Math SL PROBLEM SET 27

Section A (Short Answer)

1. (**A1.3 - N**) (**CA**) For the following binomial distributions find, *(Cirrito 4.1, p95)*

    a. The coefficient of the x^6 term in the expansion of $(2x - 3)^9$.
    b. The coefficient of the x^3 term in the expansion of $(3x - 1)^7$.

2. (**SP5.6 - R**) (**CI**) You are given two events, A and B where $P(A|B) = 0.30$, $P(B|A) = 0.60$ and $P(A \cap B) = 0.18$ *(Cirrito 15.2, p508)*

    a. Find $P(A)$
    b. Are events A and B independent? Why/why not?
    c. Find $P(B \cap A')$

3. (**A1.3 - N**) (**CI**) Use the binomial theorem to determine: *(Cirrito 4.1, p95)*

    a. The coefficient of the term containing x^3 in the expansion of $(2x - 5)^5$.
    b. The coefficient of the term independent of x in $(4x^3 - \frac{2}{x^2})^5$.

4. (**SP5.6 - R**) (**CI**) A and B are two events such that $p(A) = 0.30$, $p(B) = 0.5$ and $p(A \cup B) = 0.55$. *(Cirrito 15.3.2, p512)*

    a. Draw a Venn diagram for this problem, given this information (you may have to calculate a few things first however ......
    b. Hence or otherwise, find the probability of the following events:
       i. $A | B$ ii. $B | A$ iii. $A | B$ `               iv. $A$ ` | B `
    c. Are the events A and B dependent or independent? Explain why/why not.

5. (**A1.1 - E**) (**CA**) Given the sequence 45, -30, 20, $-\frac{40}{3}$, ... *(Cirrito 8.2.4, p263)*

    a. Find the 8th term
    b. Find the sum of the first 8 terms
    c. Find the sum of an infinite number of terms of this sequence

6. (**V4.1 - N**) The following 2 questions deal with vectors. *(Cirrito 12.3, p415)*

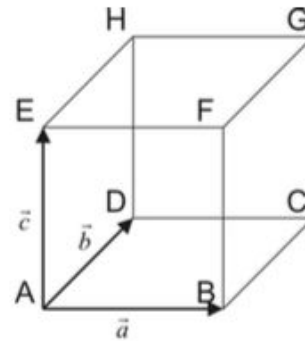   Use the following diagram to compute and draw the required resultant vectors:

         i. $a + b + c$
        ii. $b + 2c + d$
      iii. $a + 3c - 2d$
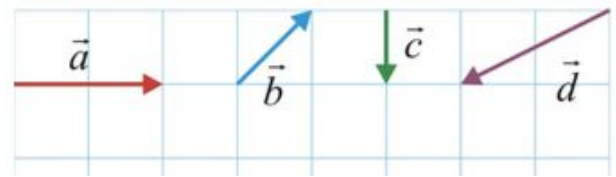
   Section B (Extended Response/Investigation)

7. A cube is constructed from three vectors, **a** and **b** and **c**   as shown on the figure. Express, in terms of vectors **a**, **b**, and **c** :

   a. *AF*
   b. *CF*
   c. *AG*
   d. *BH*

8. (**A1.1 - E**) (**CA**) Omar and Mohamed begin a training program. In the first week, Mohamed will run 10 km, in the second week, he will run 11.5 km and in the third week 13 km and so on, in an arithmetic progression. Omar will run 5 km in the first week and will increase his distance by 20% in each succeeding week. *(Cirrito 8.2.3, p261)*

   a. In which week does Omar's weekly distance first exceed Mohamed's?
   b. In with week does Omar's total distance first exceed Mohamed's?