# 2006 Hoover HS Math Tournament
## Algebra I Ciphering

Practice: Simplify: $\left[\left(m^{-2}\right)\left(n^{-6}\right)\right]^{\frac{1}{2}}\ \frac{1}{mn^3}$

1.1 The sum of an integer and its square is 240. Find the positive integer. 15

1.2 Solve. $\frac{3x}{2}+\frac{5x}{3}-\frac{13x}{6}-\frac{2}{3}=\frac{5}{6}$ $\frac{3}{2}$

1.3 What is the remainder of $\frac{a^3+1}{a+1}$ ? 0

1.4 Louise can trim the shrubbery in 6 hours working alone. Her father can do it in 5 hours. They worked together until dinner but trimmed only $\frac{11}{15}$ of the shrubbery. How long did they work? 2 hours

1.5 Simplify $\frac{1}{(a-b)(a-c)}+\frac{1}{(b-c)(b-a)}+\frac{1}{(c-a)(c-b)}$ 0

2.1 For the sequence, find the next three terms: 3, 7, 15, 31, ... 63, 127, 255

2.2 Simplify: $9^{\frac{3}{2}}+4^{\frac{-1}{2}}=$ $\frac{55}{2}$

2.3 Solve for $x$: $30-4x-\pi x=0$ $\frac{30}{4+\pi}$

2.4 Find $\left(2n^3\right)^2$ if $(n+2)(n+3)=(4-n)(12-n)$ 256

2.5 Given the equation of the line in standard form, find the sum of the intercepts. $\frac{1}{2}x-3y=-16$ $-\frac{80}{3}$

3.1 Simplify. $\frac{(-8)^{-2}(8-8^0)}{2^{-6}}$ 7

3.2 If $g(x)=\frac{x^2-7x+10}{x-5}$, find $\frac{g(1)+g(-2)}{g(-1)}$ $\frac{5}{3}$

3.3 Find the area of the shape enclosed by the x-axis, the y-axis and the line $2x+3y=7$ $\frac{49}{12}$

3.4 Simplify: $3x\left(4x^2x\right)^3\left(\frac{1}{2}x^3\right)^2$ $48x^{16}$

3.5 Solve for $x$. $\frac{x^2}{x+2}+\frac{2x}{x+2}=-x$ 0

4.1 Combine like terms: $3\sqrt{\frac{3}{5}}-5\sqrt{15}+\sqrt{60}$ $\frac{-12\sqrt{15}}{5}$

4.2 The greater of the two consecutive integers is 10 more than twice the lesser. Find the greater integer. -8

4.3 Simplify: $-\{-[-(-(-(-3))^2)^3]\}$ 729

4.4 If $w=\sin^2\theta+\cos^2\theta$ and $\sin^2\theta=1-\cos^2\theta$. Find $\frac{3w}{2}$. $\frac{3}{2}$

4.5 Three numbers who sum is 230 are in the ratio 2:5:3. What is the median number? 69

E.1 Write as one fraction: $1+\frac{3}{x-5}$ $\frac{x-2}{x-5}$

E.2 Simplify. $[(2x-1)^2-1]^2$ $16x^4-32x^3+16x^2$