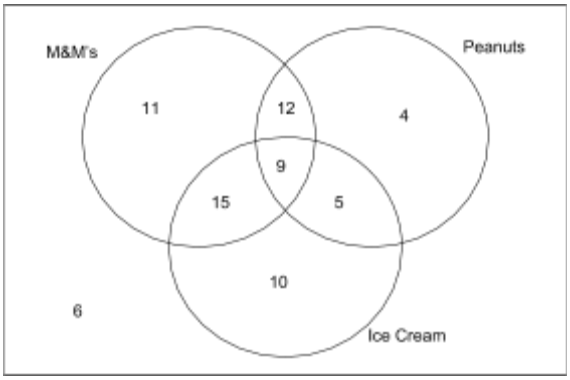
Math SL PROBLEM SET 3

Section A (Short Answer Qs)

1. **(A1.2 - R) (CI)** Solve the following equations. **(Cirrito 7.1.2, p201 & Cirrito 7.3, p220)**

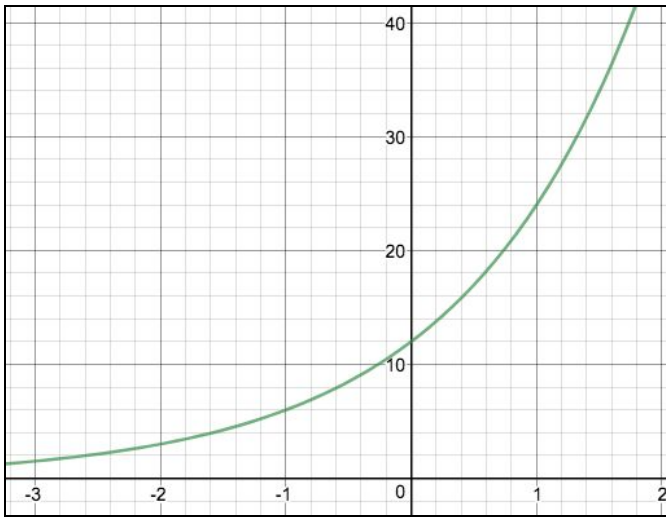
   a. $log_2 x = 4$ b. $2e^{3x} = 8$ c. $log_3 81 = x$ d. $3^{x+1} = \frac{1}{9}$

2. **(SP5.5 - R) (CI)** Students in Mr. Webb's class were sent a survey asking whether they like or dislike certain snacks. The results are pictured below. **(Oxford 3.2, p68)**



   a. How many students responded to the survey?
   b. How many student like M&M's and peanuts?
   c. What is the probability that a randomly selected student likes only ice cream?
   d. What is the probability that a randomly selected student likes all three snacks, given that her or she likes peanuts?
   e. What is the probability that a randomly selected student likes only M&M's, given that he or she does NOT like ice cream?

3. **(F2.6 - R) (CI)** Here is a graph of the function $f(x) = a * b^x$. **(Cirrito 5.3.3, p131)**



   a. Explain how you know $a = 12$.
   b. Explain how you know $b = 2$.
   c. Write the asymptote(s) of this function.
   d. State the domain and range of this function.

   Mr. Rawlings writes a new function $g(x) = 30 - 6(2^x)$

   e. List the transformations that Mr. Rawlings made to go from $f(x)$ to $g(x)$.
   f. Sketch the graph of $g(x)$.

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4. **(Pre S - R) (CI)** Given the equation $\frac{x}{3} + \frac{y}{6} = 1$. **(Cirrito 2.3, p28)**

   a. Rewrite this equation in function form, call this function $g(x)$.
   b. Hence, write the slope of $g(x)$.

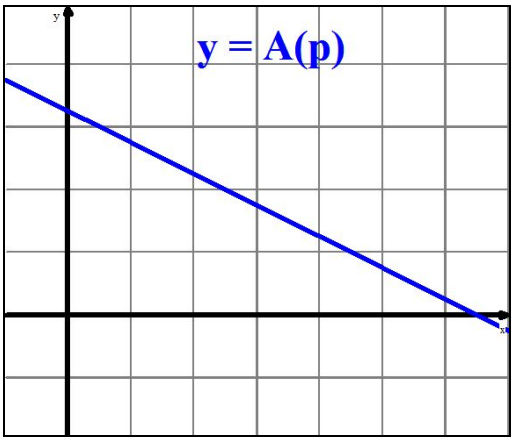
   Now consider the function $f(x) = 2(x + 1)$.

   c. Write down the x-intercept of $f(x)$.
   d. Solve $f(x) = g(x)$.
   e. Are $f(x)$ and $g(x)$ perpendicular to each other? Why/Why not?

5. **(Pre S - R, F2.8) (CI)** CAC's STUCO is selling hot chocolate as a fund raising activity this winter. The equation $A(p) = \frac{26-2p}{4}$ relates the price of a cup of hot chocolate, p, to the number of cups, A, that people will buy (in hundreds) at that given price. **(Cirrito 5.3.1, p122)**

   For example, if the price is 8 LE then $A(8) = \frac{26-2(8)}{4} = 2.5$ (actually 2.50 x 100 = 250 which is the number of cups people will buy at that price of 8 LE.)

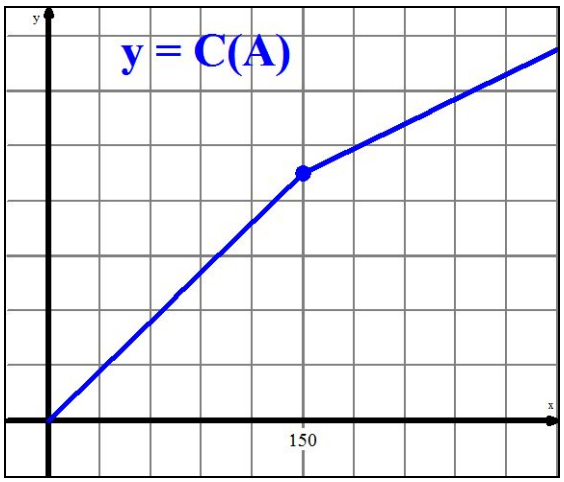
   a. Evaluate and interpret $A(10)$.
   b. Explain why the function has a negative slope.
   c. What is the y-intercept of this function and what does it represent?
   d. State the domain and range of this function, giving reasons for your domain and range.



Here is a graph of the price function for hot chocolate. The cost for supplies is modeled by the piecewise function, where C is the cost in LE and A is the number of cups sold.

$$C(A) = \begin{cases} 6A & \text{if } A \leq 150 \\ 3A + 450 & \text{if } A > 150 \end{cases}$$

Here is a graph of the cost function.



   e. Give one reason the slope of the cost function might change at $A = 150$.
   f. Evaluate and interpret $C(100)$ and $C(250)$.
   g. Determine the profit that STUCO makes if the price of hot chocolate is 9 LE.