GEOMETRY
TEAM ANSWERS

VERO BEACH
FEB, 7, 1998

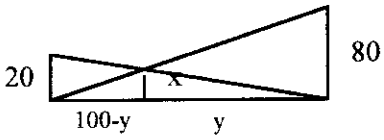
1. 680
2. 17 miles
3. $m\angle EBC = 68°$
4. 2:1 or 2
5. $2 + 2\sqrt{5}$
6. $\angle C = 15°$ or $\angle ACD = 15°$
7. $15\sqrt{7} + 24\sqrt{3} + 64\sqrt{5} + 25\pi$
8. -8
9. $A = 72\sqrt{3}$
10. $\angle AED = 15°$
11. $\frac{\sqrt{3}}{3}$
12. 36
13. $\angle ADB = 100$
14. $2 + \frac{4}{\pi} = r$
15. $\frac{\Delta\sqrt{6}}{2}$

Individual

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

17

Florida Invitational - Vero Beach
February 7, 1998
Solutions Geometry Individual



C 1. $\frac{1}{x} = \frac{1}{20} + \frac{1}{80}$; therefore:; $x = 16$"

or

$\frac{20}{100} = \frac{x}{y}$; $y = 5x$ and $\frac{80}{100} = \frac{x}{100-y}$

$= \frac{x}{100-5x}$

$x = 16$"

B 2. $\frac{A_1}{A_2} = \frac{\pi 4^2}{\pi 6^2} = \frac{4}{9}$

D 5. $\frac{16}{8} = \frac{8}{ET}$ $\quad$ $\frac{4}{AT} = \frac{AT}{20}$

$16(ET) = 64$ $\quad$ $(AT)^2 = 80$

$ET = 4$ $\quad$ $AT = 4\sqrt{5}$

B 3. area $= \frac{1}{2}bh = \frac{1}{2}h(b_1 + b_2)$

$b_1 + b_2 = b = 18$ therefore the midsegment $= \frac{1}{2}(b_1 + b_2) = 9$

B 4. AB $= \sqrt{1296 - 324}$ $\quad$ AB - AD = DB $\quad$ $\left(6\sqrt{3}\right)^2 + (18)^2 = X^2$

$= \sqrt{972}$ $\quad$ $y = 18\sqrt{3} - 12\sqrt{3}$ $\quad$ $108 + 324 = X^2$

$= \sqrt{324 * 3}$ $\quad$ $y = 6\sqrt{3}$ $\quad$ $\sqrt{432} = X$

$= 18\sqrt{3}$ $\quad$ $12\sqrt{3}$

A 6. $2y+5 = x$ $\quad$ $-x+2y = -5$

$x+y = 95$ $\quad$ $x+y = 95$

$3y = 90$

$x+30 = 95$ $\quad$ $y = 30$

$x = 65$

C 7. $\frac{(11-2)180}{11} = \frac{1620}{11}$

B 8. $x = 180 - x - 50$ $\quad$ complement

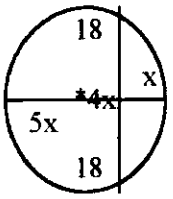
$2x = 130$ $\quad$ 90 - 65 = 25 degrees

$x = 65$

9. C

A 10. $\frac{50(50-3)}{2} = 1175$

A 11.



$9x(x) = 18(18)$

$9x^2 = 18^2$

$x^2 = 36$

$x = 6$

therefore: 5(6)

ans: 30

D 12. m TDS = 290

360 - 290 = 70

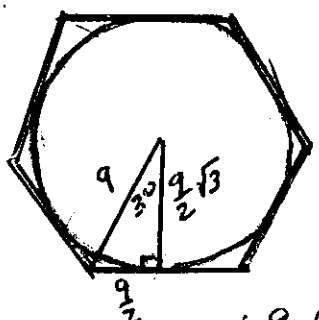
so m TS = 20

and m TOP = 70

m OTP = 90

90 - 70 = 20 so the measure of angle P = 20

C 13.



area of circle $= \left(\frac{9}{2}\sqrt{3}\right)^2 \pi$

$= \frac{81 \cdot 3}{4}\pi = \frac{243\pi}{4}$

D 14. $y = mx+b$

$y = \frac{3x}{4} + \frac{3}{2}$

The slope of the line perpendicul

has a slope of $m = -\frac{4}{3}$

C 15. $\frac{x^2\sqrt{3}}{4} \cdot 6 = \sqrt{3}$

$6x^2\sqrt{3} = 4\sqrt{3}$

$x^2 = \frac{2}{3}$, $x = \sqrt{\frac{2}{3}}$

$x = \sqrt{\frac{2}{3}} \cdot \sqrt{\frac{3}{3}} = \frac{\sqrt{6}}{3}$

$n = \sqrt{6}$; area of Δ

$A = \frac{(\sqrt{6})^2\sqrt{3}}{4} = \frac{3\sqrt{3}}{2}$

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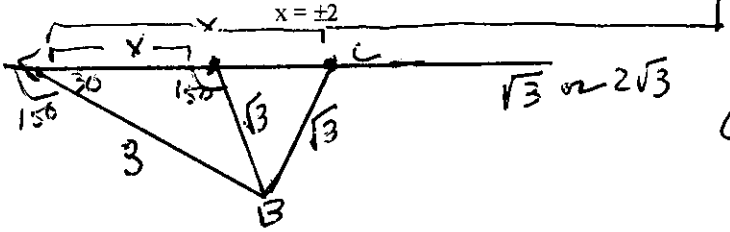
C 16. $3x^2+1 = 2x^2+5$ $3(2)^2+1=13$ $x^2=4$ $x=\pm 2$ $3(2)^2+1=\boxed{13}$

A 17.



$\sqrt{3}$ or $2\sqrt{3}$

17. Law of cosines:

$a^2 = b^2 + c^2 - 2bc\cos A$ (30°)

$(\sqrt{3})^2 = x^2 + 3^2 - 2(x)(3)\left(\frac{\sqrt{3}}{2}\right)$

$3 = x^2 + 9 - 6x\left(\frac{\sqrt{3}}{2}\right)$

$3 = x^2 + 9 - 3x\sqrt{3}$

$0 = x^2 - 3x\sqrt{3} + 6$

$(x-\sqrt{3})(x-2\sqrt{3}) = 0$

$x = \sqrt{3}$ or $x = 2\sqrt{3}$

E 18. area = 16, let legs = x
hypotenuse = $x\sqrt{2}$
$16 = \frac{1}{2} * x * x$
$32 = x^2$
$4\sqrt{2} = x$
$x\sqrt{2} = 8$ e) NOTA

B 19. $24^2 - 16^2 = x^2$
$576 - 256 = 320$
$320 = x^2$
$\sqrt{320} = x$
$8\sqrt{5} = x$
$A = \frac{1}{2} * 8\sqrt{5} * 16$
$A = 64\sqrt{5}$

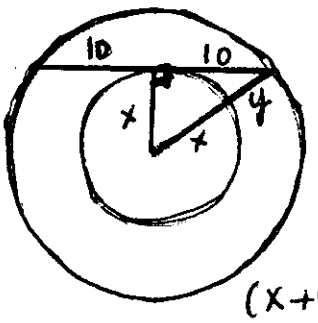
E 20. $2x + 3x + 4x = 54$
$9x = 54$
$x = 6$

SIDES ARE 12, 18, 24
SEMIPERIMETER = 27
AREA $= \sqrt{27(15)(9)(3)} = \sqrt{81 \cdot 9 \cdot 15}$
$= 27\sqrt{15}$

C 21. $4(9) = 10x$
$36 = 10x$
$\frac{36}{10} = x$
$\frac{18}{5} = x$

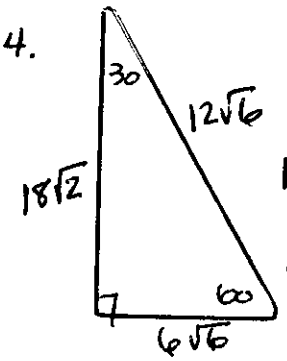
B 22. $\frac{1}{2}\begin{bmatrix} 1 & 4 & 0 & 1 \\ -1 & 7 & 8 & -1 \end{bmatrix} = (7+32+0) - (-4+0+8)$
$39 - 4 = 35$
$\frac{1}{2}(35) = 17.5$

B 23.



area of large ⊙ $= (x+y)^2\pi$
area of small ⊙ $= x^2\pi$
$x^2 + 100 = (x+y)^2$
$(x+y)^2\pi - x^2\pi = (x^2+100)\pi - x^2\pi$
$= x^2\pi + 100\pi - x^2\pi = 100\pi$

C 24.



$A = \frac{1}{2}(18\sqrt{2})(6$
$A = 108\sqrt{3}$

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B 25.

$3^2 + 5^2 = x^2 + 4^2$

$9 + 25 - 16 = x^2$

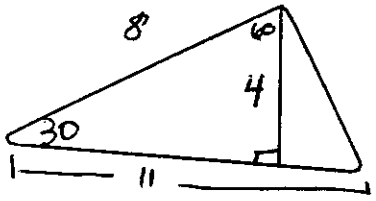
$9 + 9 = x^2$

$18 = x^2$

$\pm 3\sqrt{2} = x$

$\boxed{3\sqrt{2} = x}$

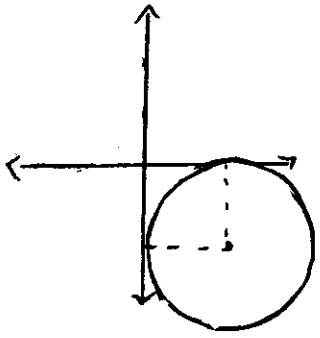
A 27.



$\frac{1}{2}(4)(11) = \underline{22}$

28. A

B 29.



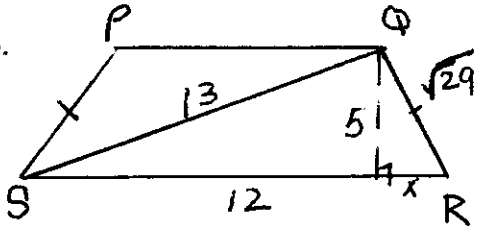
C (3, -3)

r = 3

$(x-3)^2 + (y+3)^2 = 3^2$

$(x-3)^2 + (y+3)^2 = 9$

B 26.



$12^2 + 5^2 = 13^2$

$144 + 25 = 169$

$x^2 + 5^2 = (\sqrt{29})^2$

$x^2 = 29 - 25$

$x^2 = 4$

$x = \pm 2$

Median $= \frac{1}{2}(b_1 + b_2)$

$A = \frac{1}{2}(5)(b_1 + b_2)$

$60 = \frac{5}{2}(b_1 + b_2)$

$\frac{120}{5} = b_1 + b_2$ or $\frac{60}{5} = \frac{1}{2}(b_1$

median = 12

SR = 14 PQ = 10

$\frac{1}{2}(14+10) = \frac{1}{2}(24) = 12$

D 30.) $C = 2\pi r$

$C = 2\pi(6450)$

$C \approx 40526.54523$

$\frac{40526.54523}{24} \approx 1688.61$

≈ 1690