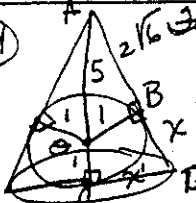
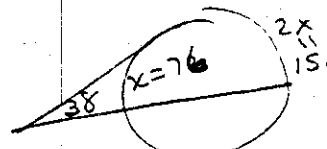


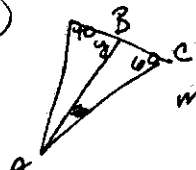
Geometry Regional 1999

Ind. Solutions continued.

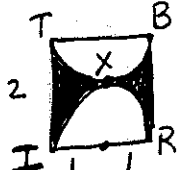
Team Solutions

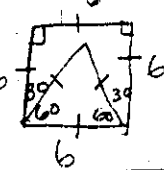
24)  Find AB using Pythag. $\triangle AOB \sim \triangle ABC$ by AA so $\frac{1}{x} = \frac{5}{2\sqrt{6}+x}$ $x = \frac{16}{2}$

1)  $2x - x = 76$
 $x = 76$
 $3^{rd} \text{ arc} = 132$

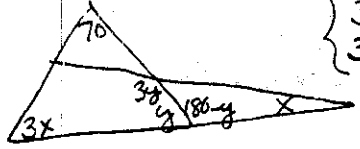
25)  In $\triangle ABC$ $m\angle CBA = 180 - y$
 $m\angle Z = 180 - (180 - y + 60)$
 $= y - 60$


2) $A = 75$, $B = \frac{4}{3}\pi$ ($x = \frac{1}{3}B$), $C = \frac{34}{360} \cdot 25\pi = 75 + \frac{4}{3}\pi + \frac{5}{2}\pi = 75 + \frac{23}{6}\pi = 87.0$

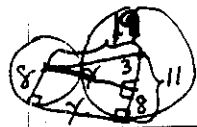
26)  shaded region = $a\square - a\circ = 4 - \pi$

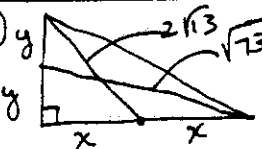
3)  $a\square = 36$, $a\circ = 9\sqrt{3}$
 $36 - 9\sqrt{3} = 20.4$

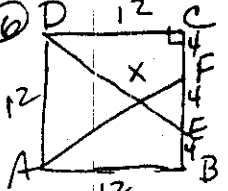
27) $x\sqrt{3} = \rho^2\sqrt{3}$
 $\rho^2 = 4x$
 $\rho = 2\sqrt{x}$
alt = $2\sqrt{x} \cdot \frac{1}{2}\sqrt{3} = \sqrt{3x}$

4)  $3x + y = 110$
 $3y = x + 180 - y$
 $x - 4y = -180$
 $3x + y = 110$ $(20, 50)$
 $m\angle A =$

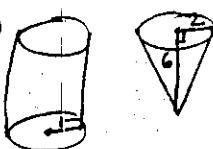
28) 

5)  using Pythag $19^2 = 3^2 + x^2$ $4\sqrt{22}$


29)  $y^2 + (2x)^2 = 73$
 $(2y)^2 + x^2 = 52$
 $x = 4, y = 3$
 $8^2 + 6^2 = (hyp)^2 = 10$


6)  Find DE, use Pythag. $DE = 4\sqrt{13}$. $\triangle ADX \sim \triangle EFY$
 $\frac{DX}{EX} = \frac{3}{1}$ $\frac{4\sqrt{13} - x}{x} = \frac{3}{1}$ $x = \sqrt{13}$

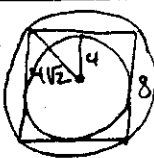
30) $x^2 + 2x + y^2 - 4y = 6$
 $x^2 + 2x + 1 + y^2 - 4y + 4 = 6 + 1 + 4$
 $(x+1)^2 + (y-2)^2 = 11$, area = 11π

7)  $V = \frac{1}{3} \cdot 4\pi \cdot 6 = 8\pi$
 $V_{\text{cyl}} = \pi r^2 h$
 $8\pi = \pi \cdot 4 \cdot h$
 $8 = h$

8) $A = -\frac{3}{2} + \frac{4}{3} = -\frac{1}{6}$; $B = \frac{5}{2} + \frac{-7}{3} = \frac{1}{6}$
 $A \div B = -1$

9)  Ratio of sides $\frac{6}{5}$, Ratio of areas $\frac{9}{25}$
 $\frac{9}{25} = \frac{x}{225}$; $x = 81$

10) $9 = \frac{n(n-3)}{2}$, $n = 6$; $150\sqrt{3} = 6 \cdot \rho^2\sqrt{3}$
 $100 = \rho^2$, $\rho = 10$
 $a = 5\sqrt{3}$, $a\circ = (5\sqrt{3})^2 \pi = 75\pi$

11  $32\pi - 16\pi = 16\pi$

12 edges $\frac{3e}{4e}$ $V = \frac{27e^3}{64e^3}$
 $64e^3 - 27e^3 = 296$
 $e = 2, \text{ (6)}$

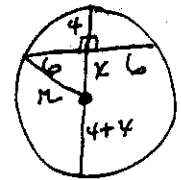
13 Using 2 chord power thm,


$$6 \cdot 6 = 4(4 + 2x)$$

$$x = \frac{5}{2}$$

To find π , $36 + \frac{25}{4} = \pi^2$

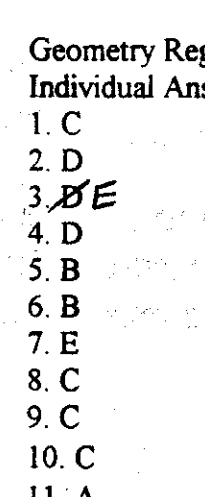
$$\pi = \frac{13}{2}, C = 13\pi$$



14  $\triangle AGD \sim \triangle FBE$ by AA

$$\frac{8}{x} = \frac{x}{12}, x = 4\sqrt{6}$$

ABFG is a trap: $A = \frac{1}{2}(b_1 + b_2)h$
 $= \frac{1}{2}(20 + 4\sqrt{6} + 4\sqrt{6}) \cdot 4\sqrt{6}$
 $= 40\sqrt{6} + 96$

15  double cone, to find π , find Area of \triangle using Heron's $A_{\triangle} = 84$
 $84 = \frac{1}{2} \cdot 14 \cdot r$
 $12 = r$

$$V = \frac{1}{3} \cdot 144\pi \cdot x + \frac{1}{3} \cdot 144\pi \cdot (14 - x)$$

$$= \frac{1}{3} \cdot 144\pi (14)$$

$$= 672\pi$$

Geometry Regional 1999
Individual Answers

1. C
2. D
3. ~~B~~ E
4. D
5. B
6. B
7. E
8. C
9. C
10. C
11. A
12. C
13. D
14. C
15. B
16. B
17. D
18. C
19. D
20. E
21. D
22. C
23. C
24. B
25. C
26. B
27. B
28. C
29. E
30. C

Geometry Regional 1999
Team Answers

1. 132
2. 87.04 (no other answer is acceptable)
3. 20.4 (no other answer is acceptable)
4. 60
5. $4\sqrt{22}$ (no other answer is acceptable)
6. $\sqrt{13}$ (no other answer is acceptable)
7. 8
8. -1
9. 81
10. 75π (no other answer is acceptable)
11. 16π (no other answer is acceptable)
12. 6
13. 13π (no other answer is acceptable)
14. $40\sqrt{6} + 96$ (no other answer is acceptable)
15. 672π