

Online Test 1, 2018 Semester 2 Results for Sicong Wu

Score for this quiz: **100** out of 100

Submitted Aug 18 at 23:23

This attempt took 23 minutes.

Question 1

10 / 10 pts

For sets $A = \{3, 5, 7, 8, 9\}$ and $B = \{1, 3, 5, 9, 10\}$ which of the following is correct:

☐ $A \cup B = \{3, 5, 7, 8, 9\}$

☐ $A \setminus B = \{3, 5, 9\}$

☐ $A \cap B = \{1, 5, 9\}$

☒ $B \setminus A = \{10, 1\}$

$B \setminus A$ contains all element of B that are not in A . They are 1 and 10. The answer is correct.

Correct!

Question 2

10 / 10 pts

For sets $A = \{x \in \mathbb{Z} | x^2 \leq 9\}$ and $B = \{1, 2, 3\}$ which of the following is equal to $A \cap B$?

☒ $\{1, 2, 3\}$

Since $A = \{-3, -2, -1, 0, 1, 2, 3\}$, $A \cap B = \{1, 2, 3\}$.

☐ $\{0, 1, 2\}$

Correct!

☐ $\{1, 2\}$ ☐ $\{-3, -2, -1, 0, 1, 2, 3\}$ **Question 3**

10 / 10 pts

Which of the following represents the **domain** of the function $\frac{1}{x^2-1}$?

☐ $\mathbb{R} \setminus \{1\}$ where \mathbb{R} is the set of all real numbers.☐ $(-1, 1)$ ☒ $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

When $x^2 = 1$ the function is not defined. This means that function is not defined at $x = 1$ and $x = -1$. Thus, the domain of the function is $(-\infty, \infty) \setminus \{-1, 1\} = (-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

☐ $(-\infty, 0) \cup (0, \infty)$ **Correct!****Question 4**

10 / 10 pts

Which of the following is the **range** of the function $\sqrt{4-x^2}$?

☐ $(-\infty, 2)$ ☒ $[0, 2]$ **Correct!**

In $\sqrt{4 - x^2}$ the allowed values of x^2 are those in $[0, 4]$. The possible values of $4 - x^2$ are those in $[0, 4]$. Thus, the range of $\sqrt{4 - x^2}$ is $[0, 2]$.

☐ $[-2, 2]$

☐ $[2, +\infty)$

Question 5

10 / 10 pts

Which of the following is the solution to the inequality $\frac{x-3}{2x-8} > 0$?

☐ $(3, 4)$

☒ $(-\infty, 3) \cup (4, \infty)$

Correct!

The inequality holds true if and only if $x - 3$ and $2x - 8$ have the same sign. That is,

either $x - 3 > 0 \ \& \ 2x - 8 > 0$

$\Rightarrow x > 3 \ \& \ x > 4 \Rightarrow x > 4$

or $x - 3 < 0 \ \& \ 2x - 8 < 0$

$\Rightarrow x < 3 \ \& \ x < 4 \Rightarrow x < 3$

So both $x < 3$ and $x > 4$ are solutions.

☐ $[3, 4]$

☐ None of these.

Question 6

10 / 10 pts

To solve the linear system of equations

$$x + 3y + 2z = 15$$

$$2x + 3y + 2z = 19$$

$$5x + 2y + 3z = 8$$

using its augmented matrix, which two elementary row operations would you apply first?

☐ $R2 \leftrightarrow R1$ (interchange row 1 and row 2)

and

☐ $R3 - 2R2$ (take 2 times of row 2 from row 3)

☐ $R2 - R1$ (take row 1 from row 2)

and

☐ $R3 - 2R2$ (take twice row 2 from row 3)

☐ $R1 - R2$ and $0 \times R3$

Correct!

☐ $R2 - 2R1$ (take 2 times of Row 1 from Row 2)

and

☒ $R3 - 5R1$ (take 5 times of row 1 from row 3)

Question 7

10 / 10 pts

Given the system of nonlinear equations

$$2x^2 + 3y - 2x = -3$$

$$4x + y = 7$$

which of the following are solutions for (x, y) ?

☐ $(-3, 19)$ and $(-4, 23)$

☐ $(-3, 7)$ and $(3, 1)$

Correct!

☒ $(3, -5)$ and $(4, -9)$

From the second equation, $y = 7 - 4x$.

Substitute $y = 7 - 4x$ into the 1st equation you would obtain

$2x^2 - 14x + 24 = 0$ which has two solutions $x_1 = 3$ and $x_2 = 4$. The corresponding y values are $y_1 = -5$ and $y_2 = -9$, respectively.

☐ There is no solution.

Question 8

10 / 10 pts

Given the polynomial $p(x) = x^3 + x^2 - 6x$, which of the following is the correct factorisation of $p(x)$? (Hint, Use Julia or otherwise)

Correct!

☒ $x(x - 2)(x + 3)$

$$p(x) = x^3 + x^2 - 6x = x(x^2 + x - 6)$$

$x^2 + x - 6$ has roots 2 & -3

Thus,

$$p(x) = x(x - 2)(x + 3)$$

☐ $(x + 1)(x - 6)x$

☐ $(x + 2)(x - 3)x$

☐ None of these.

Question 9

10 / 10 pts

Which of the following is the sum of the first 50 terms of the sequence 2, 6, 10, ...?

Correct!

☒ 5000

$$a_1 = 2, d = 4, n = 50$$

$$a_{50} = 2 + 49 \times 4 = 198$$

$$s_{50} = (a_1 + a_{50}) \times 50/2 = 200 \times 50/2 = 5000$$

☐ 3660

☐ 4802

☐ 5200

Question 10

10 / 10 pts

Given the geometric progression

$-3, 6, -12, 24, \dots$,

which of the following is the sum of the first 11 terms?

Correct!

☒ -2049

First term $a_0 = -3$, ratio $r = -2$. Thus,

$$s_{11} = a_0(1 - r^{11})/(1 - r) = -3(1 + 2^{11})/(1 + 2) = -2049$$

☐ 1023

☐ -3072

☐ None of these.

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