

Brett Robbins Academic Consulting

Math 30-1 Practice Test

Transformations, Operations & Inverse Functions

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

The point $(-2, 5)$ lies on the graph of $y = f(x)$.

The image of this point on the graph of $y = f(x + 3) - 4$ is

- A) $(-5, 1)$
- B) $(1, 1)$
- C) $(-5, 9)$
- D) $(1, 9)$

Question 2

The graph of $f(x) = (x + 2)^2 - 3$ is transformed into the graph of $g(x) = f(x - 5) + 4$.

The coordinates of the vertex on the graph of $y = g(x)$ are

- A) $(-7, 1)$
- B) $(3, 1)$
- C) $(3, -7)$
- D) $(-7, -7)$

Question 3

Compared to the graph of $y = f(x)$, the graph of $y = -\frac{1}{2}f(x)$ has been

- A) reflected in the y -axis and vertically stretched by a factor of $\frac{1}{2}$
- B) reflected in the x -axis and vertically stretched by a factor of 2
- C) reflected in the x -axis and vertically stretched by a factor of $\frac{1}{2}$
- D) reflected in the y -axis and vertically stretched by a factor of 2

Question 4

The domain of $y = f(x)$ is $-3 \leq x \leq 5$.

The domain of $y = f(x - 4) + 2$ is

- A) $-7 \leq x \leq 1$
- B) $-3 \leq x \leq 5$
- C) $-1 \leq x \leq 7$
- D) $1 \leq x \leq 9$

Question 5

The point $(6, -4)$ lies on the graph of $y=f(x)$.

The corresponding point on the graph of the inverse, $y = f^{-1}(x)$, is

- A) (6, 4)
- B) (-4, 6)
- C) (-6, -4)
- D) (4, -6)

Question 6

Given $f(x) = 2x - 3$ and $g(x) = x^2 + 1$, the value of $(f \circ g)(2)$ is

- A) 7 B) 2
C) 6 D) 5

Question 7

Given $f(x) = 3x + 2$ and $g(x) = x^2 - 4$, an expression for $(g \circ f)(x)$ is

- A) $3x^2 - 10$ B) $9x^2 + 12x + 8$
C) $9x^2 - 12x$ D) $9x^2 + 12x$

Question 8

Given $f(x) = x^2 + 3x$ and $g(x) = x - 2$, the value of $(f \circ g)(4)$ is

Question 9

The point $(4, 6)$ lies on the graph of $y = f(x)$.

The image of this point on the graph of $y = -f(2x)$ is

- A) (4, -6)
- B) (8, -6)
- C) (2, -6)
- D) (2, 6)

Question 10

The inverse of the function $f(x) = \frac{x-7}{2}$ is

A) $f^{-1}(x) = \frac{x+7}{2}$

B) $f^{-1}(x) = 2x + 7$

C) $f^{-1}(x) = 2x - 7$

D) $f^{-1}(x) = \frac{x-7}{2}$

Question 11

The domain of $y = f(x)$ is $-4 \leq x \leq 2$.

The domain of $y = f(2x + 6)$ is

A) $-5 \leq x \leq -2$

B) $2 \leq x \leq 5$

C) $-2 \leq x \leq 1$

D) $-8 \leq x \leq -5$

Question 12

The point $(2, -5)$ lies on the graph of $y = f(x)$.

On the graph of $y = -3f(x - 4)$, the y -coordinate of the image of this point is

Question 13

The graph of $y = f(x)$, where $f(x) = (x - 1)^2 + 1$, is reflected in the line $y = x$.

The number of invariant points is

A) 1

B) 3

C) 0

D) 2

Question 14

A restriction on the domain of $f(x) = (x - 3)^2 + 2$ that would ensure the inverse of $y = f(x)$ is a function is

- A) $x \geq 3$
B) $x \geq 2$
C) $x \leq 2$
D) $x \geq -3$

Question 15

Given $f(x) = x^2 + 4x - 1$ and $g(x) = 2x^2 - 3$, an expression for $(f - g)(x)$ is

- A) $3x^2 + 4x - 4$ B) $-x^2 + 4x - 4$
C) $-x^2 + 4x + 2$ D) $x^2 - 4x - 2$

Question 16

If $f(x) = 2x^2 - x + 3$ and $g(x) = x - 1$, then $(f \circ g)(x)$ can be written in the form $ax^2 + bx + c$.

The value of $a + b + c$ is

Question 17

Given the function $f(x) = 5x - 20$, the y -intercept of the graph of $y = f^{-1}(x)$ is

- [illegible]

Question 18

The range of $y=f(x)$ is $-2 \leq y \leq 6$.

If $g(x) = -f(x) + 3$, then the maximum value of $g(x)$ is

Question 19

The graph of $y = x^2$ is vertically stretched by a factor of 2, reflected in the x -axis, translated 3 units to the left, and translated 1 unit up. The equation of the resulting graph is

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

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

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

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

Question 20

The point $(8, -4)$ lies on the graph of $y = f(x)$. The graph is stretched horizontally about the y -axis by a factor of 3 and reflected in the x -axis. The x -coordinate of the image of this point is

Question 21

The domain of $y = f(x)$ is $-1 \leq x \leq 7$.

The domain of $y = f(-2x - 4)$ is

A) $\frac{3}{2} \leq x \leq \frac{11}{2}$

B) $-\frac{3}{2} \leq x \leq \frac{11}{2}$

C) $-\frac{11}{2} \leq x \leq -\frac{3}{2}$

D) $-\frac{11}{2} \leq x \leq \frac{3}{2}$

Question 22

Given $f(x) = x - 3$, $g(x) = 2x + 1$, and $h(x) = x^2$, the value of $(f \circ g \circ h)(2)$ is

Question 23

Given $f(x) = x + 3$ and $g(x) = x - 2$, an expression for $(fg)(x)$ is

A) $x^2 + 5x - 6$

B) $x^2 + x + 6$

C) $x^2 - 5x - 6$

D) $x^2 + x - 6$

Question 24

The point $(-4, 9)$ lies on the graph of $y = f(x)$ and is mapped to a new point using the mapping notation $(x, y) \rightarrow (2x + 1, -y - 3)$. The sum of the coordinates of the image point is

Question 25

The range of $y = f(x)$ is $-1 \leq y \leq 4$.

The range of $y = -2f(x - 3) + 7$ is

A) $-15 \leq y \leq 1$

B) $-1 \leq y \leq 15$

C) $-9 \leq y \leq 9$

D) $-1 \leq y \leq 9$

Answer Key

- | | | |
|-------|--------|---------|
| 1. A | 10. B | 19. A |
| 2. B | 11. A | 20. 24 |
| 3. C | 12. 15 | 21. C |
| 4. D | 13. D | 22. 6 |
| 5. B | 14. A | 23. D |
| 6. A | 15. C | 24. -19 |
| 7. D | 16. 3 | 25. B |
| 8. 10 | 17. B | |
| 9. C | 18. 5 | |

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