MATH 108 Sochacki Exam 1

Sept. 27, 2013   In Class Part 75 Points

Name ___Key West___

(Print) (1 point)

All necessary work must be shown for credit. You may NOT use calculators, computers, notes or texts. You may use your Pascal triangle.

I have neither received nor given help on this exam. ___Don Key___

(Signature) (2 points)

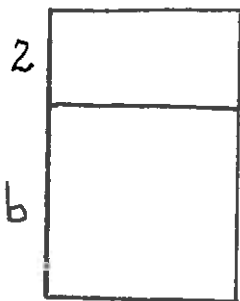1. Give the first seven numbers in the Fibonacci sequence. (6 points)

1
1
2
3
5
8
13

2. Simplify the following expression $2\varphi^2 - (\varphi+1)^2$ and give an answer with no exponents on φ. (6 points)

$$\varphi^2 = \varphi + 1 \qquad (\varphi+1)^2 = \varphi^2 + 2\varphi + 1$$

$$2\varphi^2 - (\varphi+1)^2 = 2(\varphi+1) - (\varphi^2 + 2\varphi + 1)$$

$$= 2\varphi + 2 - (\varphi + 1 + 2\varphi + 1)$$

$$= 2\varphi + 2 - 3\varphi - 2$$

$$= -\varphi$$

3. Give b so that the rectangle is a golden rectangle. (6 points)

$$\frac{b}{2} = \varphi$$

$$b = 2\varphi$$

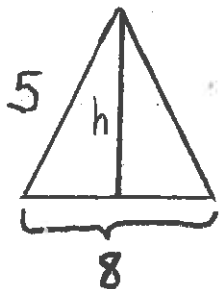4. Give the sum $1+2+3+4+5+6+\ldots+75$. (6 points)

$$\frac{75(75+1)}{2}$$

$$= 75 \cdot 38$$

$$= 2850$$

5. What is 11^7? (6 points)

Pascal: $\quad 1 \quad 7 \quad 21 \quad 35 \quad 35 \quad 21 \quad 7 \quad 1$

$\quad 1 \quad 9, 4 \quad 8 \quad 7, 1 \quad 7 \quad 1$

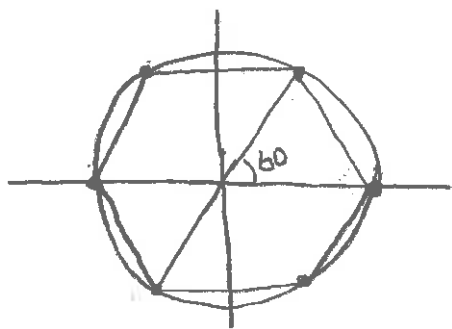6. Give the area of the isosceles triangle below. (6 points)

$$h^2 + 4^2 = 5^2$$

$$h^2 = 9$$

$$h = 3$$

$$\text{area} = \frac{1}{2}bh = \frac{1}{2} \cdot 8 \cdot 3 = 12$$

7. Draw a hexagon. Give the sum of the interior angles. Draw a line segment connecting any two opposite vertices. Show this last figure satisfies the vertex, edge, face equation. (9 points)
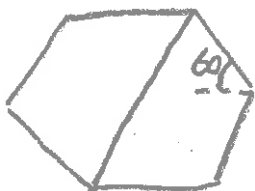

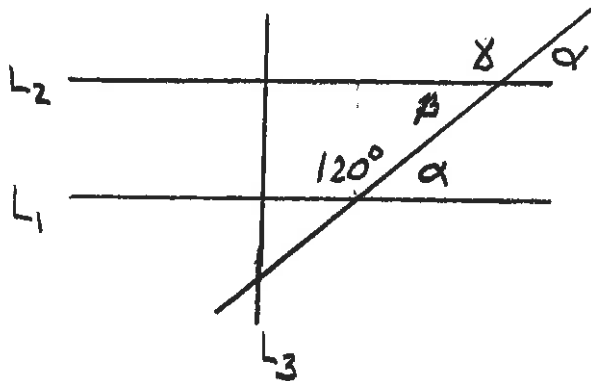$$\text{Sum} = 12 \cdot 60 = 720$$

$$\text{faces} = 3$$
$$\text{vertices} = 6$$
$$\text{edges} = 7$$

$$V + F = 9 = E + 2$$

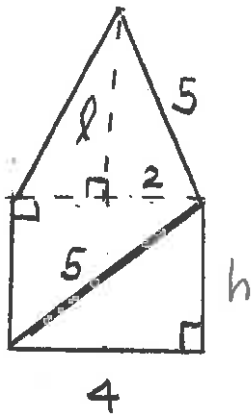8. Give the angles α, β, γ in the following picture. (9 points)

$$120 + \alpha = 180 \implies \alpha = 60$$

$$\beta = 60$$

$$\gamma = 120$$

9. Give the area of the following figure. (9 points)

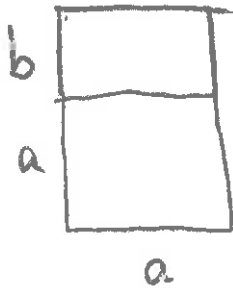$$4^2 + h^2 = 5^2 \qquad \ell^2 + 2^2 = 5^2 \qquad Area = 4 \cdot 3 + 2\sqrt{21}$$

$$h = 3 \qquad \ell^2 = 21$$

$$\ell = \sqrt{21}$$

10. Draw a figure to show whether or not $a(a+b) = a^2 + ab$. (9 points)

$$area = a(a+b)$$

$$area = a^2 + ab$$

Bonus Point Question: Write a sentence on what Benjamin Franklin thought about educators.