

1. Let $U = \{2, 7, 11, 43, 13, 19, 1\}$, $A = \{2, 7, 13, 19\}$, $B = \{13, 43, 7, 1, 2\}$. Find $(A \cap B)'$.

- A. $\{2, 7, 13\}$
 - B. $\{11, 43, 19, 1\}$
 - C. $\{11, 43, 13, 19, 1, 7, 2\}$
 - D. $\{1, 11, 43, 13, 19, 1, 7, 2\}$
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2. The degree of the polynomial $(3x^3 - 2x^2 + 1)(x^2 - 3x + 5)$ is ...

- A. 4
 - B. 5
 - C. 7
 - D. 3
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3. The degree of the polynomial $2(xyz)^3 + yx^7$ is ...

- A. 9
 - B. 8
 - C. 7
 - D. 3
-

4. For $x \neq 0$, simplify the expression $-7x^0 + (-7x)^0 + 2^3 - (\frac{1}{2})^{-3}$

- A. 12
 - B. 0
 - C. -2
 - D. -6
-

5. For $x \neq 0$ and $y \neq 0$, simplify $(3xy^{-2})^3(6x^{-2}y^{-3})^{-2}$

- A. $\frac{3y^7}{4}$
 - B. $\frac{4y^{12}}{3}$
 - C. $\frac{3x^7}{4}$
 - D. $\frac{3y^{12}}{4}$
-

6. Find the domain of $\frac{12x}{(x^2 + 2)(x^2 - 1)}$

- A. \mathbb{R}
 - B. $\mathbb{R} \setminus \{1, -1\}$
 - C. $\mathbb{R} \setminus \{1, -1, -2\}$
 - D. $\mathbb{R} \setminus \{1, -1, -\sqrt{2}, \sqrt{2}\}$
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7. Evaluate $9 + 2(80 - 9 \div 9 * 9^2)$

- A. 7
 - B. 9
 - C. 8
 - D. 0
-

8. Let $A = \{\frac{5}{8}, -3.\bar{2}, \frac{\pi}{8}, -4, \sqrt{64}, \sqrt{3}, \frac{12}{2}, 0\}$. List all the elements of A that belong to the set of natural numbers.

- A. $\{\frac{5}{8}, -3.\bar{2}, -4, \sqrt{64}, \frac{12}{2}\}$
 - B. $\{-4, \sqrt{64}, \sqrt{3}, \frac{12}{2}, 0\}$
 - C. $\{\frac{5}{8}, \sqrt{3}, \frac{12}{2}, 0\}$
 - D. $\{\sqrt{64}, \frac{12}{2}\}$
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9. Perform the indicated operations $(-2x^2 + 5x + 8) - (x^3 - 7x - 2) + 4x(x^2 - 3)$

- A. $3x^3 - 2x^2 - 14x + 16$
 - B. $-5x^3 - 2x^2 - 14x + 16$
 - C. $5x^3 - 2x^2 - 14x + 16$
 - D. $3x^3 - 2x^2 + 10$
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10. Perform the indicated operations $((x - 2) - 3y)((x - 2) + 3y)$

- A. $x^2 + 4 - 9y^2$
 - B. $x^2 - 4 - 9y^2$
 - C. $x^2 - 4x - 4 - 9y^2$
 - D. $x^2 - 4x + 4 - 9y^2$
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11. Write the rational expression in the lowest term $\frac{9 - 3x}{x^2 - 9}$

- A. $\frac{-2}{x + 3}$
 - B. $\frac{-2}{x - 3}$
 - C. $\frac{-3}{x + 3}$
 - D. $\frac{-3}{x - 3}$
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12. Perform the indicated operations $\frac{x^2 + 5x - 14}{x^2 - 4} \div \frac{x^2 + 12x + 35}{x^2 + 12x + 20} = \dots$

- A. $\frac{x + 10}{x + 5}$
 - B. $\frac{x + 5}{x + 10}$
 - C. $\frac{x + 1}{x + 2}$
 - D. $\frac{x + 2}{x + 1}$
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13. Perform the indicated operations $\frac{2x^3 - 3x^2 - 8x + 12}{x - 3}$

A. $2x^2 + 3x + 1 - \frac{15}{x - 3}$

B. $2x^2 - 3x + 1 - \frac{15}{x - 3}$

C. $2x^2 + 3x + 1 + \frac{15}{x - 3}$

D. $2x^2 - 3x + 1 - \frac{15}{x - 3}$

14. The remainder of the division $\frac{x^2 - 3x + 5}{x + 1}$ is ...

A. 0

B. 5

C. 7

D. 9

15. The division of $x^3 + 3x^2 + 3x + 7$ by $(x + 2)$ is equivalent to

A. $x^3 + 3x^2 + 3x + 7 = (x + 2)(x^2 + x + 1) + 5$

B. $x^3 + 3x^2 + 3x + 7 = (x + 2)(x^2 + x - 1) + 5$

C. $x^3 + 3x^2 + 3x + 7 = (x + 2)(x^2 + x + 1) - 5$

D. $x^3 + 3x^2 + 3x + 7 = (x + 2)(x^2 - x + 1) + 5$

16. Let a be a real number. The remainder of the division $\frac{x^2 - 3x + 3a}{x - a}$ is ...

A. $a^2 + a + 2$

B. a^2

C. $a + 2$

D. a

17. Let $a > 0$. The distance between $2a$ and $-a$ is

A. a

B. $2a$

C. $3a$

D. 0

18. Dividing $x^3 + 2x^2 - x - 2$ by $x + 2$ gives

A. $x^2 + 1$

B. $x^2 - 1$

C. $x^2 - 2$

D. $x^2 + 2$

19. Factor completely $75y^4 - 147y^2$

- A. $3(5y^2 + 7)(5y^2 - 7)$
 - B. $3y^2(5y^2 - 7)^2$
 - C. $3y^2(5y + 7)(5y - 7)$
 - D. $3y(5y^2 - 7)^2$
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20. Factor completely $x^2y - 10y + xy^2 - 10x$

- A. $(xy + 10)(x - y)$
 - B. $(xy + 10)(x + y)$
 - C. $(xy - 10)(x + y)$
 - D. $(xy - 10)(x - y)$
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21. Find the domain of $\frac{1}{(x^2 + 2)(x^2 + 1)}$

- A. $\mathbb{R} \setminus \{-1, -2\}$
 - B. $\mathbb{R} \setminus \{1, 2\}$
 - C. \mathbb{R}
 - D. $\mathbb{R} \setminus \{-1, 1, -\sqrt{2}, \sqrt{2}\}$
-

22. The solution of the equation $\frac{-2}{2x - 1} = \frac{2}{2x + 1}$ is

- A. $x = -1$
 - B. $x = 1$
 - C. ϕ
 - D. $x = 0$
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23. The solution set of the linear equation $4(5x + 1) = -5 - (3 - 20x)$ is

- A. $S = \{-2\}$
 - B. $S = \{2\}$
 - C. $S = \phi$
 - D. $S = \mathbb{R}$
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24. Simplify the following exponent $(-1)^{2018} i^{1440}$

- A. 1
 - B. -1
 - C. $-i$
 - D. i
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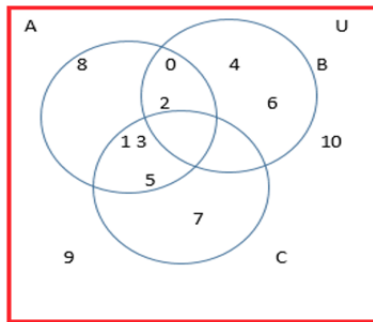
25. Simplify the following term $\frac{\sqrt{-32}\sqrt{-2}}{8}$

- A. i
- B. $-i$
- C. -1
- D. 1

26. The quotient $\frac{1+2i}{1-i}$ in standard form $a+bi$ is ...

- A. $-\frac{1}{2} + \frac{3}{2}i$
- B. $-\frac{1}{2} - \frac{3}{2}i$
- C. $\frac{1}{2} - \frac{3}{2}i$
- D. $\frac{1}{2} + \frac{3}{2}i$

27. Use the Venn diagram to determine $(A \cap C)'$



- A. $(A \cap C)' = \{4, 6, 7, 8, 9, 10\}$
- B. $(A \cap C)' = U$
- C. $(A \cap C)' = \{0, 2, 4, 6, 7, 8, 9, 10\}$
- D. $(A \cap C)' = \{\}$

28. Let x a real positive number. Simplify the following expression by rationalizing the denominator $\frac{1}{\sqrt[3]{5}-1}$

- A. $\frac{5 + \sqrt[3]{25} + \sqrt[3]{5}}{4}$
- B. $\frac{5 + \sqrt[3]{25} - \sqrt[3]{5}}{4}$
- C. $\frac{5 - \sqrt[3]{25} + \sqrt[3]{5}}{4}$
- D. $\frac{\sqrt[3]{25} + \sqrt[3]{5} + 1}{4}$

29. Simplify the following exponent i^{-2030}

- A. 1
- B. -1
- C. $-i$
- D. i

*Theses exercises DO NOT represent the whole content of the exam.
You need to study the book.*

Good Luck