

Math 1100 College Algebra and Probability Final Exam, Spring 1994

- Simplify: $x - 2[3 - (x - 1) + x]$
(A) $-3x - 4$ (B) $5x - 8$ (C) $x - 8$ (D) $x - 4$
(E) none of A, B, C, or D
- Which of the following equalities is TRUE for all choices of a , b and c ?
(A) $(a - b) - c = a - (b - c)$ (B) $(a + b)^{-1} = a^{-1} + b^{-1}$
(C) $a - (b - c) = a - b + c$ (D) $a \div (b + c) = (a \div b) + (a \div c)$
(E) $(a + b)(a + b) = a^2 + b^2$
- Use the absolute value notation to describe the expression "The distance between z and 3 is at least 1."
(A) $|z - 3| \leq 1$ (B) $|z + 3| \leq 1$ (C) $|z - 3| \geq 1$ (D) $|3z| \leq 1$
(E) none of A, B, C, or D
- Simplify $\left(\frac{2x}{y^2}\right)^{-3}$
(A) $-\frac{8y^6}{x^3}$ (B) $\frac{y^6}{8x^3}$ (C) $\frac{y^5}{8x^3}$ (D) $\frac{y^6}{6x^3}$ (E) none of A, B, C, or D
- Evaluate: $\left(-\frac{64}{27}\right)^{-2/3}$
(A) $\frac{9}{16}$ (B) $-\frac{9}{16}$ (C) $\frac{16}{9}$ (D) $-\frac{16}{9}$ (E) $\frac{128}{81}$
- Expand: $(2 - 3y)^2$
(A) $4 - 9y^2$ (B) $4 - 6y$ (C) $4 + 9y^2$ (D) $4 - 12y + 9y^2$ (E) $4 + 12y + 9y^2$
- Factor: $(3x - 1)(x + 2) + (2x + 1)(x + 2)$
(A) $5x(x + 2)$ (B) $(3x + 1)(x + 2)$ (C) $x(x + 2)$
(D) $(3x - 1)(x + 4)$ (E) $(5x - 1)(x + 2)$
- Solve: $\frac{x}{6} + \frac{2}{3} = \frac{3}{4}x$
(A) $x = -\frac{8}{7}$ (B) $x = \frac{8}{7}$ (C) $x = \frac{8}{3}$ (D) $x = -\frac{8}{3}$
(E) none of A, B, C, or D

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9. Simplify the fraction: $\frac{\frac{x+1}{y}}{1-\frac{y}{x}}$
- (A) $\frac{y(x-y)}{x(x+y)}$ (B) $\frac{x(x+y)}{y(x-y)}$ (C) $\frac{x-y}{x+y}$ (D) $\frac{x+y}{x-y}$ (E) $-\frac{x^2}{y^2}$
10. Solve: $2t^2 + 5t = -3$
- (A) $t = -3, -1$ (B) $t = -\frac{3}{2}, -1$ (C) $t = -3, \frac{1}{2}$ (D) $t = 3, 1$
- (E) $t = \frac{3}{2}, -1$
11. The number x is 15 less than the number y . Three times x added to twice the y is 80. Find the two numbers.
- (A) $y = 8, x = 7$ (B) $x = 15, y = 80$ (C) $x = 10, y = 25$ (D) $y = 19, x = 4$
- (E) none of A, B, C, or D
12. A compact disc player is on sale for \$628. What was the original price of this disc player if it has been discounted 27.5%?
- (A) \$985.05 (B) \$1067.60 (C) \$862.07 (D) \$866.21 (E) \$455.30
13. Solve $x^{3/2} = 27$
- (A) $x = 3$ (B) $x = 2$ (C) $x = 18$ (D) $x = 9$
- (E) none of A, B, C, or D
14. Solve the inequality $x^2 - x \leq 6$
- (A) $[-2, 3]$ (B) $(-\infty, -1] \cup [3, \infty)$ (C) $[-3, 2]$
- (D) $(-\infty, 3]$ (E) $(-\infty, -2]$
15. Find the distance between the points $(-3, 5)$ and $(1, -2)$
- (A) $\sqrt{5}$ (B) $\sqrt{55}$ (C) $\sqrt{65}$ (D) $\sqrt{3}$ (E) 1
16. Determine which of the following points lie on the graph of the equation $5y - 2x + 11 = 0$.
- (A) $(2, 3)$ (B) $(-3, 1)$ (C) $(3, 1)$ (D) $(3, -1)$ (E) $(0, 11)$
17. Find an equation of the line passing through the points $(2, -1)$ and $(3, 7)$.
- (A) $y = 6x + 18$ (B) $y = 6x - 11$ (C) $y = \frac{1}{8}x + 7\frac{3}{8}$
- (D) $y = 8x - 7$ (E) none of A, B, C, or D

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18. Find $g(x + 1)$ for $g(x) = x^2 + 2x - 3$

(A) $g(x + 1) = x^2 + 2x$ (B) $g(x + 1) = x^2 + 2x - 2$

(C) $g(x + 1) = x^2 + 4x$ (D) $g(x + 1) = x^2 + 2x - 1$

(E) none of A, B, C, or D

19. A rectangular family room is twice as long as it is wide, and its perimeter is 90 feet. Find the width of the room.

(A) 25 feet (B) 20 feet (C) 15 feet (D) 30 feet (E) 45 feet

20. Find the domain of the function and identify any vertical or horizontal asymptotes:

$$f(x) = \frac{3x + 2}{x - 3}$$

(A) Vert. Asym.: $x = 3$ Hor. Asym.: $y = 1$ Domain: All $x \neq 3$

(B) Vert. Asym.: $x = 3$ Hor. Asym.: $y = 1$ Domain: All real numbers

(C) Vert. Asym.: $x = -3$ Hor. Asym.: $y = 3$ Domain: All $x \neq 0$

(D) Vert. Asym.: $x = 3$ Hor. Asym.: $y = 3$ Domain: All $x \neq 3$

(E) Vert. Asym.: $x = 3$ Hor. Asym.: $y = 0$ Domain: All $x \neq 3$

21. Evaluate $f(-2)$ for $f(x) = \begin{cases} 1 - x^2 & \text{if } x \leq 0 \\ 2x + 3 & \text{if } 0 < x. \end{cases}$

(A) $f(-2) = 0$ (B) $f(-2) = 1$ (C) $f(-2) = -1$ (D) $f(-2) = 5$

(E) $f(-2) = -3$

22. The total revenue R of selling n units of a certain commodity is given by $R = n(62 - 0.08n)$. How many units must be sold to generate a revenue of \$1500?

(A) 10 (B) 20 (C) 30 (D) 25 (E) 15

23. Write the standard form of the equation of the parabola which has its vertex at $(-2, 3)$ and passes through the point $(0, -1)$.

(A) $y = (x + 2)^2 - 3$ (B) $y = -(x + 2)^2 + 3$ (C) $y = (x - 2)^2 + 3$

(D) $y = -(x + 3)^2 - 2$ (E) $y = 2(x - 2)^2 + 3$

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24. Find the center and radius of the circle defined by the equation $x^2 + y^2 - 6y = 16$.
- (A) Center: (0, 3), Radius: 25 (B) Center: (3, 0), Radius: 16
(C) Center: (0, 6), Radius: 4 (D) Center: (0, -3), Radius: 25
(E) Center: (0, 3), Radius: 5
25. Find the value of $x + y$ given that $3x + 4y = 2$ and $2x + y = 3$.
- (A) $x + y = 0$ (B) $x + y = 5$ (C) $x + y = 1$ (D) $x + y = -1$ (E) $x + y = 2$
26. Write the following as the logarithm of a single quantity: $3 \ln(a) + 2 \ln(b) - \frac{1}{2} \ln(c)$
- (A) $\ln(3abc)$ (B) $\ln\left(\frac{4ab}{c}\right)$ (C) $\ln\left(\frac{a^2b^3}{\sqrt{c}}\right)$ (D) $\ln(a^2b^3\sqrt{c})$ (E) $\ln\left(\frac{a^3b^2}{\sqrt{c}}\right)$
27. Find the coefficient of x^4y^3 in the expansion of $(x + 2y)^7$.
- (A) 560 (B) 25 (C) 320 (D) 280 (E) 16
28. Solve: $3 \ln(x) = 7$.
- (A) $x = e^{7/3}$ (B) $x = e^7 - e^3$ (C) $x = 7/3$
(D) $x = \ln\left(\frac{7}{3}\right)$ (E) none of A, B, C, or D
29. Find the x -intercept of $y = \log_4(2 - x)$.
- (A) (2, 0) (B) (-3, 0) (C) (1, 0) (D) (0, 0) (E) (3, 0)
30. If \$2000 is invested at 8.5% interest compounded continuously, find the balance after ten years.
- (A) \$2017.07 (B) \$4679.29 (C) \$2177.43
(D) \$17,000.00 (E) none of A, B, C, or D
31. Suppose you have invested \$12,000 in a small business to produce an item that will sell for \$5.95. If the production and distribution cost of each item is \$3.45, how many items must you sell to break even?
- (A) 2025 (B) 3750 (C) 3450 (D) 4350 (E) 4800
32. If r_1 and r_2 are the roots of $x^2 - 3x - 2 = 0$, then $r_1 + r_2 =$
- (A) 0 (B) $2\sqrt{17}$ (C) $\frac{3}{2}$ (D) 5 (E) 3

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33. The solution of $\frac{2x-3}{x+2} \leq 0$ is

- (A) $-\frac{3}{2} < x < 2$ (B) $-2 \leq x \leq \frac{3}{2}$ (C) $-2 < x \leq \frac{3}{2}$
(D) $x < -2$ and $\frac{3}{2} < x$ (E) $-2 < x < \frac{3}{2}$

34. Evaluate ${}_9C_5$

- (A) 2880 (B) 3024 (C) 126 (D) 15120 (E) 362,880

35. A committee consists of 4 women and 3 men. A chairperson and a vice-chairperson are to be selected and must be of opposite sex. In how many ways may they be selected?

- (A) 30 (B) 144 (C) 7 (D) 288 (E) 24

36. A fair coin is flipped three times and the result is recorded. What is the probability of getting exactly two heads?

- (A) $\frac{1}{3}$ (B) 2 (C) $\frac{2}{3}$ (D) $\frac{3}{8}$ (E) $\frac{5}{8}$

37. A bag contains 10 table tennis balls of which 3 are defective. If two balls are taken at random (without replacement) from the bag, what is the probability that both are defective?

- (A) 0.2 (B) 0.175 (C) 0.3 (D) 0.350 (E) $\frac{1}{15}$