



A Level Maths

Topic: Transformations of Graphs

Instructions

Answer all questions. Show complete working. Apply appropriate transformations to graphs based on the given functions.

Practice Questions

- Given the function $f(x) = x^2$, write the equation for the following transformations:
 - Shift $f(x) = x^2$ 3 units to the right.
 - Reflect $f(x) = x^2$ in the x-axis.
 - Stretch $f(x) = x^2$ vertically by a factor of 2.
 - Translate $f(x) = x^2$ 4 units up.
- The graph of $y = \sqrt{x}$ is shifted 5 units to the left and 2 units down. Write the equation of the transformed graph.
- Consider the function $g(x) = 3x - 1$. Apply the following transformations and write the equations of the transformed graphs:
 - Translate 4 units up.
 - Reflect in the y-axis.
 - Stretch vertically by a factor of 2.
- Given the function $h(x) = \sin x$, write the equation of the transformed graph when it is:
 - Reflected in the x-axis.
 - Shifted 90 units to the right.
 - Stretched vertically by a factor of 3.

5. For the function $y = \cos x$, perform the following transformations and write the equation for each:
- (i) Translate 2 units to the left.
 - (ii) Reflect in the y-axis.
 - (iii) Compress vertically by a factor of $1/2$.
6. Consider the function $y = |x - 1|$. Apply the following transformations and write the equations for the transformed graphs:
- (i) Translate 3 units to the right.
 - (ii) Reflect in the x-axis.
 - (iii) Stretch horizontally by a factor of 2.
7. Given the function $f(x) = x^3$, write the equations for the following transformations:
- (i) Reflect $f(x) = x^3$ in the y-axis.
 - (ii) Translate $f(x) = x^3$ 5 units to the left.
 - (iii) Stretch $f(x) = x^3$ vertically by a factor of 4.
8. Consider the function $y = e^x$. Apply the following transformations:
- (i) Translate 3 units to the left.
 - (ii) Stretch vertically by a factor of 2.
 - (iii) Reflect in the x-axis.

Multiple-Choice Questions

1. The transformation of the graph of $y = x^2$ that results in a vertical stretch by a factor of 3 is:
- A. $y = 3x^2$
 - B. $y = x^2 + 3$
 - C. $y = 3(x^2)$
 - D. $y = x^2 - 3$
2. The graph of $y = |x|$ is reflected in the x-axis. The equation of the new graph is:
- A. $y = -|x|$
 - B. $y = |x|$
 - C. $y = x$
 - D. $y = -x$

3. If the graph of $y = x^2$ is shifted 3 units to the left, the equation of the transformed graph is:
- A. $y = (x + 3)^2$
 - B. $y = (x - 3)^2$
 - C. $y = x^2 + 3$
 - D. $y = x^2 - 3$
4. For the function $y = \cos x$, if the graph is stretched vertically by a factor of 2, the new equation will be:
- A. $y = 2 \cos x$
 - B. $y = \cos 2x$
 - C. $y = 2x$
 - D. $y = \cos x + 2$
5. The equation $y = |x + 2|$ is reflected in the y-axis. The equation of the transformed graph is:
- A. $y = |x - 2|$
 - B. $y = |x + 2|$
 - C. $y = |-x + 2|$
 - D. $y = |x - 2|$

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