Geometry Solutions

1. D

2. midpoint $= \left(\frac{1+3}{2}, \frac{5+8}{2}\right) = (2, 6.5)$

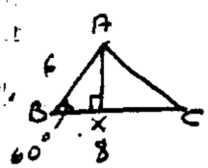
   slope $= \frac{8-5}{3-1} = \frac{3}{2}$

   so slope of $\perp$ bisector $= -\frac{2}{3}$

   $y - 6.5 = -\frac{2}{3}(x-2)$ point-slope form

   $3y - 19.5 = -2x + 4$

   $\boxed{2x + 3y = 23.5 \text{ D}}$

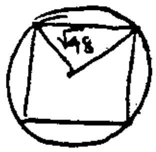
3. 

   $\triangle AXB - 30°\text{-}60°\text{-}90° \triangle$

   $AX = 3\sqrt{3}$ = height

   Area $= \frac{1}{2}bh = \frac{1}{2}(3\sqrt{3})(8) = \boxed{12\sqrt{3} \text{ D}}$

B 4. The inscribed rectangle must be a square.



   $r = \frac{\sqrt{48}}{\sqrt{2}} = \sqrt{24}$

   $\boxed{A = \pi r^2 = 24\pi}$

D 5. $V_{frustum} = \frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$

   $= \frac{1}{3}\pi 5(3^2 + 5^2 + 3 \cdot 5)$

   $= \frac{5\pi}{3}(9 + 25 + 15)$

   $\boxed{V = \frac{245\pi}{3}}$

D 6. completing the square $x^2 - 8x + 16 + y^2 + 10y + 25 = 34 + 16 + 25$

   $(x-4)^2 + (y+5)^2 = 75$

   $r = 5\sqrt{3}$ $\quad C = 2\pi(5\sqrt{3}) = \boxed{10\sqrt{3}\pi}$

D 7. $\tan 95° =$

   $\boxed{\frac{\sin 95°}{\cos 95°}}$

C 8. $V = \frac{s^3\sqrt{2}}{12} = \boxed{\frac{h^3\sqrt{2}}{12}}$

A 9. side of cube = 3

diagonal of cube = diameter of sphere = $3\sqrt{3}$

radius of sphere = $3\sqrt{3}$

$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \cdot \frac{81\sqrt{3}}{8}\pi = \boxed{\frac{27\sqrt{3}\pi}{2}}$

10. B

11. B

12. depth = 6 depth w/o covers = 5.6

$5.6/.05 = \boxed{112}$ D

13. $V_{icecream} = V_{cone}$

$V_{icecream} = \frac{4}{3}\pi\, 216 = 288\pi$

$V_{cone} = \frac{1}{3}\pi r^2 \cdot 8 = 288\pi$

$r^2 = 108$

$\boxed{r = 6\sqrt{3}}$ A

14. 4000/16 = 250 sq ft / room

lengths 2x · 5x

$10x^2 = 250$

$x^2 = 25$

$\boxed{x = 5}$

lengths of sides 10, 25

perimeter = $\boxed{70}$ C

15. dimensions of field = $100 \times \frac{200}{3}$

$A = \frac{20000}{3}$ $A_{square} = \frac{10000}{3}$

side of square = $\sqrt{\frac{10000}{3}} = \frac{100}{\sqrt{3}} = \boxed{\frac{100\sqrt{3}}{3}}$ C

16. C

17. B

18. B

19. 

$AB = \sqrt{25+100} = 5\sqrt{5}$ mi, D

20. $\triangle ADE$

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

$\triangle ABC = \frac{9\sqrt{3}}{4}$

$A_{trapezoid} = \frac{9\sqrt{3}}{4} - \sqrt{3} = \frac{5\sqrt{3}}{4}$

ratio = $\frac{\frac{4\sqrt{3}}{4}}{\frac{5\sqrt{3}}{4}} = \boxed{\frac{4}{5}}$ E

21. $\boxed{E}$ - ORTHOCENTER

$\boxed{C}$ 22. p = T q = F

I. $T \wedge {\sim}F = T \wedge T = T$

II. ${\sim}({\sim}T \vee {\sim}F)$

${\sim}(F \vee T)$

${\sim}(T) = F$

III. $((\underset{T}{\overset{F}{T \wedge F}}) \vee T) \wedge F) \vee (F \wedge F)$

F ∨ F

F

IV. $(T \to F) \to F$

$F \to F$

T

A 23. $A = \sqrt{(s-a)(s-b)(s-c)(s-d)}$

$= \sqrt{4 \cdot 3 \cdot 2 \cdot 1}$

$= \sqrt{24}$

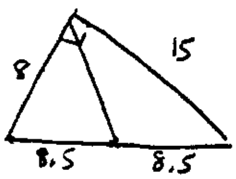
$\boxed{= 2\sqrt{6}}$

E 24. $A = \pi a b = \pi \, 8 \cdot 5 = \boxed{40\pi}$

A 25. plot or use $\perp$ lines $\cdot$ $\boxed{(5,5)}$

C 26. $d = \dfrac{|Ax + By + C|}{\sqrt{A^2 + B^2}} = \dfrac{|9(6) + 11(6) - 13|}{\sqrt{9^2 + 11^2}} = \dfrac{107}{\sqrt{202}} = \boxed{\dfrac{107\sqrt{202}}{202}}$

D 27.



In a right $\triangle$ midpt of hypotenuse is equidistant from all 3 vertices

$\boxed{\therefore 8.5}$

A 28. $x + 2x = 180$

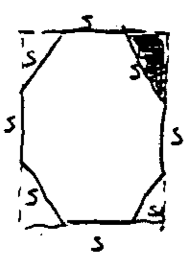
$3x = 180$

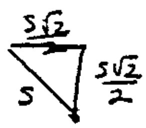
$x = 60$ (exterior $\angle$)

$60 \overline{)360}$ 6 sides

$\boxed{6 \times 8 = 48}$

E 29.





side of square $= s + s\sqrt{2}$

$A_{square} = (s + s\sqrt{2})^2 = s^2 + 2s^2\sqrt{2} + 2s^2 =$

$3s^2 + 2s^2\sqrt{2}$

$A_{Triangles} = 4 \cdot \frac{1}{2}\left(\frac{s\sqrt{2}}{2}\right)\left(\frac{s\sqrt{2}}{2}\right) =$

$\frac{2 \cdot s^2}{2} = s^2$

$\boxed{A_{square} - \triangle s = 2s^2 + 2s^2\sqrt{2}}$

A 30. BD' divided in ratio $BC : CB' = 8 : 12 = 2 : 3$

$2x + 3x = 10 \quad x = 2$

$BC = 4 \quad CB' = 6$

$\boxed{AC + A'C = 10\sqrt{5}}$

$AC = \sqrt{8^2 + 4^2} = \sqrt{80} = 4\sqrt{5} \quad A'C = \sqrt{6^2 + 12^2} = \sqrt{180} = 6\sqrt{5}$