Enlargements

Enlargements and Invariance

Using the Determinant

Example

$A\left(1,1\right),B\left(1,2\right),C\left(2,2\right)$ are points on a triangle. The transformation with matrix $M=\left(\begin{matrix}4&0\\0&3\end{matrix}\right)$ is applied to the triangle to produce a new triangle with vertices $A^{'},B'$ and $C'$.

(a) Determine the coordinates of $A^{'}, B^{'},C'$.

(b) What is the area of triangle $ABC$?

(c) What is the area of triangle $A^{'}B^{'}C^{'}$?

(d) Determine $det⁡(M)$. What do you notice?

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| **Area of Object** | **Transformation Matrix** | **Area of Image** |
| $$4$$ | $$\left(\begin{matrix}1&2\\3&4\end{matrix}\right)$$ |  |
| $$3$$ | $$\left(\begin{matrix}2&0\\9&4\end{matrix}\right)$$ |  |
| $$9$$ | $$\left(\begin{matrix}5&3\\-2&-1\end{matrix}\right)$$ |  |
| $$1$$ | $$\left(\begin{matrix}-5&2\\-4&-2\end{matrix}\right)$$ |  |

Test Your Understanding



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