

A.P. Leto Comprehensive High School
 Mu Alpha Theta Invitational Competition
 Saturday, February 2, 1991

Team Round Answers

Algebra I	Geometry	Algebra II	Pre-Calculus	Calculus
1) Quadrant I	1) 84	1) 121	1) $\{-3, 1\}$	1) -6
2) 864	2) 118	2) $14\sqrt{2}$	2) 8 ft	2) 3
3) 47	3) $\frac{21\pi}{4}$	3) 14	3) $\frac{-3}{2}$	3) $\frac{9}{4}$
4) 370.5	4) 12	4) $\{-2, 3, \frac{-1+i\sqrt{3}}{2}\}$	4) 1	4) 6
5) $\frac{6}{5}$	5) 60 meters	5) 12	5) $\frac{2\sqrt[3]{4} + 6}{31}$	5) $\frac{-3\sqrt{3}}{4}$
6) 2	6) $\frac{16}{3}$	6) $-3 \leq x < -1$	6) 4	6)
7) 2	7) $2a^2$	7) 1,489	7) $\frac{14}{3} + 2\sqrt{5}$	$4x+48y+47\pi-384=0$
8) 29	8) $\sqrt{97}$	8) 480	8) 6	7) $\frac{-80e^9}{7}$
9) $x + y - 9 = 0$	9) $\frac{8}{7}$	9) 30	9) 135	8) $\frac{1}{16}$
10) $\{2, 0, -1\}$	10) 112	10) $\{-3 \leq x \leq 2 \text{ or } x \geq 4\}$	10) $4 + 4\sqrt{13}$	9) $x - y - 1 = 0$
11) $\frac{47}{36}$ or $1\frac{11}{36}$	11) 72	11) $\frac{16\pi}{3}$	11) $\frac{-15}{4}$	10) $\frac{-\sqrt{3}}{3e}$
12) 21	12) 12	12) 20	12) 6,479	11) $2x+3y+2\sqrt{5}=0$
13) 45,369	13) 8 feet	13) 20	13) 17,550	$2x + 3y - 2\sqrt{5} = 0$
14) $\frac{7}{2}$	14) $\frac{4}{5}$	14) 644	14) $\frac{37\sqrt{7}}{4}$	12) 50
15) -12	15) $100\pi - 128$	15) 16	15) -14	13) $3 + 4\ln 2$ or $3 + 2\ln 4$
				14) $a = 2; b = -1$
				15) $2 \times 2 \times \frac{5}{2}$

Algebra I Team Round
Solutions — Left '91

1. $2x - y = 15$

$y = x + 1$

$2x - x - 1 = 15$

$x - 1 = 15$

$x = 16$ $y = 17$

Quadrant I

2. $3(4 - 2(8 - 6(4 + 3(2 + 8 - 3))))$

$3(4 - 2(8 - 6(4 + 3(7))))$

$3(4 - 2(8 - 6(25)))$

$3(4 - 2(8 - 150))$

$3(4 - 2(-142)) = 3(4 + 184) = 864$

3. SET = {1, 2, 3, 3, 3, 4, 5, 6, 9, 14, 15}

$A = 4$ $B = 3$ $C = 15 - 1 = 14$

$D = 2 + 4 + 6 + 14 = 26$

$4 + 3 + 14 + 26 = 47$

4. $A = 3Q5$ 10 $2P = 6$

$B = 4 - 206$ $1 - 5$ $1 - 2$ $1 - 1 = 7$

$C = (45 \text{ min}) \cdot (60 \text{ sec}) \cdot (\frac{3}{2} \text{ in}) \cdot (\frac{1}{12} \text{ in})$

$\frac{45}{45} \cdot \frac{1}{15} \cdot \frac{675}{2} \cdot \frac{3}{2} \cdot \frac{27}{14}$

$= 337.5$

$D = 4 + 4 + 6 + 6 = 20$

$A + B + C + D = 337.5 + 33 = 370.5$

5. $(\frac{27}{4}) (\frac{3}{9}) (\frac{18}{8}) (\frac{32}{5}) (\frac{1}{18}) = \frac{6}{5}$

6. $\frac{2 \cdot 2 + 2 \cdot 2 \cdot 1 + 2 + 2}{6} = \frac{4 + 4 + 2 + 2}{6} = 2$

7. $M = \frac{0(-1) + 2}{0 + 2} = \frac{1}{3}$

$N = \sqrt[0+2]{\frac{2(2-1+2)}{2} + 1} = \sqrt[2]{3+1} = \sqrt{4} = 2$

$N^2 - 6NM + 8M^2 = 9 - 6(2)(\frac{1}{3}) + 8(\frac{1}{3})^2 = 9 - 4 + \frac{8}{9} = 2$

8. L = Laurin's current Age

S = Son's current Age

$L = 21 + S$ $21 + 5 = 5 \cdot 5 - 7$

$L = 5 \cdot 5 - 7$ $25 = 4 \cdot 5$

$S = 7$

$L = 21 + 7 = 28$

9. $\frac{2-k}{1-3} = 2$ $\frac{2-k}{-2} = 2$ $2-k = -4$ $k = 6$

$x + y = 3 + 6 = 9$ $x + y - 9 = 0$

10. $\{2, 0, -1\}$

11.
$$\frac{\sqrt{\sqrt{4^3} + \frac{\sqrt{9}}{3}}}{4} + \frac{\sqrt{\sqrt{9^3} - \sqrt{4}}}{9}$$

$$= \frac{\sqrt{8+1}}{4} + \frac{\sqrt{27-2}}{9}$$

$$= \frac{3}{4} + \frac{5}{9} = \frac{27+20}{36} = \frac{47}{36}$$

2. $y = kx \quad 6 = 4k \quad k = \frac{3}{2}$

$$y = \frac{3}{2}x$$

$$= \frac{3}{2}(14) = 21$$

3. $y^2 + 2y + 1 = (y+1)^2 = (213)^2 =$

$$\begin{array}{r} 213 \\ \times 213 \\ \hline 639 \\ 426 \\ \hline 45369 \end{array}$$

14. $2^{2x} = 2^7 \quad 2x = 7 \quad x = \frac{7}{2}$

15. $4(1-x) + 2x - 3 + 4 = 16x + 17(1-x)$

$$4 - 4x + 2x + 1 = 16x + 17 - 17x$$

$$5 - 2x = 17 - x$$

$$-12 = x$$

$$x = -12$$