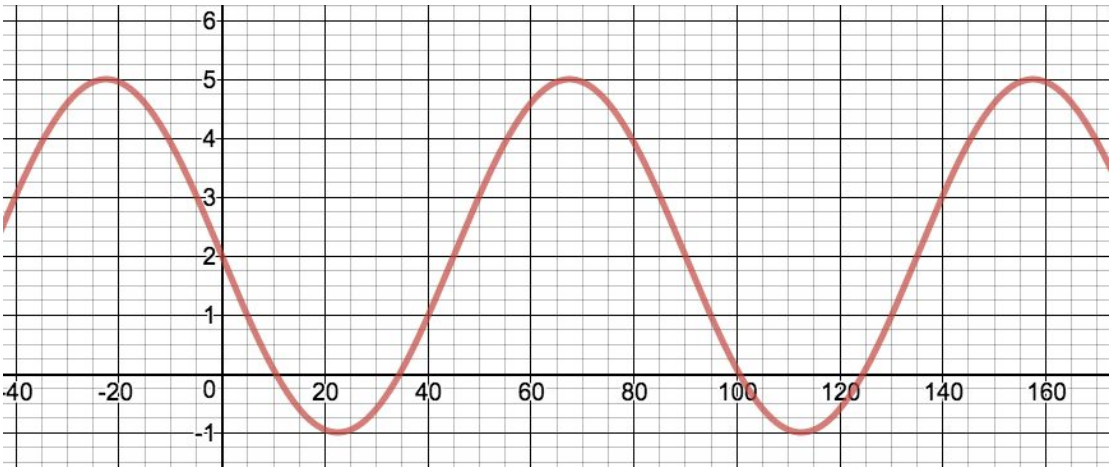
Math SL PROBLEM SET 2

Section A

1. (**T3.4, 3.5 - R**) (CI) Given the graph of the following sinusoidal function, $g(x) = A\sin(kx) + D$: ***(Cirrito 10.3.2, p340)***

    a. Determine the values of A, k and D.

    b. Given the domain of $0° < x < 90°$, determine the interval in which this sinusoidal function is increasing.



2. (**SP5.5 - R**) (CI) A bag contains 6 red disks, 4 blue disks and 5 green disks. A fair dice has 4 faces painted red and the other 2 faces painted blue. Lisa takes a disk at random from the bag and records its colour. Lisa then throws the dice twice and each time records the colour of the face it lands on. Use a tree diagram to work out the probability that, of the three colours Lisa records, exactly two are the same. ***(Oxford 3.5, p89)***

3. (**F2.6 , 2.8, T1.1 - R**) (CA) Mr. S has invested $5,000 in an investment earning 6% compounded monthly. Mr. D has invested $8,000 in an investment earning a fixed, constant return of $40 per month. ***(Cirrito 7.2, p209)***

    a. Write down the value of both of these investments after 4 years. Which investment earned the most interest?

    b. Which investment reaches a value of $15,000 first?

    c. When does the value of Mr. S's investment first exceed that of Mr. D?

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4. (**V4.1, 4.3 - N**) (CI) A bug lands on a piece of graph paper at the point (2,-5) and its movement from this starting point is described by the following set of instructions: ***(Cirrito 12.7.1, p444)***

   - Starting from an x value of 2, the subsequent x values will increase by 3 units every second.
   - Starting from a y value of -5, the subsequent y values will increase by 2 units every second.

   a. Create a data table, showing the bugs position every second for the first 6 seconds.
   b. Graph the data points, showing the bug's path across the graph paper.
   c. Explain what the equation $(x,y) = (2,-5) + t(3,2)$ means in this context.
   d. How far did the bug travel in these 6 seconds?
   e. What was the bug's average speed in these 6 seconds?

5. (**A1.3, SP5.6 - R**) (CA) You are asked to make a 4 character secret password which consists of numbers and letters. For example, you could make the password MATH or IM3R or 1345. ***(Cirrito p14.1.2, p491)***

   a. How many unique passwords are possible if you MUST use one number and NO repetition?
   b. How probable is it that a password contains a vowel if you MUST use one number and NO repetition?

6. (**F2.7 - R**) (CA) You are given two linear functions. One linear function is $y - 5 = -\frac{4}{5}(x + 2)$ and the second linear function is $\frac{x}{7} - \frac{y}{M} = 1$, where M is a constant. ***(Cirrito 2.2, p21)***

   a. For the function $\frac{x}{7} - \frac{y}{M} = 1$, let $M = 3$, so the equation now becomes $\frac{x}{7} - \frac{y}{3} = 1$. Determine the point where this line intersects the line $y - 5 = -\frac{4}{5}(x + 2)$. Show the work leading to your answer.
   b. Determine a value for M in the equation for which the system has no solution. Show the work leading to your answer.

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7. (**T5.5, T5.6 - R**) (CA) Isabel goes to school by one of two routes, A or B. The probability of going by route A is 38%. If she goes by route A, the probability of being late is 12% and if she goes by route B, the probability of being late is 20%. ***(Oxford 3.5, p89)***

    a. Complete a tree diagram, showing the possible outcomes and their probabilities.
    b. Find the probability that Isabel is late for school.
    c. Given that she is late, find the probability that she went to school using route A.
    d. How probable is it that she is late on three consecutive days, if the being late on consecutive days is an example of **independent events**?