Unit 6: Functions and Graphs

SSC-II Mathematics (Federal Board, National Book Foundation) | 36 MCQs

Choose the correct answer. The correct option is shown in **bold**. Each question carries one mark.

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1. A function from set A to set B is a relation in which

A. some elements of A have no image

B. every element of A has exactly one image in B

C. an element of A may have two images

D. every element of B has exactly one image in A

2. The domain of the relation {(1, 2), (2, 3), (3, 4)} is

A. {2, 3, 4}

B. {1, 2, 3, 4}

C. {1, 4}

D. {1, 2, 3}

3. The range of the relation {(1, 2), (2, 3), (3, 4)} is

A. {2, 3, 4}

B. {2, 4}

C. {1, 2, 3, 4}

D. {1, 2, 3}

4. If A = {1, 2, 3} and R = {(x, y) | y = 2x}, then the range of R is

A. {1, 2, 3}

B. {3, 6, 9}

C. {2, 4, 6}

D. {1, 4, 9}

5. If $f(x) = 2x + 3$, then $f(2)$ equals

A. 5

B. 7

C. 10

D. 4

6. If $f(x) = x^2 - 1$, then $f(-2)$ equals

A. 5

B. -5

C. 3

D. -3

7. A function f: A → B is one-to-one (injective) if

A. different elements of A have different images in B

B. every element of B has an image in A

C. the range equals A

D. two elements of A have the same image

8. A function f: A → B is onto (surjective) if

A. different elements have different images

B. the domain of f equals B

C. the range is a proper subset of B

D. the range of f equals B

9. A function f: A → B is into if

A. the range of f equals B

B. at least one element of B is not the image of any element of A

C. every element of B has exactly one pre-image

D. A has only one element

10. A function that is both injective and surjective is called

A. bijective

B. constant

C. identity

D. into

11. The inverse of $f(x) = x + 5$ is

A. $f^{-1}(x) = 5 - x$ B. $f^{-1}(x) = 1/(x + 5)$

C. $f^{-1}(x) = x + 5$ **D. $f^{-1}(x) = x - 5$**

12. The inverse of $f(x) = 2x - 3$ is

A. $f^{-1}(x) = 2x + 3$ B. $f^{-1}(x) = (x - 3)/2$

C. $f^{-1}(x) = (x + 3)/2$ D. $f^{-1}(x) = 1/(2x - 3)$

13. If $f(x) = 3x$, then $f^{-1}(x)$ equals

A. $x/3$ B. $3/x$

C. $3x$ D. $x - 3$

14. The composite function $(f \circ g)(x)$ means

A. $f(x) \cdot g(x)$ B. $f(x) + g(x)$

C. $g(f(x))$ **D. $f(g(x))$**

15. If $f(x) = x + 1$ and $g(x) = x^2$, then $(f \circ g)(x)$ equals

A. $x + 2$ B. $x^2 + x$

C. $x^2 + 1$ D. $(x + 1)^2$

16. If $f(x) = x + 1$ and $g(x) = x^2$, then $(g \circ f)(x)$ equals

A. $x^2 + x$ **B. $(x + 1)^2$**

C. $x^2 + 2$ D. $x^2 + 1$

17. If $f(x) = 2x$ and $g(x) = x + 3$, then $(f \circ g)(x)$ equals

A. $x + 6$ B. $2x^2 + 3$

C. $2x + 3$ **D. $2x + 6$**

18. If $f(x) = x^2$ and $g(x) = x + 1$, then $(f \circ g)(2)$ equals

A. 9 B. 5

C. 4 D. 6

19. The graph of the constant function $y = c$ is a

A. vertical line B. line through the origin

C. horizontal line D. parabola

20. The graph of the identity function $y = x$ is a straight line

A. parallel to the y-axis **B. through the origin making 45° with the x-axis**

C. not passing through the origin D. parallel to the x-axis

21. For the line $y = mx + c$, the gradient is

A. c/m B. $m + c$

C. m D. c

22. The y-intercept of the line $y = 2x + 3$ is

A. $-3/2$ **B. 3**

C. 5 D. 2

23. The gradient of the line joining (1, 2) and (3, 6) is

A. 2 B. 1/2

C. 3 D. 4

24. The graph of $y = x^2$ is a

A. V-shaped curve B. parabola opening downwards

C. straight line **D. parabola opening upwards**

25. The vertex of the parabola $y = x^2$ is

A. (1, 1) B. (1, 0)

C. (0, 0) D. (0, 1)

26. The graph of $y = -x^2$ is a parabola that opens

A. to the right B. to the left

C. upwards **D. downwards**

27. The graph of $y = |x|$ has the shape of the letter

A. U **B. V**

C. W D. S

28. The range of the function $y = |x|$ is

A. $y \geq 0$ B. $y > 0$

C. all real numbers D. $y \leq 0$

29. The graph of $y = x^3$ passes through the origin and lies in the

A. first and fourth quadrants **B. first and third quadrants**

C. second and fourth quadrants D. first and second quadrants

30. The x-intercepts of the curve $y = x^2 - 4$ are

A. −2 and 2 B. only 2

C. −4 and 4 D. 0 and 4

31. The curve $y = x^2 + 1$ does not cut the x-axis because

A. its vertex is at the origin B. $x^2 + 1 = 0$ has equal roots

C. it opens downwards **D. $x^2 + 1 = 0$ has no real roots**

32. The gradient of a tangent drawn at a point of a curve gives

A. the area under the curve B. the y-intercept of the curve

C. the slope of the curve at that point D. the length of the curve

33. The solutions of a linear and a quadratic equation solved graphically are given by

A. the vertex of the parabola B. the x-intercepts of the line only

C. the y-intercepts of the graphs **D. the points where their graphs intersect**

34. The line $y = x + 2$ meets the parabola $y = x^2$ at the points

A. (−2, 0) and (0, 2) B. (−2, 4) and (1, 1)

C. (2, 4) and (−1, 1) D. (2, 4) and (1, 1)

35. The line $y = 2x - 1$ and the parabola $y = x^2$ meet at

A. the origin only
B. exactly one point (1, 1)
C. no point
D. two points

36. If $f(x) = x$ (identity function), then $f(5)$ equals

A. 5
B. 1
C. 0
D. 25