

Math 1B
Final Exam Review

1. The fraction $\frac{2x+3}{(x+2)^2}$ can be written as a sum of partial fractions where one of these fractions is $\frac{B}{(x+2)^2}$. Find B .
- A) -4 B) -2 C) -1 D) 2 E) 7
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2. Which of the following is equal to the area of the region inside the polar curve $r = 3 \sin \theta$ and outside the polar curve $r = \sin \theta$?
- A) $8 \int_0^{\pi} \sin^2 \theta d\theta$ B) $\frac{9}{2} \int_0^{\frac{\pi}{2}} \sin^2 \theta d\theta$ C) $8 \int_0^{\frac{\pi}{2}} \sin^2 \theta d\theta$
- D) $8 \int_0^{\frac{\pi}{2}} \sin \theta d\theta$ E) $8 \int_0^{\pi} \sin \theta d\theta$
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3. A direction vector of a line parallel to the intersection of the planes $x - 3y - z = 8$ and $2x - 2y - z = -7$ is
- A) $\langle -1, -1, -4 \rangle$ B) $\langle -1, -1, 4 \rangle$ C) $\langle 1, -1, -4 \rangle$
- D) $\langle 1, -1, 4 \rangle$ E) $\langle 1, 1, 4 \rangle$
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4. The distance between the two foci of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = 1$ is
- A) 8 B) 10 C) $8\sqrt{2}$ D) 20 E) 24
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5. If $a_n = \frac{(-1)^n n!}{n^n}$, then $\left| \frac{a_{n+1}}{a_n} \right| = ?$
- A) $1 + \frac{1}{n}$ B) $1 + \left(\frac{1}{n}\right)^n$ C) $\frac{n+1}{n}$ D) $\left(\frac{n+1}{n}\right)^n$ E) $\left(\frac{n}{n+1}\right)^n$

6. Find the sum of the infinite series $1 - x^3 + x^6 - x^9 + \cdots$ for $|x| < 1$.

- A) $\frac{-x}{1-x^3}$ B) $\frac{-x}{1+x^3}$ C) $\frac{x}{1-x^3}$ D) $\frac{-1}{1+x^3}$ E) $\frac{1}{1+x^3}$
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7. Convert the polar equations $r = \sin^3 \theta \cos^2 \theta$ to an equivalent rectangular equation.

- A) $x^2 + y^3 = x^2 y^3$ B) $(x^2 + y^2)^3 = x^2 y^3$ C) $(x^2 + y^2)^3 = xy^2$
D) $x^2 + y^3 = xy$ E) $(x^2 + y^2)^5 = x^2 y^3$
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8. For what integer k , $k > 1$, will both $\sum_{n=1}^{\infty} \frac{(-1)^{kn}}{n}$ and $\sum_{n=1}^{\infty} \left(\frac{k}{4}\right)^n$ converge?

- A) 6 B) 5 C) 4 D) 3 E) 2
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9. $\int x e^{2x} dx =$

- A) $\frac{x e^{2x}}{2} - \frac{e^{2x}}{4} + C$ B) $\frac{x e^{2x}}{2} - \frac{e^{2x}}{2} + C$ C) $\frac{x e^{2x}}{2} + \frac{e^{2x}}{4} + C$
D) $\frac{x e^{2x}}{2} + \frac{e^{2x}}{2} + C$ E) $\frac{x^2 e^{2x}}{4} + C$
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10. If a particle moves in the xy -plane so that at time $t > 0$ its position vector is $\langle \ln(t^2 + 2t), 2t^2 \rangle$, then at time $t = 2$, its velocity vector is

- A) $\langle \frac{3}{4}, 8 \rangle$ B) $\langle \frac{3}{4}, 4 \rangle$ C) $\langle \frac{1}{8}, 8 \rangle$ D) $\langle \frac{1}{4}, 8 \rangle$ E) $\langle -\frac{3}{4}, 8 \rangle$
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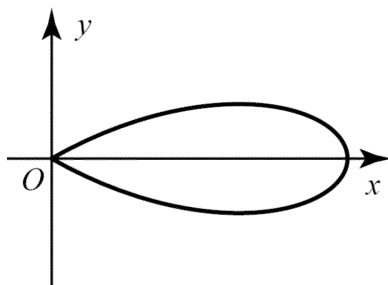
11. The interval of convergence of $\sum_{n=0}^{\infty} \frac{(x-1)^n}{3^n}$ is

- A) $-3 < x \leq 3$ B) $-3 \leq x < 3$ C) $-2 < x < 4$ D) $-2 \leq x < 4$ E) $0 \leq x \leq 2$

12. $\int_1^{\infty} \frac{x}{(1+x^2)^2} dx$ is

- A) $-\frac{1}{2}$ B) $-\frac{1}{4}$ C) $\frac{1}{4}$ D) $\frac{3}{4}$ E) divergent
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13.



Which of the following gives the area of the region enclosed by the loop of the polar curve $r(\theta) = 4 \cos(3\theta)$ shown in the figure above?

- A) $16 \int_{-\pi/3}^{\pi/3} \cos(3\theta) d\theta$ B) $8 \int_{-\pi/6}^{\pi/6} \cos(3\theta) d\theta$ C) $8 \int_{-\pi/3}^{\pi/3} \cos^2(3\theta) d\theta$
D) $16 \int_{-\pi/6}^{\pi/6} \cos^2(3\theta) d\theta$ E) $8 \int_{-\pi/6}^{\pi/6} \cos^2(3\theta) d\theta$
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14. The length of the path described by the parametric equations $x = \frac{1}{3}t^3$ and $y = \frac{1}{2}t^2$, where $0 \leq t \leq 1$, is given by

- A) $\int_0^1 \sqrt{t^2 + 1} dt$ B) $\int_0^1 \sqrt{t^2 + t} dt$ C) $\int_0^1 \sqrt{t^4 + t^2} dt$
D) $\frac{1}{2} \int_0^1 \sqrt{t^4 + 4} dt$ E) $\frac{1}{6} \int_0^1 t^2 \sqrt{4t^2 + 9} dt$
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15. What are all values of p for which the infinite series $\sum_{n=1}^{\infty} \frac{n}{n^p + 1}$ converges?

- A) $p > 0$ B) $p \geq 1$ C) $p > 1$ D) $p \geq 2$ E) $p > 2$

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| 1. | |
| Answer: | C |
| 2. | |
| Answer: | C |
| 3. | |
| Answer: | D |
| 4. | |
| Answer: | B |
| 5. | |
| Answer: | E |
| 6. | |
| Answer: | E |
| 7. | |
| Answer: | B |
| 8. | |
| Answer: | D |
| 9. | |
| Answer: | A |
| 10. | |
| Answer: | A |
| 11. | |
| Answer: | C |
| 12. | |
| Answer: | C |
| 13. | |
| Answer: | E |
| 14. | |
| Answer: | C |
| 15. | |
| Answer: | E |