

Alegbra II Individual

February 5, 1994

Each question on this test has choices a - d. If none of these choices is correct, mark "e" for None Of The Above.
(Note: Throughout this test $i = \sqrt{-1}$.)

1.) Simplify: $(x-3)^2 - (2x-5)(x+4)$

a.) $-x^2 - 9x - 29$ b.) $-x^2 - 9x + 29$ c.) $-x^2 - 3x - 11$ d.) $-x^2 - 3x + 11$ e.) NOTA

2.) Name the property illustrated: $(a + b) + (c + 0) = (a + b) + c$

a.) commutative property of addition b.) distributive property
c.) additive identity property d.) additive inverse property e.) NOTA

3.) Solve: $|2x+3| \geq \frac{5}{3}$

a.) $\left\{x: x \leq \frac{-7}{3} \text{ or } x \geq \frac{-2}{3}\right\}$ b.) $\left\{x: \frac{-7}{3} \leq x \leq \frac{-2}{3}\right\}$ c.) $\left\{x: x \leq \frac{-2}{3} \text{ or } x \geq \frac{7}{3}\right\}$

d.) $\left\{x: \frac{-2}{3} \leq x \leq \frac{7}{3}\right\}$ e.) NOTA

4.) A park district rents its swimming pool to residents for private parties. The rental charge consists of two parts. The first part is a charge for fixed costs (f). This charge remains the same regardless of the number of guests. The second part of the fee is a cost per guest (g). For a party of 30 people, the total charge is \$215, and for a party of 150 people, the total charge is \$575. Find the fixed cost.

a.) \$2 b.) \$3 c.) \$125 d.) \$155 e.) NOTA

5.) Identify the domain and range for the following function

$$f(x) = -2x^2 + 3x - 4$$

a.) domain: Reals range: Reals
b.) domain: Reals range: $\left\{y: y \geq \frac{-23}{8}\right\}$
c.) domain: $\left\{x: x \geq \frac{-23}{8}\right\}$ range: Reals
d.) domain: $\left\{x: x \leq \frac{-23}{8}\right\}$ range: $\left\{y: y \leq \frac{-23}{8}\right\}$ e.) NOTA

6.) Find the equation of the line that goes through the point (3,5) and is perpendicular to the line that contains the points (-5,-3) and (6,-2).

a.) $y = 11x - 28$ b.) $y = -11x + 38$ c.) $y = \frac{1}{11}x + \frac{52}{11}$ d.) $y = \frac{-1}{11}x + \frac{58}{11}$ e.) NOTA

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7.) $x = 2y$
 $y = 3z$
 $2x + 4y + 6z = 10$

For this system of equations, the value of x is:

- a.) 0 b.) $\frac{1}{3}$ c.) 1 d.) 2 e.) NOTA

8.) Find the vertex of the parabola: $y = x^2 - 6x + 4$

- a.) (-3, 5) b.) (5, -3) c.) (3, -5) d.) (-5, 3) e.) NOTA

9.) Find the discriminant of $10x^2 - 13x - 3 = 0$

- a.) -30 b.) -17 c.) 17 d.) 289 e.) NOTA

10.) If $f(x) = 3x^2 + 2$ and $g(x) = 2x - 5$, find $g \circ f$.

- a.) $\frac{x-2}{3}$ b.) $6x^2 - 1$ c.) $12x^2 - 60x + 77$ d.) $\frac{x+5}{2}$ e.) NOTA

11.) Simplify $\frac{3x^2 + 7x - 6}{6x^2 - 7x + 2} \cdot \frac{2x^2 + 7x - 4}{3x^2 + 8x - 3}$

- a.) $\frac{x+3}{3x-2}$ b.) $\frac{2x-1}{x+3}$ c.) $\frac{x+4}{3x-1}$ d.) $\frac{3x-2}{2x-1}$ e.) NOTA

12.) Given $f(x) = \frac{2x+5}{3}$, find $f^{-1}(x)$.

- a.) $\frac{x+2}{5}$ b.) $\frac{3x-5}{2}$ c.) $\frac{3}{2x+5}$ d.) $\frac{15+6x}{10x}$ e.) NOTA

13.) Simplify $(3x^2 - 2)^3$

- a.) $9x^4 - 12x^2 + 4$ b.) $27x^6 - 8$ c.) $27x^6 - 18x^4 + 12x^2 - 8$
 d.) $27x^6 - 54x^4 + 36x^2 - 8$ e.) NOTA

14.) Simplify $\sqrt{x^2 - 25} + \sqrt{75} - \sqrt{12} + \sqrt[3]{-27}$

- a.) $x - 8 + 3\sqrt{3}$ b.) $|x - 5| + 3\sqrt{3} - 3$ c.) $(x+5)(x-5) + 3\sqrt{3} - 3$
 d.) $\sqrt{x^2 - 25} + 3\sqrt{3} - 3$ e.) NOTA

15.) Simplify $\frac{(x^4)^{\frac{1}{2}}}{(x^{\frac{2}{3}})^{\frac{2}{4}}} \cdot \frac{(x^3)^{\frac{1}{5}}}{(x^5)^{\frac{1}{3}}}$

- a.) $\frac{1}{x}$ b.) x c.) $x^{\frac{1}{2}}$ d.) x^2 e.) NOTA

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16.) Simplify $\log_8 32$

- a.) $\frac{1}{3}$ b.) $\frac{2}{3}$ c.) $\frac{4}{3}$ d.) $\frac{5}{3}$ e.) NOTA

17.) At what rate of interest compounded continuously would you have to invest your money so that it would triple in 20 years. Round the answer to the nearest hundredth of a percent.

- a.) 5.47% b.) 5.48% c.) 5.49% d.) 5.50% e.) NOTA

18.) A rug factory produces bathroom mats and throw rugs. No more than 1000 rugs or mats can be made per hour and may not cost over \$1800 per hour. It costs \$1.50 to make a bathroom mat and \$2 to make a throw rug. The profit is \$.65 per bathroom mat and \$1 per throw rug. If B is the number of bathroom mats made per hour and T is the number of throw rugs, then list 4 inequalities to describe this problem.

- a.) $B > 0, T > 0, B + T < 1000, 1.50B + 2T < 1800$
b.) $B \geq 0, T \geq 0, B + T \leq 1000, 1.50B + 2T \leq 1800$
c.) $B \geq 0, T \geq 0, B + T \leq 1000, .65B + T = P$
d.) $B \geq 0, T \geq 0, B + T \leq 1800, 1.50B + 2T \leq 1000$
e.) NOTA

19.) Simplify $(3 + 2i) / (5 - i)$

- a.) $\frac{17}{26} + \frac{13}{26}i$ b.) $\frac{1}{2} + \frac{1}{2}i$ c.) $\frac{13}{24} + \frac{13}{24}i$ d.) $\frac{17}{24} + \frac{13}{24}i$ e.) NOTA

20.) The Pep Club made \$850 in soda sales last year. This year they made \$1050 by raising the price \$.20, but selling 200 fewer sodas. How many sodas were sold this year?

- a.) 850 b.) 860 c.) 1500 d.) 1700 e.) NOTA

21.) Simplify $(4 - 3i)(5 + 2i)$

- a.) $20 + 6i$ b.) $20 - 6i$ c.) $26 + 7i$ d.) $26 - 7i$ e.) NOTA

22.) The population in the United States in 1970 was about 203.3 million, with an annual growth rate of 1.3%. If the population is assumed to change continuously, predict how many years it will take for the population to reach 300 million. Round your answer to the nearest tenth.

- a.) 29.7 b.) 29.8 c.) 29.9 d.) 30.0 e.) NOTA

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23.) Identify the conic section with equation

$$2x^2 - 3xy + 5y^2 - x + 8y - 3 = 0$$

- a.) circle b.) ellipse c.) parabola d.) hyperbola e.) NOTA

24.) Find the radius of the circle with equation

$$x^2 + 8x + y^2 - 4y - 8 = 0$$

- a.) 4 b.) $2\sqrt{5}$ c.) $2\sqrt{7}$ d.) 6 e.) NOTA

25.) Which of the following is a solution of

$$x^3 - 7x^2 + 17x - 15$$

- a.) $3 + i$ b.) $3 + 2i$ c.) $2 + i$ d.) $1 + i$ e.) NOTA

26.) If $f(x) = \frac{5x^5 - 4x^4 - 7x^3 + 2x - 8}{(x-5)(x+3)(x-2)}$, find $f(-7)$.

- a.) -1267.5 b.) -84.5 c.) 211.25 d.) 720.36 e.) NOTA

27.) If $f(x) = \frac{1}{3x+2}$, $g(x) = \frac{2x}{2x+5}$, and $h(x) = x$, find $f(x) + g(x) - h(x)$.

- a.) $\frac{-6x^3 - 13x^2 - 4x + 5}{(3x+2)(2x+5)}$ b.) $\frac{25x+15}{(3x+2)(2x+5)}$ c.) $\frac{-6x^3 + 25x^2 + 16x + 5}{(3x+2)(2x+5)}$

- d.) $\frac{-6x^3 - 25x^2 - 4x + 5}{(3x+2)(2x+5)}$ e.) NOTA

28.) Find one factor of $6x^2 - 11x - 35$

- a.) $2x + 7$ b.) $3x + 5$ c.) $3x - 5$ d.) $2x - 5$ e.) NOTA

29.) Find the product $\begin{bmatrix} 1 & -1 & 2 \\ 2 & 0 & 3 \\ -2 & -1 & 3 \end{bmatrix} \cdot \begin{bmatrix} -3 \\ 2 \\ 1 \end{bmatrix}$

- a.) $\begin{bmatrix} -3 \\ 0 \\ 7 \end{bmatrix}$ b.) $\begin{bmatrix} -3 \\ -3 \\ 7 \end{bmatrix}$ c.) $\begin{bmatrix} -3 & 3 & -6 \\ 4 & 0 & 6 \\ -2 & -1 & 3 \end{bmatrix}$ d.) $\begin{bmatrix} -3 & -2 & 2 \\ -6 & 0 & 3 \\ 6 & -2 & 3 \end{bmatrix}$ e.) NOTA

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30.) Find the inverse of $\begin{bmatrix} 7 & 5 \\ 4 & 3 \end{bmatrix}$

- a.) $\begin{bmatrix} 3 & 7 \\ 5 & 4 \end{bmatrix}$ b.) $\begin{bmatrix} 5 & 7 \\ 3 & 4 \end{bmatrix}$ c.) $\begin{bmatrix} -3 & 5 \\ 4 & -7 \end{bmatrix}$ d.) $\begin{bmatrix} 3 & -5 \\ -4 & 7 \end{bmatrix}$ e.) NOTA