HOLIDAYS HOMEWORK 2015
FORM 5 BUDIMAN

1 Given that function $g : x \to 3x - h$ and $g^{-1} : x \to 2kx - \frac{5}{9}$, where h and k are constants. Find the values of h and k. [4 marks]

2. Differentiate $4x^2(2x-5)^3$ with respect to x. Simplify your answer. [4 marks]

3. Given that $\int_{-1}^{k}(2x-5)\,dx = 8$, and $k > -1$, find the value of k. [3 marks]

4. A particle moves along a straight path with a displacement, s *m* from a fixed point O is given as $s = \frac{t^3}{3} - \frac{9t^2}{2} + 18t$, where t is the time in seconds after leaving O. Find
   a) the initial velocity and acceleration.
   b) the minimum velocity achieved by the particle
   c) the range of values of t when the velocity is negative
   d) the total distance traveled by the particle from t = 1*s* to t = 4*s* [10 marks]

5. a) ***Diagram 1*** shows a curve $y = 6x - x^2$ intersect the straight line $2x + y = 12$ at points A and B. Find
      i) the coordinates of A and B.
      ii) the area of the shaded region. [4 marks]

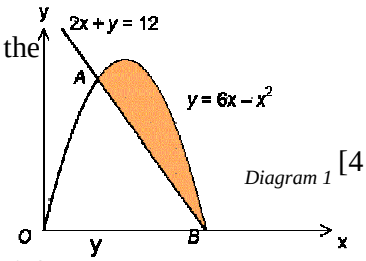

Diagram 1

   b) ***Diagram 2*** shows the region bounded by the curve $y^2 = 7x$, $y = k$ and the $y-axis$. When the region is rotated through 360° about the y-axis, the volume generated is $\frac{243\pi}{245}\ unit^3$. Find the value of k. [3 marks]

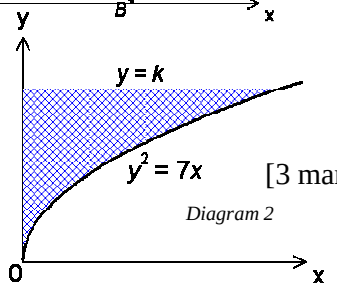

Diagram 2

6. A particle moves in a straight line passes through a fixed point O with a velocity of 12 *m/s*. Its acceleration, $a\ ms^{-2}$, t seconds after passing through O is given by $a = 12t - 18$.
   a) Determine the velocity function and displacement function of the particle [3 marks]
   b) Find the values of t when the particle is momentarily at rest. [2 marks]
   c) Find its displacement when it is momentarily at rest [2 marks]
   d) Calculate the total distance traveled from t = 0 until it is at rest for the second time. [3 marks]

7 ***Diagram 3*** shows that $\overrightarrow{AB} = 5\underset{\sim}{i} + 3\underset{\sim}{j}$, $\overrightarrow{AC} = 2\underset{\sim}{i} + 9\underset{\sim}{j}$ and M is a point on the line CB such that CM: MB = 1: 2.
Find $\overrightarrow{AP}$ in terms of $\underset{\sim}{i} + \underset{\sim}{j}$. [3 marks]

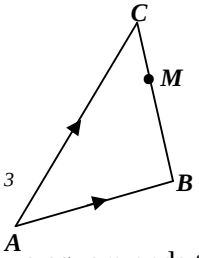

Diagram 3

8. Is it possible to construct an aquarium with a glass top and two square ends that holds 16 m^3 of water and requires 40 m^2 of glass for its construction? If yes, what should be the dimension of the aquarium? From the solutions, what do you think should be a probable one?
[3.12 *m* by 3.12 *m* by 1.64 *m* (approximately) or 2*m* by 2*m* by 4 *m*]
[10 marks]