x+1}$$

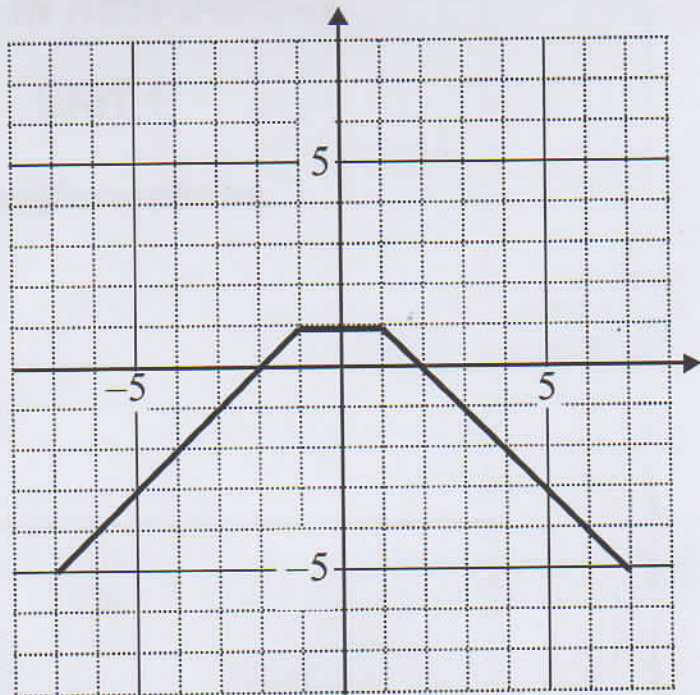
8. $y = \frac{2}{5x+1}$
3 marks

9. For the function $y = f(x)$ graphed below, list all the coordinates of the invariant points for the following transformations.

a) $y = f(-x)$

b) $y = -f(x)$

c) $x = f(y)$



- a) $(0, 1)$ 2 marks
- b) $(-2, 0), (2, 0)$ 2 marks
- c) $(1, 1)$ 2 marks

10. The point $(8, -5)$ is on the graph of $y = f(x)$, which point must be on the graph

of $y = \frac{3}{|f(-x+1) - 2|} + 5$?

$$3 \times \frac{1}{|f(-(-8+1)) - 2|}$$

$$+ 5 = \frac{3}{|f(-(-8+1)) - 2|} + 5$$

$$\begin{aligned} &= \frac{3}{|f(-(-8+1)) - 2|} + 5 \\ &= \frac{3}{|f(-(-7)) - 2|} + 5 \\ &= \frac{3}{|f(7) - 2|} + 5 \end{aligned}$$

10. $(-7, \frac{38}{7})$ 2 marks