
GRADE 11
MATHS UNIT 1
RELATIONS AND FUNCTIONS
UEE(2005-2016)

1. The value of $|x|+2x$ if $x<0$ (UEE 2005)

A. $-3x$

B. $3x$

C. $-x$

D. x

2. Given $f(x)=\ln(x-1)$ and $g(x)=\sqrt{1-2x}$, then the domain of fg is equal to _____ **(UEE 2005)**

- A. $\{x \in \mathbb{R}: x > 1\}$ B. $\{x \in \mathbb{R}: x \leq \frac{1}{2}\}$ C. $\{x \in \mathbb{R}: x < 0\}$ D. $\{x \in \mathbb{R}: x \geq \frac{1}{2}\}$

3. If $f(x) = \frac{x+1}{x-1}$ and $f(a)=5$ then $f(2a)$ is equal to **(UEE 2006)**

A. 2

B. 4

C. 6

D. 8

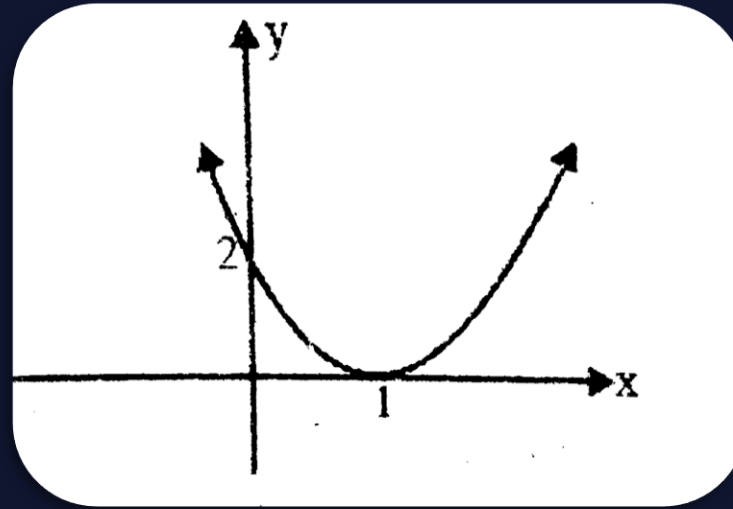
4. Which of the following equations below represented by the following parabola? **(UEE 2006)**

A. $y=x^2+2$

B. $y=(2x-1)^2$

C. $y=2(x-1)^2$

D. $y=(2x+1)^2$



5. The inverse of the function defined by $g(x) = \frac{2x}{x+3}$ is equal to **(UEE 2007)**

A. $g^{-1}(x) = \frac{2x}{x-3}$

B. $g^{-1}(x) = -\frac{3x}{x-2}$

C. $g^{-1}(x) = -\frac{x+3}{2x}$

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

6. If $f:A \rightarrow B$ and $g:B \rightarrow C$ are functions, then which one of the following is true about the composition function? (UEE 2008)

A. Domain of $(g \circ f) \subseteq$ Domain of f

B. Range of $(g \circ f) \not\subseteq$ Range of g

C. Domain of $(g \circ f) \not\subseteq$ Domain of f

D. Range of $(g \circ f) \subseteq$ Range of f

7. If the point $(3, -2)$ is on the graph of $y = f(x)$, which point is on the graph of $y = f^{-1}(x)$?

(UEE 2008)

A. $(1/3, -2)$

B. $(3, -1)$

C. $(-2, 3)$

D. $(3, -1/2)$

8. Let A and B be non-empty sets. If R is a relation from A to B, then which one of the following is NOT always true? **(EGSECE 2008)**

A. The domain of R is A

B. R is a set of ordered pairs

C. $R \subseteq A \times B$

D. The range of R is a subset of B

9. When solving $\sqrt{x+3} \neq 6$, which one of the following is the Universal set? (EGSECE 2008)

- A. $[-3, \infty)$ B. $[-\infty, 33) \cup (33, \infty)$ C. $(-\infty, -3] \cup [33, \infty)$ D. $[-3, 33) \cup (33, \infty)$

10. Which one of the following is the inverse of $f(x) = 8x^3 + 2$? (UEE 2009)

A. $f^{-1}(x) = \frac{1}{2} \sqrt[3]{x-2}$

B. $f^{-1}(x) = \frac{1}{8x^3+2}$

C. $f^{-1}(x) = \frac{1}{8} \sqrt[3]{x-2}$

D. $f^{-1}(x) = 8x^3 - 2$

11. If $f(x) = \sqrt{x^3}$ and $(f \circ g)(x) = \sqrt[4]{x}$, then what is the value of $g(8)$? **(UEE 2009)**

A. 2

B. $\sqrt[3]{2}$

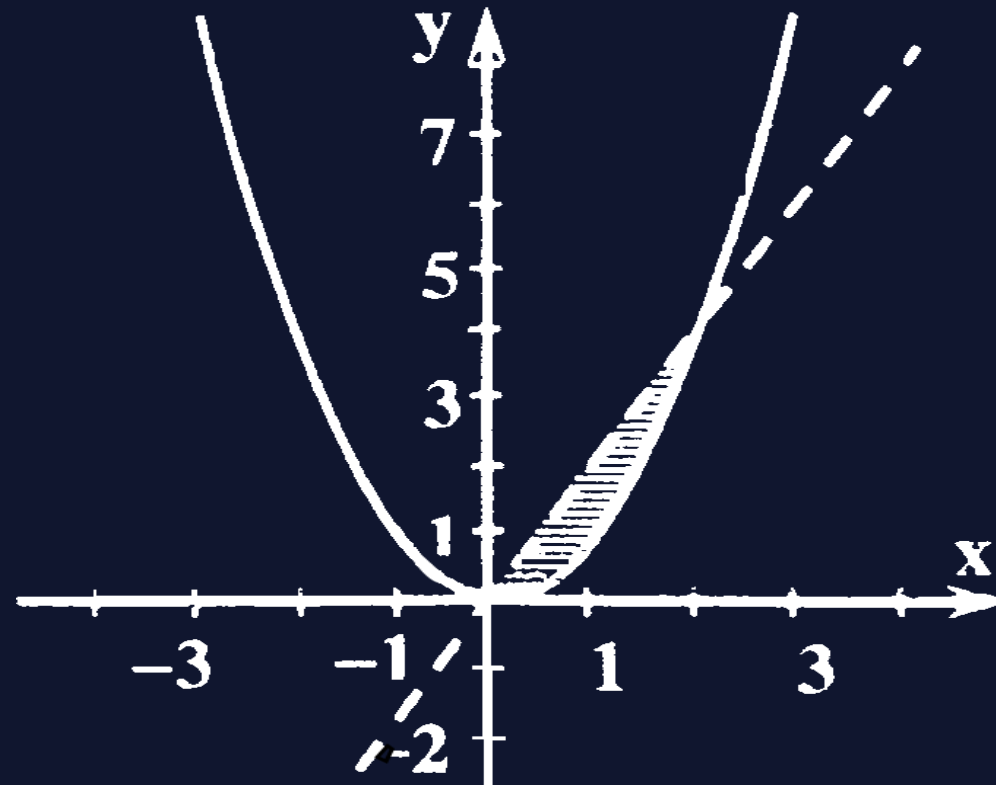
C. $2\sqrt{2}$

D. $\sqrt{2}$

12. Consider the graph of a relation $R = \{(x, y): y \geq x^2 \text{ and } y < 2x\}$ that is shown below.

Then which of the following is true of this relation? (EGSECE 2009)

- A. The range of R is $\{y \in \mathbb{R}: 0 < y < 4\}$
- B. The domain of R is $\{x \in \mathbb{R}: x \leq 2\}$.
- C. The domain of R is $\{x \in \mathbb{R}: 0 \leq x \leq 2\}$.
- D. The range of R is $\{y \in \mathbb{R}: y > 0\}$.



13. Let $f(x) = \frac{3x+1}{x-2}$ then what is the range of $f(x)$? **(UEE 2010)**

A. $\mathbb{R} \setminus \{2\}$

B. $\mathbb{R}$

C. $\mathbb{R} \setminus \{3\}$

D. $\mathbb{R} \setminus \{1/3\}$

Exercise 1:

Which one of the following is the range of the function $f(x) = \frac{2x-1}{x+3}$?

A. $\mathbb{R} \setminus \{1/2\}$

B. $\mathbb{R} \setminus \{2\}$

C. $\mathbb{R} \setminus \{-1/3\}$

D. $\mathbb{R} \setminus \{-3\}$

14. Which one of the following is true about Signum and absolute value functions? **(UEE 2010)**

A. $\text{sgn}(x) = \pm |x|$, for all $x \in \mathbb{R}$

B. $\text{sgn}(x) \leq \lfloor x \rfloor$, for all $x \leq 0$

C. $|x| = x \text{sgn}(x)$, for all $x \in \mathbb{R}$

D. $\text{sgn}(x) < \lfloor x \rfloor$, for all $x \geq 0$



Note: $\text{sgn}(x) \leq |x|$, for all $x \leq 0$

15. Let $f(x) = x - x^2$ and $g(x) = 1/x$. Then what is $g(f(1/x))$ equal to..... (UEE 2010)

A. $\frac{x^2}{x-1}$

B. $x-x^2$

C. $\frac{x-1}{x^2}$

D. $\frac{1}{x^2-x}$

16. Let $D = \{0, 1, 2, 4\}$ and $R = \{(x,y): x,y \in \mathbb{R} \text{ and } y < x\}$. From the following ordered pairs, which one belongs to R ? **(EGSECE 2010)**

A. (0,4)

B. (4,4)

C. (2, 0)

D. (1,3)

14. Which one of the following is true about Signum, absolute value and greatest integer functions? **(UEE 2010)**

A. $\text{sgn}(x) = \pm |x|$, for all $x \in \mathbb{R}$

B. $\text{sgn}(x) \leq [x]$, for all $x \leq 0$

C. $|x| = x \text{sgn}(x)$, for all $x \in \mathbb{R}$

D. $\text{sgn}(x) < [x]$, for all $x \geq 0$



Note: $\text{sgn}(x) \leq |x|$, for all $x \leq 0$

17. Let $f(x) = x^2 + 4x + 1$, Thus the graph of f is obtained by shifting the graph of: (EGSECE 2010)

- A. $f(x) = (x + 2)^2$ by 1 units upward B. $f(x) = (x + 2)^2$ by 1 units downward
C. $f(x) = (x + 2)^2$ by 3 units upward D. $f(x) = (x + 2)^2$ by 3 units downward



Note:

18. Let $R = \{(x, y): x, y \in \mathbb{R} \text{ and } y < 2x - x^2\}$ be a relation. What is the range of R ? (EGSECE 2010)

A. $\{y \in \mathbb{R}: y > 2\}$

B. $\{y \in \mathbb{R}: y < 2\}$

C. $\{y \in \mathbb{R}: y > 1\}$

D. $\{y \in \mathbb{R}: y < 1\}$

19. If f is the greatest integer function and g is the absolute value function, then what is the value of $(f \circ g)(3/2) + (g \circ f)(-4/3)$? **(UEE 2011)**

A. 3

B. 1

C. -1

D. 2

20. If $f(x) = ax - b$ and $f^{-1}(x+1) = \frac{1}{2}x + 2$, for each $x \in \mathbb{R}$, then what must be the values of a and b ? **(UEE 2011)**

- A. $a = 1/2, b = -2$ B. $a = 2$ and $b = 2$ C. $a = 2, b = 3$ D. $a = 1, b = 1$

21. Let $f(x) = 3 - 2x$. What is the inverse of f ? (UEE 2012/13)

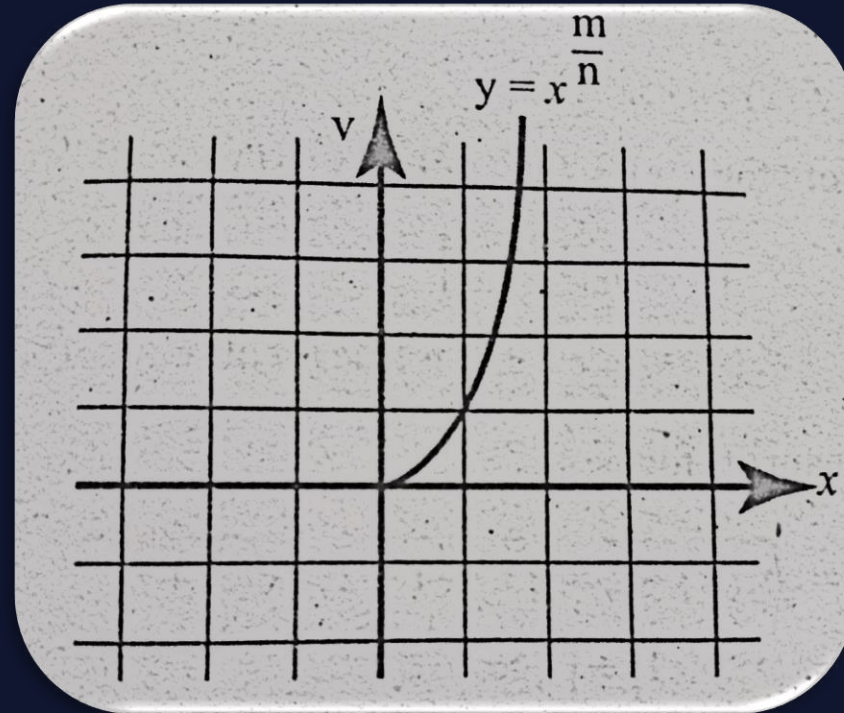
A. $f^{-1}(x) = \frac{x}{2} - 3/2$ B. $f^{-1}(x) = 3 + 2x$ C. $f^{-1}(x) = \frac{3}{2} - \frac{x}{2}$ D. $f^{-1}(x) = 2x - 3$

22. Let $f(x) = \sqrt{x+2}$ and $g(x) = x^2-1$. what are the domain and range of the composition of f with g, fog respectively? **(UEE 2012/13)**

A. $\mathbb{R}$ and $[1, \infty)$ B. $[0, \infty)$ and $[1, \infty)$ C. $\mathbb{R}$ and $[0, \infty)$ D. $[0, \infty)$ and $[1, \infty)$

23. The following graph is the graph of the function $y = x^{m/n}$, where m and n are positive integers and $n \neq 0$, Which of the following is true about m and n ? **(UEE 2012/13)**

- A. m is odd, n is even and $m < n$
- B. m is even, n is odd and $m > n$
- C. m is odd, n is even and $m > n$
- D. m is even, n is odd and $m < n$



24. What are the domain and range of the function $f(x)=2x^{3/4}$ respectively? (UEE 2013/14)

A. $[0, \infty]$ and $(0, \infty)$ B. R and $[0, \infty)$ C. $[0, \infty)$ and $[0, \infty)$ D. $[0, \infty)$ and R

25. The inverse of the function $y=3x-5$ is equal to (UEE 2013/14)

A. $y = \frac{(x+5)}{3}$

B. $y = \frac{(x+3)}{5}$

C. $y = \frac{(x-5)}{5}$

D. $y = -5x+3$

26. Let $R = \{(x, y) : y \geq x^2 + 1 \text{ and } y \leq 5\}$ be a relation. Then which one of the following defines the inverse of R . (UEE 2014/15)

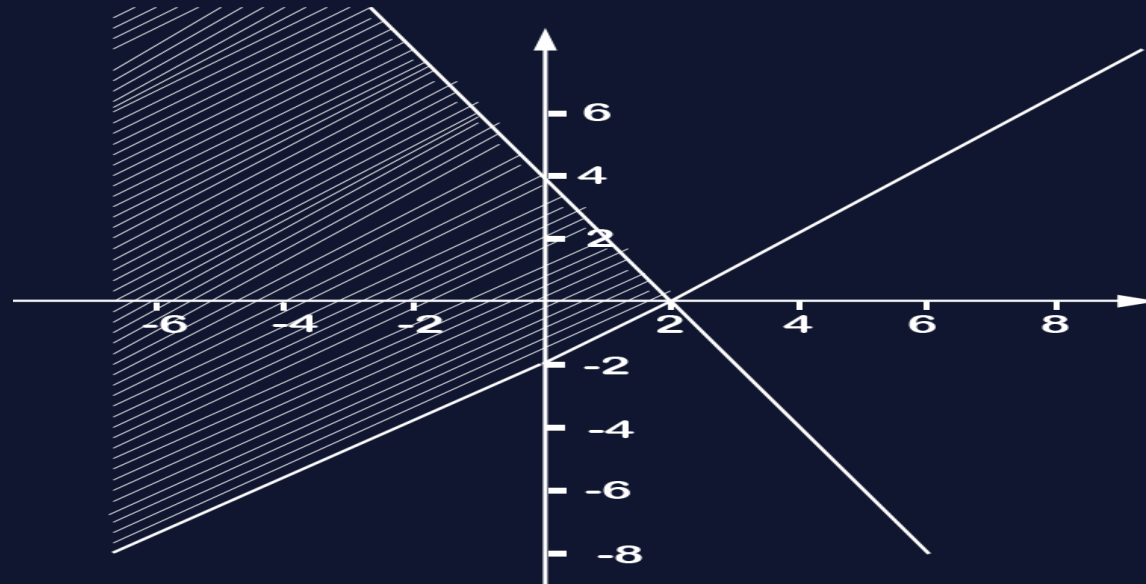
A. $\{(x, y) : x \leq y^2 - 1, x \leq 5\}$

B. $\{(x, y) : x \leq y^2 + 1, x \geq 5\}$

C. $\{(x, y) : x \geq y^2 + 1, x \leq 5\}$

D. $\{(x, y) : x \geq y^2 + 1, x \geq 5\}$

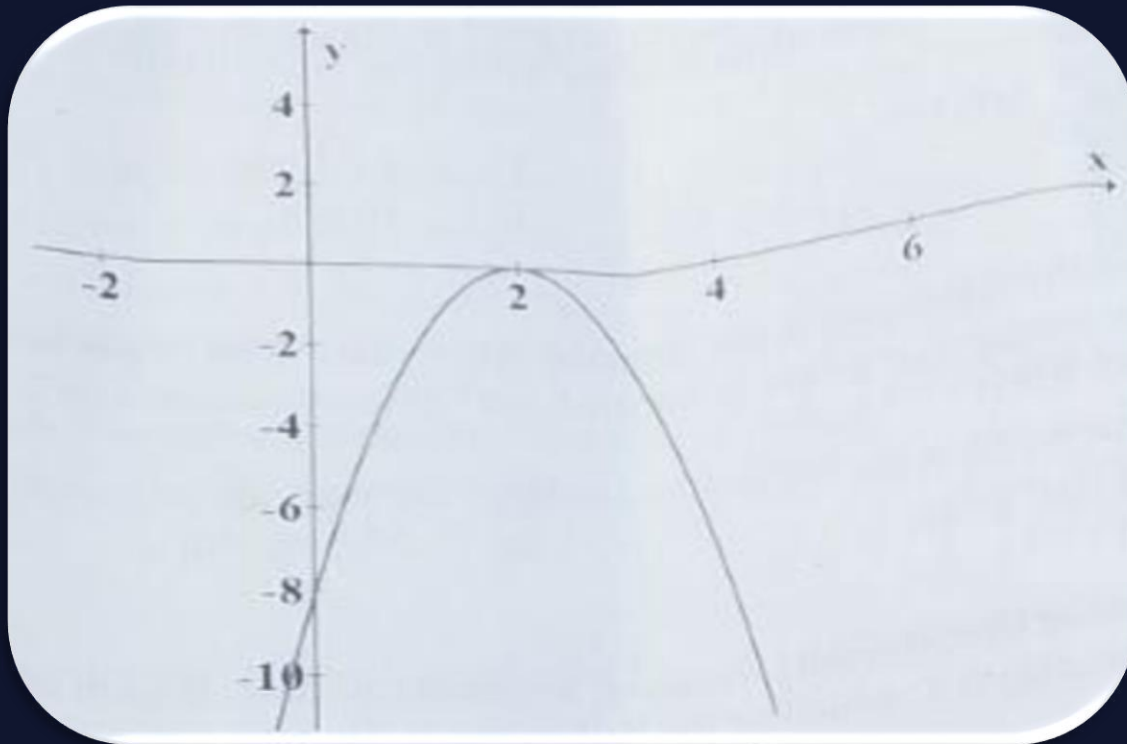
27. The graph of a certain relation R is represented by the shaded region shown on the figure below. (UEE 2014/15)



Which one of the following pairs of sets respectively gives the domain and range of this relation?

- A. $\{x:x \leq 2\}$ and $\mathbb{R}$ B. $\{x|x < 2\}$ and $\{y|y \leq 6\}$ C. $\mathbb{R}$ and $\mathbb{R}$ D. $\mathbb{R}$ and $\{y|y \leq 2\}$

28. Let f be a function whose graph is given below



Which one of the following is equal to $f(x)$?
(UEE 2016)

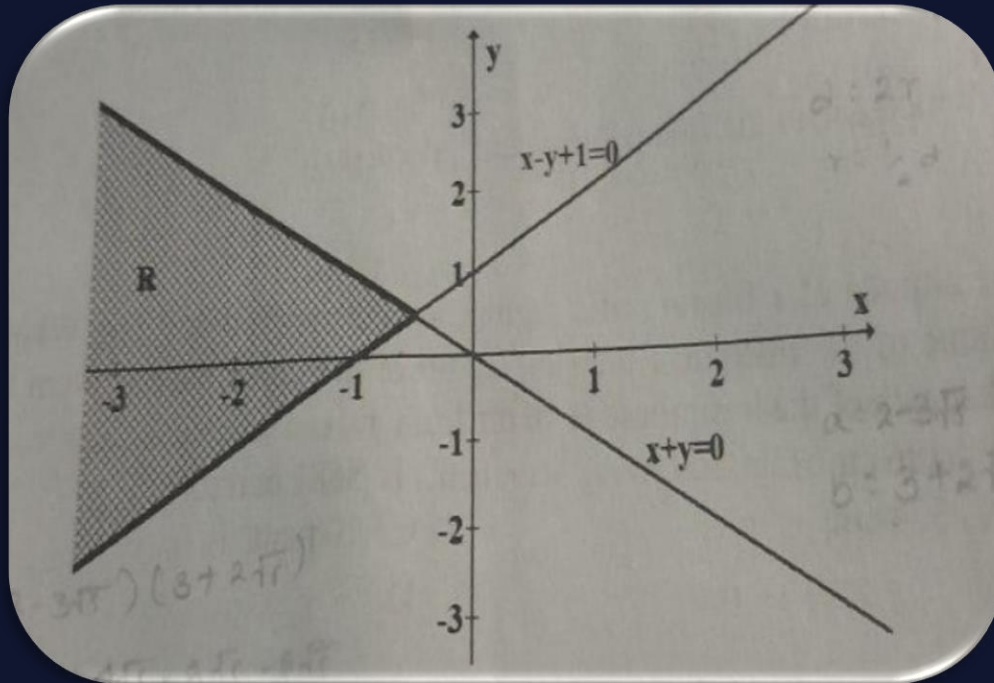
A. $-2x^2+4x-8$

B. $2x^2-8x+8$

C. $8x-2x^2-8$

D. $8x-2x^2+8$

29. The shaded region in the following figure is the graph of a relation R.



Which one of the following is the domain and range of R respectively? (UEE 2016)

- A. $(-\infty, -1/2]$ and R B. R and $(-\infty, -1/2)$
C. R and $(-\infty, -1/2]$ D. $(-\infty, -1/2)$ and R

30. Which of the following is the inverse of $f(x) = \sqrt{x - 3}$? (UEE 2016)

A. $f^{-1}(x) = x^2 + 3, x \geq 0$

B. $f^{-1}(x) = x^2 + 3, x \geq 3$

C. $f^{-1}(x) = \sqrt{x + 3}, -\infty < x < \infty$

D. $f^{-1}(x) = \sqrt{x^2 + 3}, -\infty < x < \infty$

31. Let $f(x) = \frac{x+1}{x-1}$ and $g(x) = \sqrt{x+2}$ be two functions. Which one of the following is true about the combination values of f and g at $x = 2$? (UEE 2016)

A. $(f-g)(2) = -1$

B. $\left(\frac{f}{g}\right)(2) = \frac{2}{3}$

C. $(f+g)(2) = 3$

D. $(f \cdot g)(2) = 6$

32. Which one of the following pairs of functions is an inverse of each other in their respective domains? (UEE 2016)

A. $f(x) = \frac{x+1}{x-1}$ and $g(x) = \frac{x-1}{x+1}$

B. $f(x) = x^5$ and $g(x) = \frac{1}{x^5}$

C. $f(x) = x^3 - 1$ and $g(x) = \sqrt[3]{x+1}$

D. $f(x) = \sqrt{x+3}$ and $g(x) = x^2 - 9$

33. The domain and the range respectively of the function f defined by $f(x)=1+|2x-4|$ are: (UEE 2016)

A. $[2, \infty)$ and $[1, \infty)$

B. $\mathbb{R}$ and $[2, \infty)$

C. $[2, \infty)$ and $\mathbb{R}$

D. $\mathbb{R}$ and $[1, \infty)$

Quiz 5%

34. Given a set $A = \{1, 2, 3\}$ and $R = \{(x, y) : y \leq 2x - 3\}$, a relation on A , which of the following is the inverse of R ?

A. $\{(2, 1), (3, 1), (3, 2), (3, 3)\}$

B. $\{(1, 2), (1, 3), (2, 3), (3, 3)\}$

C. $\{(2, 1), (2, 3), (3, 1), (3, 3)\}$

D. $\{(1, 2), (3, 2), (3, 1), (3, 3)\}$

Exercise 2

35. Let $A = \{-2, -1, 0, 1\}$, $B = \{1, 5\}$ and $R = \{(-1, 5), (0, 5), (1, 0)\}$. The which of the following is true?

A. Domain of R is $\{-1, 0, 1, -2\}$.

B. Range of R is $\{1, 0, 5\}$.

C. R is a relation from A into B .

D. R is a relation of 3 elements.

6. If $f:A \rightarrow B$ and $g:B \rightarrow C$ are functions, then which one of the following is true about the composition function? (UEE 2008)

A. Domain of $(g \circ f) \subseteq$ Domain of f

B. Range of $(g \circ f) \not\subseteq$ Range of g

C. Domain of $(g \circ f) \not\subseteq$ Domain of f

D. Range of $(g \circ f) \subseteq$ Range of f



Thank you!!!