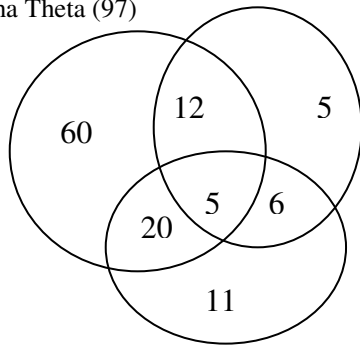


- 1)  $f(-1) = 10, g(7) = -14, g(2) = 1, h(1) = -2, f(3) = 6,$  and  $g(6) = -11$ ; so  
 $f(-1) + g(7) - h(g(2)) + g(f(3)) = 10 + -14 - -2 + -11 = \mathbf{-13}$
- 2)  $-12 * 3 = -6$  and  $5 * -6 = -45$ ;  $4 \odot 3 = 7$  and  $8 \odot 7 = 15$ ;  $-45 * 15 = -135 + 150 = \mathbf{15}$
- 3) The slopes are, in order:  $\frac{2}{3} \cdot \frac{-5}{4} \cdot \frac{5}{6} \cdot \frac{-9}{5}$ , so the product is  $\frac{5}{4}$
- 4) Solving gives us:  $a = -9/2, b = 0, c = 1/2,$  and  $d = 6$ .  $2a + \frac{b}{d} - \frac{1}{c} = 2\left(\frac{-9}{2}\right) + \frac{0}{6} - \frac{1}{1/2} = -9 + 0 - 2 = \mathbf{-11}$
- 5) A: Set up with the equations  $t + u = 6$  and  $10u + t = 4(10t + u) - 9$ ; Solving gives us  $A = 15$   
 B: Set up with equations  $n + q = 30$  and  $5n + 25q = 510$ . Solving gives 12 nickels, 18 quarters, so  $B = 12$   
 C: Set up with  $N = R - 12$  and  $R + 7 + R - 12 + 7 = 60$ . Solving gives  $R = 29$  and  $N = 17$ , so next year,  $C = 18$   
 $B + C - A = 12 + 18 - 15 = \mathbf{15}$
- 6) The region defined by these inequalities is a triangle with vertices at (0,6), (-6,-6) and (8,-6). The base of this triangle is 14, the height is 12, so the area is  $\frac{1}{2} (14)(12) = \mathbf{84}$  (square units)
- 7) Solving A:  $x \leq \frac{1}{3}$  and  $x \geq -3$ , so the integers are  $\{ 0, -1, -2, -3 \}$ . Solving B:  $x < 3$  or  $x > -5/3$ , which is the integers  $\{-1, 0, 1, 2\}$ , so the sum of these integer solutions is  $\mathbf{-4}$
- 8)

Mu alpha Theta (97)



Spanish (28)

Fill in a Venn diagram starting with the intersection of all 3 sets (students who are members of all 3 clubs). Working your way out, you get the following:  
 The total number of students is **119**

Scrabble (42)

- 9) Just simplify the powers of  $a$ :  $\frac{a^{56}}{a^{30}} = a^{26}$  so the power of  $a$  is **26**
- 10) The first number is 225, the second is 2,772. Their sum is **2,997**.
- 11) The intercepts are: (0, -3), (4,0), (0,-5), (-2,0), (0,  $4\frac{1}{3}$ ), and (13,0); their sum is  **$11\frac{1}{3}$**
- 12) The first 10 prime numbers are: 2,3,5,7,11,13,17,19,23,and 29. Their sum is **129**
- 13) To solve  $3ab - 5a = 7b - 1$  for  $a$  factor out  $a$ , and solve. This gives us:  $a(3b - 5) = 7b - 1$ , so  $a = \frac{7b - 1}{3b - 5}$
- 14) A line with no slope is vertical and is of the form  $x = c$ , where  $c$  is the  $x$  coordinate of every point on the line. Therefore the equation is  **$x = 4$**
- 15) To find the least common multiple of 180 and 144, first do prime factorizations of each number:  
 $180 = 2^2 \cdot 3^2 \cdot 5$  and  $144 = 2^4 \cdot 3^2$ . The LCM is the union of these factors, so  $LCM = 2^4 \cdot 3^2 \cdot 5 = 720$ , and the sum of the digits is **9**