

Math 110 Test 4

Start Date: Apr 2

All sections

Late Fee: Apr 6; 2:00 PM

End Date: Apr 8; Noon

No calculators, notes, or books.

1. Which expression should be used to find the partial fraction decomposition of

$$\frac{x^2 - 16}{(x + 5)(x^2 + 2x + 4)(x - 2)^2}?$$

(a) $\frac{A}{x + 5} + \frac{B}{x^2 + 2x + 4} + \frac{C}{(x - 2)^2}$

(b) $\frac{A}{x} + \frac{B}{5} + \frac{Cx + D}{x^2 + 2x + 4} + \frac{E}{x - 2} + \frac{F}{(x - 2)^2}$

(c) $\frac{A}{x + 5} + \frac{Bx + C}{x^2 + 2x + 4} + \frac{D}{x - 2} + \frac{E}{x - 4} + \frac{F}{x + 4}$

(d) $\frac{A}{x + 5} + \frac{Bx + C}{x^2 + 2x + 4} + \frac{D}{x - 2} + \frac{E}{(x - 2)^2}$

2. Solve the following system of equations. Find z .

$$\begin{cases} x + y - 3z = 6 \\ 2x + y - z = 4 \\ x - 4y + 2z = -14 \end{cases}$$

(a) $z = -1$ (b) $z = 0$ (c) $z = 1$ (d) $z = 2$ (e) $z = 3$

3. Which one of the conics is represented by the equation $x - 2y^2 - 12y + 9 = 0$?

(a) hyperbola (b) parabola (c) ellipse (d) circle (e) none of the above

4. Find the seventh term in the sequence $\left\{ \frac{-n^2 + 3}{(-3)^{n-4}} \right\}$.

(a) $-\frac{46}{27}$ (b) $\frac{46}{27}$ (c) $\frac{52}{9}$ (d) $-\frac{52}{27}$

5. Find the sum $\sum_{n=1}^4 n^n$.

(a) 10 (b) 256 (c) 287 (d) 288 (e) 10^{10}

6. Let $A = \{1, -2, -3, 5, -9\}$, $B = \{0, -2, -4, 5, 13\}$, and $C = \{0, 2, -3, -6, 7, -13\}$. Find $(A \cup B) \cap C$.

(a) $\{0, 1, -2, -3, 5, -9\}$ (b) $\{13, 0, -3\}$ (c) $\{0, -3\}$ (d) $\{0\}$

7. Find the center of the ellipse $2x^2 + y^2 - 4x + 8y + 11 = 0$.

(a) $(0,0)$ (b) $(\sqrt{7/2}, \sqrt{7})$ (c) $(\sqrt{7}, \sqrt{7})$ (d) $(1,-4)$ (e) $(2,1)$

8. How many solutions does the following system of equations have?

$$\begin{cases} x^2 + y^2 = 1 \\ yx = 1 \end{cases}$$

(a) 0 (b) 1 (c) 2 (d) 3 (e) 4

9. Solve the following system of equations. What is the sum of the x -coordinates of all possible solutions?

$$\begin{cases} x^2 - y^2 = 1 \\ y^2 + x^2 = 49 \end{cases}$$

(a) -10 (b) $-8\sqrt{6}$ (c) 0 (d) 10 (e) 20

10. If $a_1 = 1$, $a_2 = -1$, and $a_n = 2a_{n-1} - a_{n-2}$ for $n > 2$, find a_6 .

(a) -1 (b) 2 (c) 3 (d) -7 (e) -9

11. Find the 529th term of the arithmetic sequence $\{8, 11, 14, 17, \dots\}$.

(a) 532 (b) 529 (c) 524 (d) 1592 (e) 1587

12. Find the infinite geometric sum $1 - \frac{3}{7} + \frac{3^2}{7^2} - \frac{3^3}{7^3} + \dots$

(a) 1 (b) 0.7 (c) 1.75 (d) $\frac{4}{7}$ (e) $\frac{3}{7}$

13. Find the arithmetic sum $7 + 13 + 19 + \dots + 133$.

- (a) 1540 (b) 3080 (c) 1520 (d) 3040

14. $\frac{x-2}{(x+3)(x-4)} = \frac{A}{x+3} + \frac{B}{x-4}$. Find $A + B$.

- (a) $A + B = 3$ (b) $A + B = 2$ (c) $A + B = 1$ (d) $A + B = 0$ (e) $A + B = -1$

15. Consider the proposition $1 + 5 + 9 + \dots + (4n - 3) = n(2n - 1)$.

What term is added to the left side of the equation when n is replaced by $n + 1$?

- (a) $n + 1$ (b) $4n + 4$ (c) $4n + 1$ (d) $4n - 3$ (e) $(n + 1)(2n + 1)$

16. Find the asymptotes of the hyperbola $\frac{y^2}{25} - \frac{x^2}{9} = 1$.

- (a) $y = \pm \frac{5}{4}x$ (b) $y = \pm \frac{5}{3}x$ (c) $y = \pm \frac{3}{4}x$ (d) $y = \pm \frac{3}{5}x$ (e) $y = \pm \frac{4}{5}x$

17. Let $n(C)$ = the number of elements in a set C . If $n(A \cup B) = 116$, $n(A) = 47$ and $n(B) = 76$, find $n(A \cap B)$.

- (a) 6 (b) 7 (c) 29 (d) 40 (e) 47

18. Solve the following system of equations. Find $x + y$.

$$\begin{cases} 2x + 5y = 1 \\ -3x + y = 7 \end{cases}$$

- (a) $x + y = -2$ (b) $x + y = -1$ (c) $x + y = 0$ (d) $x + y = 1$ (e) $x + y = 2$

19. Write the repeating decimal $3.\overline{63}$ in fraction form.

- (a) $\frac{363}{99}$ (b) $\frac{11}{4}$ (c) $\frac{40}{11}$ (d) $\frac{4}{11}$

20. What is the n^{th} term in the geometric sequence $\frac{9}{8}, \frac{-3}{2}, 2, \frac{-8}{3}, \dots$?

- (a) $\left(\frac{8}{9}\right)^{-n}$ (b) $\frac{-4}{3} \cdot \left(\frac{9}{8}\right)^{n-1}$ (c) $\left(\frac{4}{3}\right)^{-n}$ (d) $\frac{9}{8} \cdot \left(\frac{-4}{3}\right)^{n-1}$

Answers

- 1 D
- 2 A
- 3 B
- 4 B
- 5 D
- 6 C
- 7 D
- 8 A
- 9 C
- 10 E
- 11 D
- 12 B
- 13 A
- 14 C
- 15 C
- 16 B
- 17 B
- 18 B
- 19 C
- 20 D