JZ Maths

TMUA PRACTICE SET

Transformations Part A Practice 1

Time limit: none — work at your own pace

Calculators: not permitted

Format: 10 multiple-choice questions

This is a TMUA-style practice set, intended for familiarisation with a specific topic.

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Last updated: 25 August 2026 at 08:17

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Question 1

The curve $y = f(x)$, where $f(x) = x^2 + x - 2$, undergoes the following transformations in order: a horizontal translation by $+2$, a vertical stretch by factor 3, a reflection in the y-axis, and a vertical translation by -4. Which of the following is the equation of the transformed curve?

A $y = 3x^2 - 9x - 4$

B $y = 3x^2 + 9x - 4$

C $y = 3x^2 + 9x - 12$

D $y = 3x^2 - 15x + 8$

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Question 2

The curve $y = f(x)$, where $f(x) = x^3 - x + 2$, undergoes the following transformations in order: a reflection in the x-axis, a horizontal stretch by factor 2, a horizontal translation by -1, and a vertical translation by $+3$. Which of the following is the equation of the transformed curve?

A $y = -\dfrac{(x-1)^3}{8} + \dfrac{x-1}{2} + 1$

B $y = -8(x+1)^3 + 2(x+1) + 1$

C $y = -\dfrac{(x+1)^3}{8} + \dfrac{x+1}{2} - 5$

D $y = -\dfrac{(x+1)^3}{8} + \dfrac{x+1}{2} + 1$

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Question 3

The curve $y = f(x)$, where $f(x) = 2x^2 - 3x + 1$, undergoes the following transformations in order: a reflection in the line $x = 2$, a vertical stretch by factor $1/2$, a vertical translation by $+5$, and a reflection in the line $y = 1$. Which of the following is the equation of the transformed curve?

A $y = -x^2 + \frac{13}{2}x - \frac{27}{2}$

B $y = -x^2 + \frac{13}{2}x - \frac{29}{2}$

C $y = -x^2 + \frac{13}{2}x - \frac{7}{2}$

D $y = -x^2 + \frac{5}{2}x - \frac{9}{2}$

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Question 4

The curve $y = f(x)$, where $f(x) = x^3 + 2x^2 - x$, undergoes the following transformations in order: a horizontal stretch by factor 0.5, a reflection in the y-axis, a horizontal translation by $+3$, and a reflection in the x-axis. Which of the following is the equation of the transformed curve?

A $y = -(-2x - 6)^3 - 2(-2x - 6)^2 + (-2x - 6)$

B $y = -\left(\dfrac{3 - x}{2}\right)^3 - 2\left(\dfrac{3 - x}{2}\right)^2 + \dfrac{3 - x}{2}$

C $y = -(6 - 2x)^3 - 2(6 - 2x)^2 + (6 - 2x)$

D $y = -(2x - 6)^3 - 2(2x - 6)^2 + (2x - 6)$

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Question 5

The curve $y = f(x)$, where $f(x) = x^2 - 4x + 3$, undergoes the following transformations in order: a vertical translation by $+2$, a reflection in the x-axis, a horizontal translation by -3, and a reflection in the line $x = -1$. Which of the following is the equation of the transformed curve?

A $y = -x^2 + 2x - 2$

B $y = -x^2 - 2x - 2$

C $y = -x^2 - 2x + 2$

D $y = -x^2 - 6x - 10$

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Question 6

Let $f(x) = x^2 + 3x - 1$ and $g(x) = 2(x-4)^2 + 6(x-4) + 3$. Which of the following sequences of transformations maps the graph of $y = f(x)$ to the graph of $y = g(x)$?

A A horizontal translation by -4, followed by a vertical stretch by factor 2, then a vertical translation by $+5$

B A horizontal translation by $+4$, followed by a vertical translation by $+5$, then a vertical stretch by factor 2

C A horizontal stretch by factor 4, followed by a vertical stretch by factor 2, then a vertical translation by $+5$

D A horizontal translation by $+4$, followed by a vertical stretch by factor 2, then a vertical translation by $+5$

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Question 7

Let $f(x) = x^3 - 2x$ and $g(x) = -(2-x)^3 + 2(2-x) - 4$. Which of the following sequences of transformations maps the graph of $y = f(x)$ to the graph of $y = g(x)$?

A A reflection in the line $x = 1$, followed by a reflection in the line $y = -2$

B A reflection in the line $x = -1$, followed by a reflection in the line $y = -2$

C A reflection in the line $x = 1$, followed by a vertical translation by -4

D A reflection in the line $x = 1$, followed by a reflection in the x-axis, then a vertical translation by -2

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Question 8

Let $f(x) = 2x^2 + x - 3$ and $g(x) = 4x^2 - x + \frac{5}{2}$. Which of the following sequences of transformations maps the graph of $y = f(x)$ to the graph of $y = g(x)$?

A A reflection in the y-axis, a horizontal stretch by factor 2, a vertical stretch by factor 0.5, then a vertical translation by $+4$

B A reflection in the y-axis, a horizontal stretch by factor 0.5, a vertical stretch by factor 2, then a vertical translation by $+4$

C A reflection in the y-axis, a horizontal stretch by factor 0.5, a vertical stretch by factor 0.5, then a vertical translation by $+4$

D A reflection in the y-axis, a horizontal stretch by factor 0.5, a vertical stretch by factor 0.5, then a vertical translation by -4

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Question 9

Let $f(x) = x^3 + x^2 - 1$ and $g(x) = -\frac{(x+2)^3}{27} - \frac{(x+2)^2}{9} + 2$. Which of the following sequences of transformations maps the graph of $y = f(x)$ to the graph of $y = g(x)$?

A A horizontal translation by -2, followed by a horizontal stretch by factor 3, a reflection in the x-axis, then a vertical translation by $+1$

B A horizontal stretch by factor 3, followed by a horizontal translation by -2, a reflection in the x-axis, then a vertical translation by $+1$

C A horizontal stretch by factor 3, followed by a horizontal translation by $+2$, a reflection in the x-axis, then a vertical translation by $+1$

D A horizontal stretch by factor 3, followed by a horizontal translation by -2, a vertical translation by $+1$, then a reflection in the x-axis

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Question 10

Let $f(x) = x^3 - x + 1$ and $g(x) = (x-5)^3 - x + 5$. Which of the following sequences of transformations maps the graph of $y = f(x)$ to the graph of $y = g(x)$?

A A reflection in the line $y = 2$, followed by a reflection in the line $x = 3$, a horizontal translation by $+1$, then a vertical translation by -3

B A vertical translation by -3, followed by a reflection in the line $y = 2$, a horizontal translation by $+1$, then a reflection in the line $x = 3$

C A reflection in the line $y = -2$, followed by a horizontal translation by $+1$, a reflection in the line $x = 3$, then a vertical translation by -3

D A reflection in the line $y = 2$, followed by a horizontal translation by $+1$, a reflection in the line $x = 3$, then a vertical translation by -3

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