

HHS Math Tournament 2005 Algebra I Ciphering

- 1.1 $3^{x^2+4x} = \frac{1}{27}$ Find x. ans. -1, -3
- 1.2 Solve: $36x^2 - 168x = -196$ ans. $\frac{7}{3}$
- 1.3 Put in order from least to greatest: 60%, 0.5, $\frac{2}{3}$, 0.56, $\frac{14}{20}$, 0.67 ans. 0.5, 0.56, 60%, $\frac{2}{3}$, 0.67, $\frac{14}{20}$
- 1.4 Find the slope of a line perpendicular to the line containing the points (4, 2) and (5, 4). ans. $-\frac{1}{2}$
- 1.5 Give the sum of the units digits for : $14286^{248} + 2816^{12} + 542^{17}$ ans. 14
- 2.1 Solve for x: $\sqrt{5x+39} = x-9$ ans. 21
- 2.2 Solution A is 12% acid and Solution B is 60% acid. How many liters of Solution A should be mixed together with Solution B to obtain 24 liters of a new solution that is 59% acid? ans. Sol A = .5
- 2.3 Factor Completely: $24x^6y + 375y$ ans. $3y(2x^2 + 5)(4x^4 - 10x^2 + 25)$
- 2.4 Simplify. Leave no negative exponents. $\left(\frac{48c^3}{9a^2b}\right)\left(\frac{15ab^3}{-4c^4}\right)$ ans. $\frac{-20b^2}{ac}$
- 2.5 The long leg of a 30-60-90 triangle is 28. Find the hypotenuse. ans. $\frac{56\sqrt{3}}{3}$
- 3.1 Write an equation of the line in slope-intercept form that passes through the given points (2, 2) and (6, 8). ans. $y = \frac{3}{2}x - 1$
- 3.2 Find the hypotenuse of a 30-60-90 triangle whose long leg is 24. ans. $16\sqrt{3}$
- 3.3 Factor Completely: $2x^4y + 9x^3y - 56x^2y$ ans. $x^2y(2x-7)(x+8)$
- 3.4 In how many different ways can the 6 letters A B C D E F be arranged? ans. 720
- 3.5 Ned can paint 1 house in 5 hours. Fred can paint 1 house in 8 hours. How long does it take them to paint 26 houses if they work together? ans. 80 hrs.
- 4.1 The distance between the points (2, 5) and (-4, y) is 10. Solve for the value(s) of y. ans. 13, -3
- 4.2 Find the sum of the reciprocals of the roots for: $3x^2 - 10x + 4 = 0$. ans. $\frac{5}{2}$
- 4.3 Factor Completely: $16x^8 - 81z^{12}$ ans. $(2x^2 - 3z^3)(2x^2 + 3z^3)(4x^4 + 9z^6)$
- 4.4 Write the equation of the line contains point (-3, 4) and is perpendicular to $y = 4$. ans. $x = -3$
- 4.5 Simplify: $5\sqrt{192x^3y^9z^{16}}$ ans. $40xy^4z^8\sqrt{3xy}$
- Extra: Simplify. Do not leave negative exponents. $x^{-5}(x^2 + x^{-2} + x^5)$ ans. $\frac{x^{10} + x^7 + x^3}{x^{10}}$ or $\frac{1}{x^3} + \frac{1}{x^7} + 1$
- Extra: Divide. $(x^3 - x^2 + x - 1) \div (x + 1)$ Write the remainder in fraction form. ans. $x^2 - 2x + 3 - \frac{4}{x+1}$