

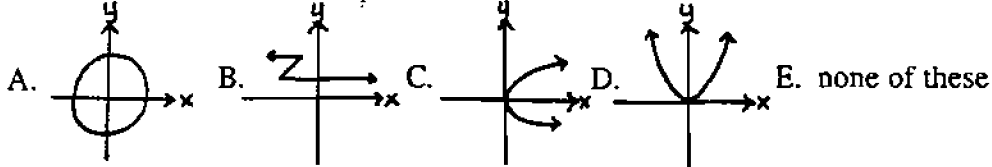
1996 Hoover High School Math Tournament
Algebra I Written Test
February 24, 1996

- How many integers satisfy $|5x - 4| \leq 8$?
A. 0 B. 2 C. 3 D. 4 E. none of these
- How much of an 80% nitric acid solution must be added to 125g. of a solution of 10% nitric acid to produce a 50% nitric acid solution?
A. 170 g. B. $\frac{500}{3}$ g. C. 75 g. D. $\frac{375}{4}$ g. E. none of these
- In order to fill a water tank, three pipes producing 12 L/min. , 16 L/min., and 20 L/min. of water are turned on at 30 minute intervals. No pipe is turned off after being turned on. If they are turned on in the order given, how long after the first pipe is turned on will a 1200 L. tank be filled?
A. 75 min. B. 45 min. C. 60 min. D. 90 min. E. none of these
- Find an equation of the line which passes through the points (-5,12) and (8, -2).
A. $14x + 13y = 86$ B. $13x + 14y = 103$ C. $10x - 3y = 86$
D. $14x - 13y = 138$ E. none of these
- If $f(x) = 3x^2 - 2$. Find $f(f(f(0)))$.
A. 1 B. -2 C. 0 D. 298 E. none of these
- Simplify : $7\sqrt{10} - 5\sqrt{90} - 4\sqrt{\frac{1}{10}}$.
A. $\frac{-42\sqrt{10}}{5}$ B. $-2\sqrt{80} - \frac{1}{5}$ C. $\frac{42\sqrt{10}}{5}$ D. $42\sqrt{2}$ E. none of these
- The solution for the inequality $3(5x-7)+7 \leq 8 - 2(2x-9)$ is
A. $x \leq 2$ B. $x \leq \frac{40}{19}$ C. $x \geq \frac{40}{19}$ D. $x \geq 2$ E. none of these

8. If the graphs of the two equations $2x + 3y = 11$ and $5x + ky = 18$ intersect at the point $\left(2, \frac{7}{3}\right)$, then $k =$

A. $\frac{15}{2}$ B. $\frac{24}{7}$ C. 3 D. -1 E. none of these

9. Which of the following is a graph of a function?



10. Simplify the following expression for $x = 5$, $y = 11$, $z = -2$: $\frac{x^2 + xy - 2z + yz^2}{8xyz}$

A. $-\frac{8}{55}$ B. 0 C. $\frac{2}{55}$ D. $-\frac{16}{55}$ E. none of these

11. Simplify the following expression for $x = 9$, $y = 27$, $z = 5$: $\frac{x^{\frac{1}{2}}y^{\frac{1}{6}}z^2}{\left(\frac{1}{x^2z^2}\right)^0 y^{\frac{-5}{6}}}$

A. 1024 B. 27 C. 45 D. 2025 E. none of these

12. Simplify: $\frac{1 + \frac{1}{x+2}}{\frac{x+1}{x+2} - \frac{2x+3}{x+5}}$

A. $\frac{x+1}{x+2}$ B. $\frac{x^2+x+1}{x+5}$ C. $\frac{1}{x+2}$ D. $-\frac{x^2+8x+15}{x^2+x+1}$
E. none of these

13. What is the sum of the roots of the equation $2x^2 - 5x + 11 = 0$?

A. $\frac{11}{2}$ B. $\frac{5}{2}$ C. $-\frac{5}{2}$ D. -5 E. none of these

14. Simplify: $\left[\frac{x^2-1}{x-1} \cdot \frac{x^3-x^2-2x}{x^2-3x+2} \right] + \frac{x^2+3x+2}{x^2+2x}$
- A. $\frac{x+1}{x-1}$ B. $\frac{x}{x-1}$ C. $\frac{x^3+x^2}{x-1}$ D. $\frac{x^2+3x+2}{x-1}$
 E. none of these
15. A college crew team can maintain a speed equivalent to 15 km/h. in still water . If it takes the team 50 minutes to row 6 km. upstream and 6km. back, what is the rate of the current of the river?
- A. 3 km/hr B. 2.5 km/hr C. $\sqrt{7}$ km/hr D. 1 km/hr E. none of these
16. Out of a club of 85 students, 51 attend the homecoming parade, 48 attend the Valentine's Day dance, and 8 attend neither the parade nor the dance. How many students in the club attended both the parade and the dance?
- A. 11 B. 44 C. 14 D. 22 E. none of these
17. Find k so that the lines $2x + 8y = 11$ and $kx - 5y = 15$ will be parallel.
- A. $-\frac{5}{4}$ B. $-\frac{4}{5}$ C. $\frac{5}{4}$ D. $\frac{4}{5}$ E. none of these
18. If N the x-intercept of the line $3x - 1.5y = 15$ and P is the slope of the same line. Find N + P.
- A. 7 B. $\frac{11}{2}$ C. 3 D. -8 E. none of these
19. If $(2x-5)(3x+7)(x+5) = Ax^3 + Bx^2 + Cx + D$. Find A + B - C - D.
- A. -100 B. -169 C. -180 D. -238 E. none of these
20. Solve for g: $g^2 - 3g + 1 = 0$.
- A. $\frac{-3 \pm \sqrt{5}}{2}$ B. $\frac{3 \pm \sqrt{13}}{2}$ C. $\frac{-3 \pm \sqrt{13}}{2}$ D. $\frac{3 \pm \sqrt{5}}{2}$ E. none of these
21. If y varies directly with x and inversely with z^2 and $y = 15$ when $x = 8$ and $z = 2$. Find y when $x = 3$ and $z = 5$.
- A. $\frac{21}{50}$ B. $\frac{9}{10}$ C. $\frac{18}{5}$ D. $\frac{45}{2}$ E. none of these

22. When $3.0\bar{4}$ can be written as a reduced fraction $\frac{a}{b}$. Find $a + b$.
- A. 40 B. 400 C. 22 D. 404 E. none of these
23. The sum of the abscissa and the ordinate of the intersection of the graphs $x + 2y = 13$ and $2x + y = 11$.
- A. 5 B. 24 C. 8 D. 14 E. none of these
24. If ΔSTU is a right Δ with $\angle T = 90^\circ$, $ST = 9$, and $TU = 12$, find US .
- A. 15 B. $6\sqrt{3}$ C. $\frac{21}{2}$ D. 6 E. none of these
25. A family sold 2 km^2 more than three fifths of their farm and had more than 4 km^2 less than half of it left. If the farm originally contained an integral number of square kilometers, what was the greatest possible area it could have had?
- A. 25 km^2 B. 20 km^2 C. 60 km^2 D. 19 km^2 E. none of these

TIE BREAKERS

- TB1 What is the fourth term in the expansion of $(x + 2y)^4$?
- TB2 How many distinguishable arrangements can be made using all of the letters in the word "HOOVER"?
- TB3 Determine an equation whose solution set consists of those points (x,y) equidistant from the points $(-3,4)$ and $(5,-2)$. Write the equation in slope-intercept form.