Geometry Ind. Plant City Invitational 1999

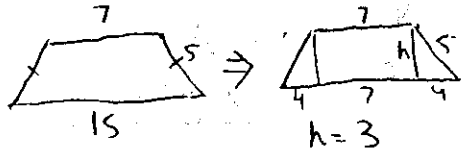
1. **C**

$m\angle DAB + m\angle BCF = m\angle ABC$

$42^\circ + (180^\circ - 102^\circ) = m\angle ABC$

$m\angle ABC = 120^\circ$

2. **A**



$A = \left(\frac{b_1+b_2}{2}\right)h = \left(\frac{22}{2}\right)3 = 33$

3. **B**

$5.5m - 30h = \angle A$

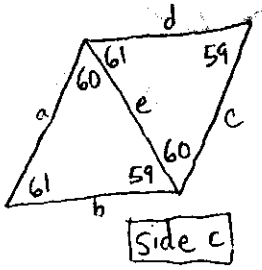
$5.5(48) - 30(1) = 126^\circ$

4. **C**

perimeter + circum

$16 + 4\pi$

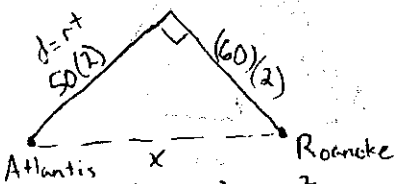
5. **C**



side e is longest of Δabe but side c is longest side of Δdce

Side c

6. **B**



$x^2 = 100^2 + 120^2$

$x = 20\sqrt{61}$

7. **D**

$(3,-5)\ (-3,3)$

$m = \frac{-4}{3}$

$4x + 3y + b = 0$

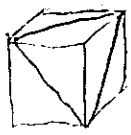
$4(3) + 3(-5) = -b$

$4x + 3y + 3 = 0$

$d = \frac{4(1) + 3(2) + 3}{\sqrt{4^2 + 3^2}}$

$d = \frac{13}{5}$

8. **A**



Volume of tetrahedron is $\frac{1}{6}$ of cube

$s^3 = 6^3$

$\frac{6^3}{} = 36$

9. **D**

$180 - x = 32 + 2(90 - x)$

$148 - x = 180 - 2x$

$x = 32$

$(180 - 32) + (90 - 32) = 206^\circ$

10. **C**

$V = \frac{1}{3}h\left(B_1 + B_2 + \sqrt{B_1 B_2}\right)$

$V = \frac{1}{3}(30)\left[(100 + 625) + 250\right]$

$V = 9750$

11. **C**

$x + 70^\circ = 3x$

$x = 35^\circ \Rightarrow$

$3x = 105^\circ$

12. **D**

$P \to Q$

converse $Q \to P$

13. **B**

nC_2

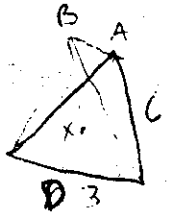
$_{12}C_2 = \frac{12 \cdot 11}{2} = 66$

14. **A**

Euclid

15. **E**

$A_{base} = \frac{s^2\sqrt{3}}{4} = 9\sqrt{3}$



$AD = 3\sqrt{3}$

$AX = 2\sqrt{3} \Rightarrow BX = 2\sqrt{6}$

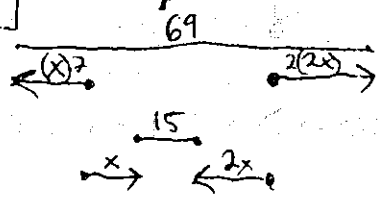
$V = \frac{1}{3}(9\sqrt{3})(2\sqrt{6})$

$V = \boxed{18\sqrt{2}}$

16. **B**

Kara's rate = $2x$

Becky's rate = x



$15 + x + 2x + 2x + 4x = 69$

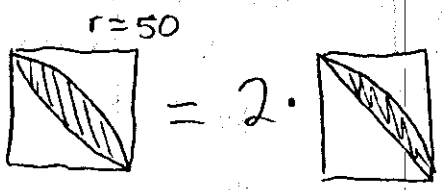
$9x = 54$

$x = 6$

$15 + 3x$

$15 + 3(6) = 33$

17. **C**

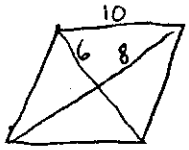


$= 2 \left[\text{▨} - \text{▨} \right] =$

$2\left[\frac{\pi r^2}{4} - \frac{r^2}{2}\right] = 1250\pi - 2500$

18. **C**

$A = \frac{d_1 \cdot d_2}{2} = 96$



$P = 40$

$A + P = 136$

19. **B**

rad.. 1:5 $\quad h = 2r$

Volume 1:125

$\frac{1}{125} = \frac{x}{6750\pi} \quad x = 54\pi$

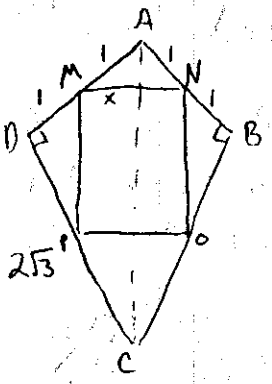
$\frac{1}{5} = \frac{h}{H}$

$V = r^2 \pi h = 54\pi$

$r^2 \pi \cdot 2r = 54\pi$

$r = 3 \Rightarrow h = 6$

20. **B**



Look at right triangle ADC. $AD = 2$, $DC = 2\sqrt{3}$

$\Rightarrow$ 30°-60°-90° triangle and $m\angle ACD = 30° \Rightarrow$

$m\angle DCB = 60° \Rightarrow$

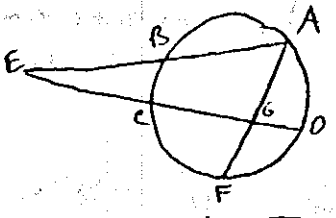
$\triangle POC$ is equilateral

$\angle CAD = 60° \Rightarrow$

$x = \frac{\sqrt{3}}{2} \Rightarrow$ Area of $\triangle POC$ is $A = \frac{s^2\sqrt{3}}{4}$

$A = \frac{(\sqrt{3})^2\sqrt{3}}{4}$

21. **A**



$\overline{EB} \cdot \overline{EA} = \overline{EC} \cdot \overline{ED}$

$5 \cdot 12 = 4 \cdot x$

$x = 15$

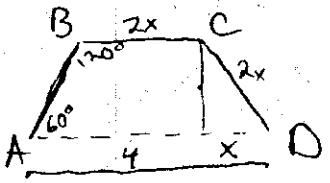
$\Rightarrow \overline{CG} = 8$

$\overline{AG} \cdot \overline{GF} = \overline{CG} \cdot \overline{GD}$

$6 \cdot x = 8 \cdot 3$

$x = 4$

22. **A**



$x + x + 2x = 4$

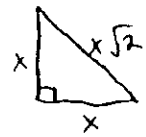
$x = 1 \Rightarrow$ side $= 2$

$A = \frac{s^2\sqrt{3}}{4} \cdot 6 = \frac{4\sqrt{3}}{4} \cdot 6 = 6\sqrt{3}$

23. **C**

perpendiculars drawn from sides to a single point equals the altitude of triangle

24. **B**



$2x + x\sqrt{2} = 12$

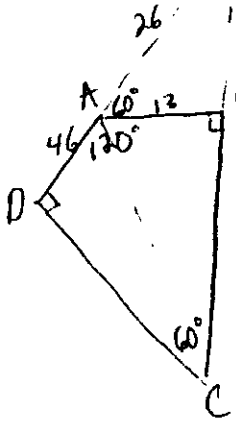
$x = \frac{12}{2+\sqrt{2}}$

$x = \frac{12(2-\sqrt{2})}{2}$

$x = 12 - 6\sqrt{2}$

$\Rightarrow x\sqrt{2} = 12\sqrt{2} - 12$

25. **C**



$\triangle ABM$ is 30-60-90

$\triangle DMC$ is 30-60-90

$\Rightarrow AM = 26 \Rightarrow DM = 72$

$\Rightarrow DC = \frac{72\sqrt{3}}{3} = 24\sqrt{3}$

$46^2 + (24\sqrt{3})^2 = AC^2$

$AC = 62$

26. **E**

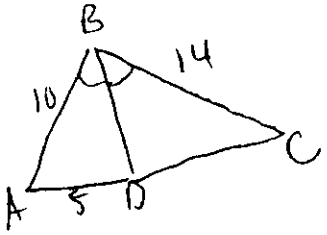
$\frac{48}{6} = 8$ side $= 8$

$A = \frac{s^2\sqrt{3}}{4} \cdot 6 + 16(6)$

$A = \frac{64\sqrt{3}}{4} \cdot 6 + 16 \cdot 6$

$A = 96\sqrt{3} + 96$

27. **A**



$\frac{10}{5} = \frac{14}{x}$

$x = 7$

$\overline{BD} = \sqrt{ab - cd}$

$= \sqrt{140 - 35}$

$= \sqrt{105}$

28. **D**

$\frac{1}{h} = \frac{2}{3}\left(\frac{1}{a} + \frac{1}{b}\right)$

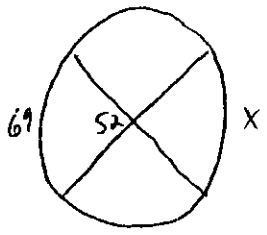
$\frac{1}{h} = \frac{2}{3}\left(\frac{1}{20} + \frac{1}{12}\right)$

$\frac{1}{h} = \frac{64}{720}$

$h = 11.25$

29. **D**

30. **E**



$\frac{69 + x}{2} = 52$

$x = 35$