

# FAMAT State 2002 Geometry

- 1) Tangent line is perpendicular to the radius at (4,0). A negative reciprocal is used for the slope of the tangent. Radius  $0 = -4/3(4) + b$ ,  $b = 16/3$  **D**
- 2) Triangle:  $A = \frac{1}{2}bh = \frac{1}{2}x(\frac{1}{2}x\sqrt{3})$  [30,60,90 makes  $h = \frac{1}{2}x\sqrt{3}$ ] Square:  $A = S^2$ ,  $A = 1x^2$   
Hexagon: apothem is the h of triangle  $A = \frac{1}{2}(\text{perm})(\text{apothem}) = \frac{1}{2}(6x)(\frac{1}{2}x\sqrt{3})$   
Ratio is:  $\frac{1}{4}x^2\sqrt{3} : 1x^2 : (\frac{6}{4})x^2\sqrt{3}$  multiply by 4 to get answer **B**
- 3) Draw a line parallel to the horizontals at the center intersection and Alternate Interior angles are equal  $80+60=140$  **A**
- 4)  $3,4,5\Delta$ ; (exterior portion)(total) = (exterior portion)(total)  $(1)(7) = (x)(5)$   $x = 7/5$  **C**
- 5)  $3,4,5\Delta$ ;  $\cos = \text{Adjacent} / \text{hypotenuse}$  therefore  $3/5$  **B**
- 6) Regular octagon's interior angles = 135.  $\angle ELA = 135$  An isosceles  $\Delta$  is made when drawing in line segment EA.  $135 + 2x = 180$   $x = 22.5$   
 $m\angle LAT - m\angle LAE = m\angle EAT$  thus  $135 - 22.5 = 112.50$  **B**
- 7)  $IR/RL = BO/YO$  substituting  $1/4 = 6/x$   $x = 24$   $IR/YO = 1/24$  **B**
- 8) 2 is  $4/7$ th the way between 10 and -4 (x coordinate)  
3 is  $4/7$ th the way between -9 and -12 (y coordinate) Answer (2,3) **A**
- 9)  $|xy|$  the line  $y=x$  creates a 45 angle with all axis.  $|(3\sqrt{2})(3\sqrt{2})| = 18$  **D**
- 10) A  $7 \cdot 3.5 = \text{not integer}$  B  $10 \cdot 5 = 50$  zero is not positive  
C  $12 \cdot 6 = 72$  2 is a positive integer D  $14 \cdot 7 = 98$  8 is not prime **C**
- 11) All titles by definition and drawing **B**
- 12) 81 squares makes 41 dark & 40 light squares. The ratio is  $41/40 = 1.025$  **C**
- 13) Interior angle =  $180(n-2)/n$   $15 = n$  thus  $(15)(13 \text{ cm}) = 195 \text{ cm}$  **B**
- 14) Midseg =  $\frac{1}{2}$  parallel base in  $\Delta$ .  $7 = \frac{1}{2}(14)$ . Area of a  $\Delta = \frac{1}{2}(14)(14) = 98$  **D**
- 15) The altitude from A uses (10,8) and a negative reciprocal slope to that of the opposite side B(-4, -12) C(6,-8) thus  $(-5/2) y = mx + b$   $(8) = -5/2(10) + b$   $b = 33$   
Altitude B uses point (-4,-12) and A(10,8) C(6,-8) thus  $-12 = -1/4(-4) = b$   $b = -11$   
Altitude C uses (6,-18) & B(-4,-12) A(10,8) thus  $-8 = -7/10(6) + b$   $b = -3.88$  **A**
- 16) **B**
- 17)  $[1.20(3)](1 - .20) = (3.6) .80 = 2.88$  **A**
- 18) **B** Medians
- 19) Outer half + outer half + two(distance apart)  
 $2\pi r = 2(60)$  thus  $2\pi(8) + 120$  answer  $16\pi + 120$  **B**
- 20)  $\Delta = 180$ . The sum of their vertical pairs is 180. Each intersection is 360 and there are 3 intersections = 1080. 360 are unmarked  $\angle$ , 720 are marked  $\angle$ s. **C**
- 21) If  $r < 2$  then A. If  $r = 2$  then A & C. If  $r > 2$  then C. Not Determined **D**
- 22) Large  $p = 4s$  thus  $\frac{1}{4} = s$ . half of  $\frac{1}{4} = 1/8$ . Side of smaller is  $1/8$ .  $p = 4(1/8)$  **D**
- 23)  $12^2 = 4^2 + x^2$  thus  $x = 8\sqrt{2}$  Double  $x = \text{length of the chord}$ .  $16\sqrt{2}$  **B**
- 24)  $9/x = x/4$  G.M.  $x = 6$  A.M.  $(9+4)/2 = 6.5$  difference  $6.5 - 6 = .5$  **C**
- 25)  $\text{Supp} = 4(\text{compl})$  thus  $(180 - x) = 4(90 - x)$   $x = 60$  **A**
- 26) Total surface of a square is  $6(\text{face}) = 6(100) = 600$  **D**
- 27) Can not be determined **D** 28) Time 1:35 plus 15 minutes equals 1:50 **A**
- 29)  $48 + 32 + 2x = 180$  thus  $x = 50$  **C**
- 30)  $4x + 9x + 12x + 15x = 360$  thus  $x = 9$  and  $4(9)^2 = 324$  **A**

