

1996 Hoover High School Math Tournament
Algebra I Ciphering

1.1 Find the common fraction in lowest terms for $\sqrt[3]{421}$

ANS: $\frac{139}{330}$

1.2 Find the equation in slope-intercept form for the line that is parallel to the line $2x + 3y = 8$ and that passes through the point (2,5).

ANS: $y = -\frac{2}{3}x + \frac{19}{3}$

1.3 Find the product of the x and y intercepts of $7x - 8y = 11$.

ANS: $-\frac{121}{56}$

1.4 $1011010_2 = \text{_____}_4$

ANS: 1122

1.5 The average of three numbers is $\frac{23}{72}$. Two of the numbers are $\frac{7}{8}$ and $\frac{1}{9}$. Find the other number.

ANS: $\frac{-1}{36}$

2.1 Solve $\sqrt{y-3} = 5-y$

ANS: 4

2.2 Solve for x: $(3x+1)(4x+5)-(2x+3)(6x+1)=15$

ANS: -13

2.3 Find the slope of a line that is perpendicular to the line which contains the points (2,-4) and (-1, 8).

ANS: $\frac{1}{4}$

2.4 Simplify: $\frac{1 - \frac{1}{x^2}}{1 + \frac{1}{x}}$

ANS: $\frac{x-1}{x}$

2.5 Simplify: $\frac{\sqrt{2}}{5 + \sqrt{3}}$

ANS: $\frac{5\sqrt{2} - \sqrt{6}}{22}$

3.1 What is the remainder when $5x^{10} + 11x^7 - 3x + 1$ is divided by $x - 1$?

ANS: 14

3.2 Simplify : $29^2 + 16^2 - (58)(16)$

ANS: 169

3.3 Solve: $x^2(x^2 + 2x) - x(x^2 + 2x) - 2(x^2 + 2x) = 0$

ANS: 0,-1,2,-2

3.4 $(-2)^{-1} + (-1^{-2})$

ANS: $-\frac{3}{2}$

3.5 What must be added to $x^2 - \frac{3}{5}x$ to make it a perfect square trinomial?

ANS: $\frac{9}{100}$

4.1 What is the sum of the roots of $6x^2 - 1 = 7x$?

ANS: $\frac{7}{6}$

4.2 Find $A - B + C$, where A is the y-intercept of $x = 3y + 6$
B is the slope of the line $y = 8$
C is the ordinate of the point (2,5)

ANS: 3

4.3 Find the product of the roots of $|x + 5| = 3$

ANS: 16

4.4 Bob can mow a lawn in four hours. Jack can mow the same lawn in five hours. How long does it take them to mow the lawn together?

ANS: $\frac{20}{9}$ hrs. or $2\frac{2}{9}$ hrs.

4.5 $4x + 5y = 3$, $5x + 6y = 2$. Find $-x + 2y$.

ANS: 22

ALT Simplify: $\frac{x^{y+1}}{x^{y-1}}$

ANS: x^2

ALT In a group of nickels and dimes worth \$7.00, the ratio of the number of nickels to the number of dimes is 4 to 3. Find the number of nickels.

ANS: 56

ALT Solve for x: $y = x + xwz$

ANS: $x = \frac{y}{1 + wz}$