Moonlight Academy

"Preparing Students for the 21st Century"

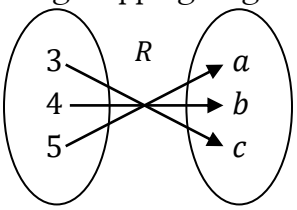
☎ 011-8-30 50 20 0920 34 90 34 41575 Addis Ababa E-mail: moon. academy 2010@ gmail.com

Name: _____ **2024/2025 1st Semester**
Full date: _____ **Mid Exam**
Subject: Mathematics **Grade – 11**

Time allowed 1:00 hr

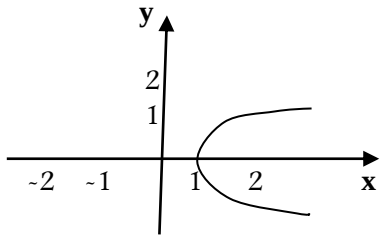
Choose the correct option from the given four alternatives and write the corresponding letter of your best choice on the space provided.

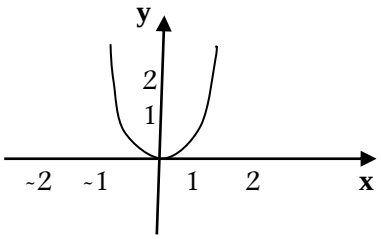
1. The domain and range of the relation $R = \{(-1, 2), (11, 4), (3, 6), (5, 7)\}$ respectively are
   A. $\{-1, 4, 3, 7\}$ *and* $\{2, 11, 6, 5\}$
   B. $\{-1, 11, 3, 5\}$*and* $\{2, 4, 6, 7\}$
   C. $\{2, 4, 6, 7\}$ *and* $\{-1, 11, 3, 5\}$
   D. $\{2, 11, 6, 5\}$ *and* $\{-1, 4, 3, 7\}$
2. What is the inverse of the relation represented by the following mapping diagram?
   A. $R^{-1} = \{(3, a), (4, b), (5, c)\}$
   B. $R^{-1} = \{(a, 3), (b, 4), (c, 5)\}$
   C. $R^{-1} = \{(3, c), (4, b), (5, a)\}$
   D. $R^{-1} = \{(c, 3), (b, 4), (a, 5)\}$

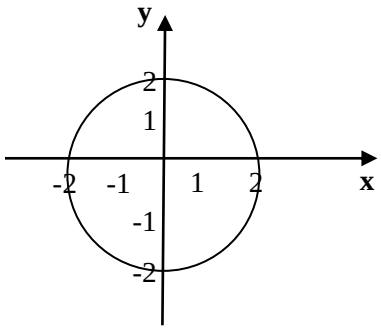


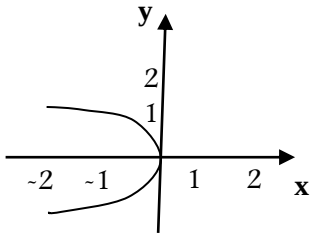
3. Given a relation $R = \{(x, y) | \, y = 2x + 6$ what is R^{-1}?
   A. $R = \{(x, y) | \, y = 2x - 3\}$
   B. $R = \{(x, y) | \, y = \frac{x}{2} - 3\}$
   C. $R = \{(x, y) | \, y = 2x + 3\}$
   D. $R = \{(x, y) | \, y = \frac{x}{2} + 3\}$
4. Of the following, which one is always true about the domain and range of a relation R and its inverse R^{-1}?
   A. Dom(R)= Dom(R^{-1})
   B. Dom(R)=Ran(R^{-1})
   C. Dom(R^{-1})=Ran(R^{-1})
   D. Dom(R)=Ran(R)
5. Among the following equations, which one represents a function?
   A. $y = x^3 + 5$
   B. $x^2 + y^2 = 9$
   C. $y^2 = x - 5$
   D. $x^2 - y^2 = 9$
6. Which of the following is an example of power function?
   A. $f(x) = 2^x$
   B. $f(x) = 3x^{\frac{1}{2}}$
   C. $f(x) = 3x + 5$
   D. $f(x) = Sin(x)$
7. Given the equation $y = 2x^2 + 1$ and the values $x = -2, -1, 0, 1, 2$, what are the elements of the relation?
   A. $\{(-2, -7), (-1, -1), (0, 1), (1, 3), (2, 9)\}$
   B. $\{(-2, 9), (-1, 3), (0, 1), (1, 3), (2, 9)\}$
   C. $\{(-2, -4), (-1, -2), (0, 0), (1, 2), (2, 4)\}$
   D. $\{(-2, 4), (-1, 2), (0, 0), (1, 1), (2, 4)\}$
8. For the function $f(x) = x^{\frac{m}{n}}$, where m is an even and n is an odd natural number, what is its domain and range respectively?
   A. $\{x \mid x \geq 0\}$ *and* $\{y \mid y \geq 0\}$
   B. $\{x \mid x \in \mathbb{R}\}$ *and* $\{y \mid y \geq 0\}$
   C. $\{x \mid x > 0\}$ *and* $\{y \mid y > 0\}$
   D. $\{x \mid x \geq 0\}$ *and* $\{y \mid y \in \mathbb{R}\}$
9. The graph of the inequality $y \geq 3x - 5$ on the Cartesian plane is
   A. a solid line with shading above the line
   B. a broken line with shading below the line
   C. a solid line with shading below the line
   D. a broken line with shading above the line
10. For the relation represented by the equation $y = 2x^2$, which of the following points is NOT on the graph?
   A. (1, 2) B. (2, 4) C. (3, 18) D. (−1, 2)

11. Which of the following graph represents the graph of a function?

A 

C 

B 

D 

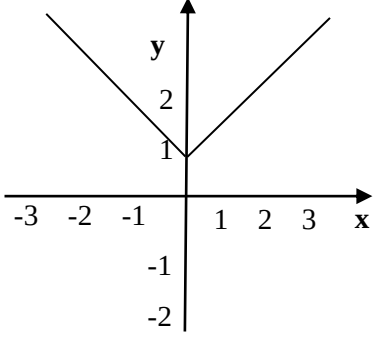
12. What is the value of the expression $|-5+2|-|-3-2|-6$?
A. 8 B. -8 C. 5 D. -5

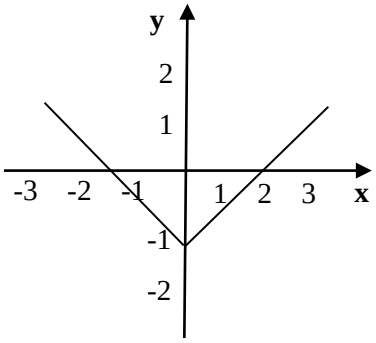
13. What are the possible values of x in the equation $|x+2|-1=6$?
A. 1 and 8 B. 3 and 5 C. -9 and 5 D. -9 and 8

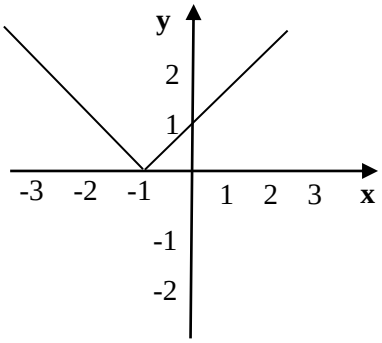
14. Suppose $f(x)=|x|+2$, then $f(-2)$ is
A. 2 B. -4 C. 4 D. 0

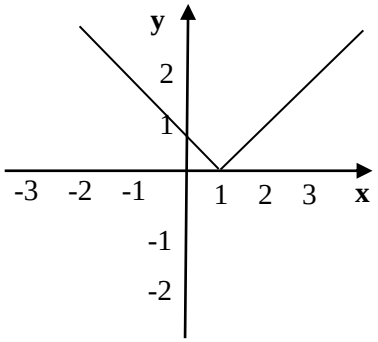
15. What is the domain and range of the function $f(x)=|x|+2$?
A. Domain= $\mathbb{R}$ and Range=$[2,\infty)$
B. Domain=$[2,\infty)$ and Range= $[2,\infty)$
C. Domain=$[2,\infty)$ and Range= $\mathbb{R}$
D. Domain= $\mathbb{R}$ and Range= $\mathbb{R}$

16. Which of the following is the graph of the function $f(x)=|x-1|$

A 

C 

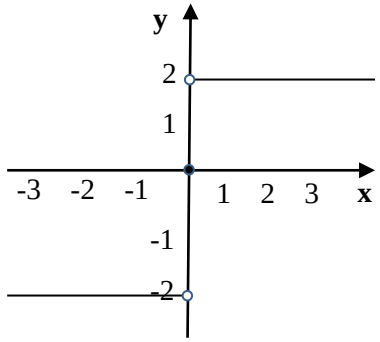
B 

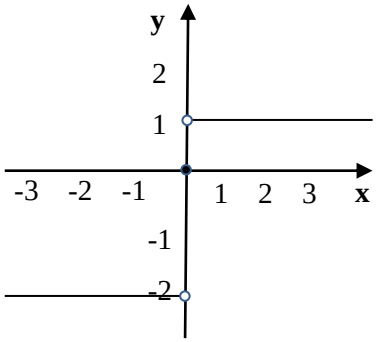
D 

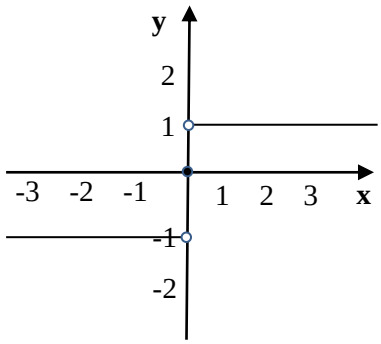
17. Suppose $f(x) = 3 + sgnx$, then $f(5)$ is
A. 3 B. 5 C. 4 D. 0

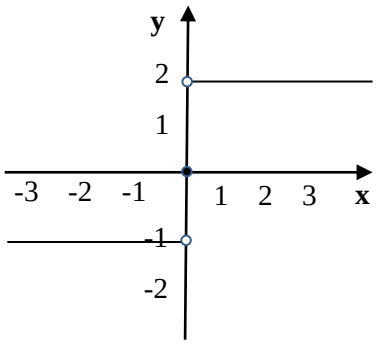
18. What is the domain and range of the function $f(x) = -3 + sgnx$?
A. Domain= $\mathbb{R}$ and Range=$\{-1, 0, 1\}$
B. Domain=$\{-1, 0, 1\}$ and Range=$\mathbb{R}$
C. Domain= $\{-4, -3, -2\}$ and Range= $\mathbb{R}$
D. Domain= $\mathbb{R}$ and Range= $\{-4, -3, -2\}$

19. Which of the following is the graph of the function $f(x) = 2sgnx$

A 

C 

B 

D 

20. Assume $f(x) = \lfloor x + 3 \rfloor$, then $f(2.4)$ is
A. 3 B. 5 C. 4 D. 0

21. What are the possible values of x in the equation $\lfloor x + 3 \rfloor = 5$?
A. $3 \leq x < 5$
B. $3 \leq x < -5$
C. $2 \leq x < 3$
D. $-3 \leq x < 5$

22. What is the domain and range of the function $f(x) = \lfloor x \rfloor$, ?
A. Domain= $\mathbb{R}$ and Range=$\mathbb{Z}$
B. Domain=$\mathbb{Z}$ and Range=$\mathbb{R}$
C. Domain= $\mathbb{R}$ and Range= $\mathbb{R}$
D. Domain= $\mathbb{Z}$ and Range= $\mathbb{Z}$

23. If $f(x) = \{(1, d), (2, e), (3, f)\}$ and $g(x) = \{(-1,1), (-2,2), (-3, 3)\}$ then which of the following is **not true**?
A. $(f \circ g)(-1) = d$
B. $(f \circ g)(-3) = f$
C. $(f \circ g)(-2) = e$
D. $(f \circ g)(-1) = f$

24. Let $f(x) = x - 5$ and $g(x) = x^2$, then $(f \circ g)(x)$ is
A. $x^2 + 5$
B. $x^2 - 5$
C. $(x - 5)^2$
D. $x^2 + x - 5$

25. If $f(x) = 2x - 5$ and $g(x) = x^2$, then $(g \circ f)(1)$ is
A. 4 B. 9 C. 3 D. 6

26. Of the following, which one is a rational expression?

A. $\frac{x^2+x+1}{x^2+x}$ B. $\frac{x^2+1}{x^2+x+1}$ C. $\frac{x+1}{\sqrt{x-1}}$ D. $\frac{3x+1}{x^2+1}$

27. What is the domain of the rational expression $\frac{2x+1}{x^2+5x+6}$?

A. $\{x \in \mathbb{R} \mid x \neq 2\}$ C. $\{x \in \mathbb{R} \mid x \neq -2\}$

B. $\{x \in \mathbb{R} \mid x \neq 2 \text{ and } x \neq 3\}$ D. $\{x \in \mathbb{R} \mid x \neq 2 \text{ and } x \neq -2\}$

28. What is the simplest form of $\frac{3x-6}{x^2+x-6}$?

A. $\frac{3}{x+1}$ B. $\frac{3}{x+3}$ C. $\frac{x+1}{x+2}$ D. $\frac{3}{x+2}$

29. $\frac{x+2}{x-6} \div \frac{3x}{x^2-6} =$ _____

A. $\frac{x^3+2x^2-6x-12}{3x^2-18x}$ C. $\frac{6x+6}{3x+2}$

B. $\frac{3x^2+6x}{x^3-6x^2-6x+36}$ D. $\frac{3x^2}{x^3+2x^2-6x+12}$

30. $\frac{2x-3}{x^2+x-2} = \frac{A}{x-1} + \frac{B}{x+2}$ then what is the value of A and B respectively?

A. 4, -1 B. 3, 2 C. $\frac{-1}{3}, \frac{7}{3}$ D. -3, -7

Answer Sheet

1. _____	6. _____	11. _____	16. _____	21. _____	26. _____
2. _____	7. _____	12. _____	17. _____	22. _____	27. _____
3. _____	8. _____	13. _____	18. _____	23. _____	28. _____
4. _____	9. _____	14. _____	19. _____	24. _____	29. _____
5. _____	10. _____	15. _____	20. _____	25. _____	30. _____

Prepared By: Tejrib S.

Signature: _____