

Group Quiz A

Names: \_\_\_\_\_  
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Fill the box of your choice with BLACK INK until you hit the correct answer.

1 box: 4 points; 2 boxes: 2 points; 3 boxes: 1 point.

The highest score available is 12 points.

1. Let  $S = \{1, 2, \emptyset, \{\emptyset\}\}$ . Which of the following is FALSE?A.  $\emptyset \in S$ .B.  $\{\emptyset\} \subset S$ .C.  $1 \in S$ .D.  $\{1, 2\} \in S$ . A B C D2. Let  $A = \{2, 5, 11\}$  and  $B = \{0, 1\}$ . Which of the following is TRUE?A.  $A \times B$  has 5 elements.B.  $(1, 2) \in A \times B$ .C.  $A^3 = A \times A \times A$  and has 27 elements.D.  $A \times B = B \times A$ . A B C D3.  $A$ ,  $B$  and  $C$  are three sets. Which of the following is TRUE?A.  $A \cup (B \cap C) = (A \cup B) \cap C$ B.  $A - (B \cup C) = (A - B) - C$ C.  $\overline{A \cap B} = \overline{A} \cap \overline{B}$ .D.  $A - B = \overline{B - A}$ . A B C D4.  $A = \{2, 4, 6, 8, 10\}$ ,  $B = \{3, 6, 9\}$  and  $C = \{5, 10\}$ . Which of the following is in  $(A \oplus C) \cap B$ ?

A. 2

B. 5

C. 6

D. 10

 A B C D

Group Quiz B

Names: \_\_\_\_\_

Fill the box of your choice with BLACK INK until you hit the correct answer.

1 box: 4 points; 2 boxes: 2 points; 3 boxes: 1 point.

The highest score available is 12 points.

1. Which one of the following is FALSE?

- A. If  $A \cap B = B$  then  $B \subset A$ .  
 B. If  $A \cup B = B$  then  $A \subset B$ .  
 C. If  $A - B = A$  then  $A \cap B = \emptyset$ .  
 D. If  $A - B = B - A$  then  $A$  and  $B$  must be both empty.

 A B C D2. Let  $S_n = \{n, n + 1, \dots, 100\}$ ,  $n = 1, 2, \dots, 99$ . Which of the following is FALSE?

- A.  $S_9 = \{9, 10, 11, \dots, 100\}$ .  
 B.  $S_5 \subset S_6$ .  
 C.  $\bigcup_{n=5}^{10} S_n = \{5, 6, 7, \dots, 100\}$ .  
 D.  $\bigcap_{n=5}^{10} S_n = \{10, 11, 12, \dots, 100\}$ .

 A B C D3. Let  $A_i = (0, i)$  be the interval between 0 and  $i$ , exclusive of endpoints,  $i = 1, 2, \dots$ . Which of the following is TRUE?

- A.  $\bigcap_{i=1}^5 A_i = A_5$ .  
 B.  $\bigcup_{i=1}^5 A_i = A_1$ .  
 C.  $\bigcup_{i=1}^{\infty} A_i = (0, \infty)$ .  
 D.  $A_{100} \subset A_{99}$ .

 A B C D

4. Which of the following is De Morgan's Law?

- A.  $\overline{A \cap B} = \overline{A} \cup \overline{B}$ .  
 B.  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ .  
 C.  $A - B = A \cap \overline{B}$ .  
 D.  $A \oplus B = (A - B) \cup (B - A)$ .

 A B C D

Group Quiz C

Names: \_\_\_\_\_

Fill the box of your choice with BLACK INK until you hit the correct answer.

1 box: 4 points; 2 boxes: 2 points; 3 boxes: 1 point.

The highest score available is 12 points.

1.

$$3 \cdot [2.9 - 5 [3/5]] = \dots$$

A. -5

B. -9

C. -12

D. None of the above

2. Which of the following is a function?

A.  $f: \mathbf{Z} \rightarrow \mathbf{R}, f(x) = 1/x.$ B.  $f: \mathbf{R} \rightarrow \mathbf{R}, f(x) = 1/x.$ C.  $f: \mathbf{N} \rightarrow \mathbf{N}, f(x) = 1/x.$ D.  $f: \mathbf{N} \rightarrow \mathbf{R}, f(x) = 1/x.$ 3. Which of the following is a one-to-one function? Assume they are  $\mathbf{R} \rightarrow \mathbf{R}$ .A.  $f_1(x) = x^2$ B.  $f_2(x) = |x|$ C.  $f_3(x) = 3x + 1$ D.  $f_4(x) = 1/x$ 4. Consider  $f(x) = 2x - 1, f: \mathbf{Z} \rightarrow \mathbf{Z}$ . Then  $f$  is ...

I. Well-defined

II. one-to-one

III. onto.

A. I and II

B. I and III

C. I, II and III

D. II and III

Group Quiz D

Names: \_\_\_\_\_

Fill the box of your choice with BLACK INK until you hit the correct answer.

1 box: 4 points; 2 boxes: 2 points; 3 boxes: 1 point.

The highest score available is 12 points.

1.  $f, g : \mathbf{R} \rightarrow \mathbf{R}$ ,  $f(x) = x^2 - 5$  and  $g(x) = 3x + 1$ . Which of the following is a formula for  $f \circ g$ ?

A.  $(3x + 1)^2 - 5$

B.  $3(x^2 - 5) + 1$

C.  $(x^2 - 5)(3x + 1)$

D. None of the above.

A

B

C

D

2. Which of the following function has an inverse? All functions are from  $\mathbf{R}$  to  $\mathbf{R}$ .

A.  $f_1(x) = x^2 - 5$

B.  $f_2(x) = x^3 - 3x$

C.  $f_3(x) = 12 - 5x$

D.  $f_4(x) = |x|$

A

B

C

D

3.  $f : \mathbf{R} \rightarrow \mathbf{R}$ ,  $f(x) = \frac{1}{1+x^2}$ . Which of the following is NOT in  $f(\mathbf{Z})$ ?

A.  $\frac{1}{5}$

B.  $\frac{1}{10}$

C.  $\frac{1}{26}$

D.  $\frac{1}{45}$

A

B

C

D

4. Which of the following functions is bijective?

A.  $f_1(x) = \lfloor 2x \rfloor$ ,  $f_1 : \mathbf{Z} \rightarrow \mathbf{Z}$ .

B.  $f_2(x) = \lfloor 2x \rfloor$ ,  $f_2 : \mathbf{R} \rightarrow \mathbf{R}$ .

C.  $f_3(x) = 2x + 1$ ,  $f_3 : \mathbf{Z} \rightarrow \mathbf{Z}$ .

D.  $f_4(x) = 2x + 1$ ,  $f_4 : \mathbf{R} \rightarrow \mathbf{R}$ .

A

B

C

D