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VCE Mathematical Methods $\frac{3}{4}$
Transformations [1.3]
Test

Results:

Test	_____ / 13.5
Extension	_____ / 6



Section A: Test Questions (13.5 Marks)

INSTRUCTION: 13.5 Marks. 17 Minutes Writing.



Question 1 (2.5 marks)

Tick whether the following statements are **true** or **false**.

	True	False
a. The image of a transformation is the point before the transformation is applied.		
b. When a point undergoes a dilation by a factor 3 from the y -axis, we can describe it as $x' = \frac{1}{3}x$.		
c. The transformation $x' = -2(x - 2)$, indicates a translation of 2 units left, a dilation by a factor 2 from the y -axis and a reflection in the y -axis.		
d. $y' = 2y + 1$ and $y' = 2\left(y + \frac{1}{2}\right)$ result in the same transformed function.		
e. The transformation that maps $y = x^2$ to $y = 8x^2$ can be interpreted using either a dilation from the x -axis or the y -axis.		

Space for Personal Notes

Question 2 (2 marks)

The series of transformations given by “a dilation by a factor of 5 from the x -axis, reflection in the x -axis, and a translation of 2 units up” yields the same result as the series of transformations given by “a translation by a units down, a reflection in the x -axis, and a dilation by a factor of b from the x -axis.” Find the values of a and b .

Question 3 (3 marks)

For the function $f: [0, \infty) \rightarrow R, f(x) = \sqrt{x+3}$, the function f is dilated by a factor of $\frac{3}{2}$ from the x -axis, translated 3 units in the negative x -direction, and then reflected in the y -axis to produce the function g .

Find the rule for $g(x)$ and state its domain.

Question 4 (3 marks)

Consider the following functions:

$$f(x) = \log_e(x + 4)$$

$$g(x) = 2 \log_e(3x - 1) + 1$$

Find the series of transformations that map $f(x)$ to $g(x)$.

Question 5 (3 marks)

The graph of a linear function $y = f(x)$ has an x -intercept at $(2, 0)$ and a y -intercept at $(0, -6)$. Find the x and y -intercepts of the graph of $y = 2f(3x)$.

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Section B: Extension Test Questions (6 Marks)

INSTRUCTION: 6 Marks. 6 Minutes Writing.



Question 6 (3 marks)

It is known that $f(x)$ has a tangent $y = 2x + 3$ at $x = 3$. $f(x)$ has been transformed into $g(x)$, where $g(x) = 3f(2x - 1) + 2$.

Find the tangent of $g(x)$ at $x = 2$.

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Question 7 (3 marks)

Find a sequence of transformations that map the function $f(x) = x^2 - 6x + 13$ to the function $g(x) = 18(x - 1)^2 + 10$.

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