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VCE Mathematical Methods ½ Transformations [2.4]

Test

15 Marks. 19 Minutes Writing.

Results:

/15	
	/ 15





Section A: Test Questions (15 Marks)

Question 1 (3 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.	Reflection in the x -axis makes the y value negative of what it was.	1	
c.	When a point undergoes a dilation by a factor 3 from the y-axis, we can describe it as $x' = 3x$.		
d.	The transformation $x' = 2(x - 2)$, indicates a translation of 2 units left, and a dilation by a factor 2 from the x-axis.		
e.	$y' = 2y + 1$ and $y' = 2\left(y + \frac{1}{2}\right)$ result in the same transformed function.		
f.	A transformation that maps $y = x^2$ to $y = 9x^2$ could be a dilation by factor 3 from the <i>y</i> -axis.		



Question 2 (2 marks)

The series of transformations given by "a dilation by a factor of 3 from the x-axis, followed by a translation of 8 units up", yields the exact same result as the series of transformations given by "a translation by a units up, followed by a dilation by a factor of b from the x-axis".

Find the values of a and b.

$$3y+8 = b(y+a)$$



Question 3 (3 marks)

Consider the following function: $f(x) = (x + 1)^2$

Apply the following transformations below to the function above.

Dilation by a factor of
$$\frac{1}{4}$$
 from the y-axis

Dilation by a factor of 2 from the x-axis
$$\begin{bmatrix} \frac{1}{4}x_1 & 2y \end{bmatrix}$$

Translation by 2 units in the negative direction of the x-axis
$$(4x-2)24$$

Translation by 9 units in the positive direction of the y-axis

Reflection in the y-axis
$$(\frac{4}{4}x+2,2y+9)$$

$$y = 2(-4x+9)^{2}+9$$

$$\therefore f(x) = 2(-4x+9)^{2}+9$$



Question 4 (3 marks)

Consider the following functions:

$$f(x) = \sqrt{x+2}$$

$$g(x) = -2\sqrt{7 - 2x} + 3$$

Find the set of transformations that maps f(x) to g(x).

$$y = \sqrt{x+2} \quad \Rightarrow \quad y' = -2\sqrt{7-2x'} + 3$$

$$y'-3 = \sqrt{7-2x'}$$

1. Dil 2 from
$$\chi' = -\frac{1}{2}\chi + \frac{1}{2}$$



Question 5 (2 marks)

Consider the following functions:

$$f_1(x) = x^3$$

$$f_2(x) = -2(3x+1)^3 - 1$$

Find the set of transformations that maps the function f_1 into f_2 .

$$y = x^{3} \Rightarrow y' = -2(3x+1)^{3} - 1$$

$$y = x^{3} \Rightarrow x' = -2(3x+1)^{3} - 1$$

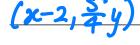
$$y = \frac{y+1}{-2} = (3x+1)^3$$



Question 6 (3 marks)

For the function $f(x) = \sqrt{x+2}$, the function f is dilated by a factor of $\frac{5}{4}$ from the x-axis, translated 2 units in the negative x-direction and then is reflected in the y-axis to produce the function g.

Find the rule for g(x).



$$\therefore x' = -x + 2 \qquad x = 2 - x'$$

$$x' = xy$$

$$y = xy'$$



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VCE Mathematical Methods ½

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