BECA / Huson / 12.1 IB Math SL Name:
9 November 2018

Homework: IB Differential calculus exam problems

1. In an arithmetic sequence, $S_{40} = 1900$ and $u_{40} = 106$. Find the value of u_1 and of d.

2. Let $f(x) = cos2x$ and $g(x) = ln(3x - 5)$.

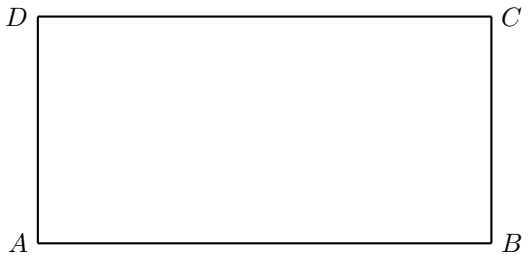
   (a) Find $f'(x)$.

   (b) Find $g'(x)$.

   (c) Let $h(x) = f(x) \times g(x)$. Find $h'(x)$.

3. Consider the curve with equation $f(x) = px^2 + qx$, where p and q are constants. The point A(1, 3) lies on the curve. The tangent to the curve at A has gradient 8. Find the value of p and of q.

4. A farmer wishes to create a rectangular enclosure, ABCD, of area 525 m^2, as shown below.



   The fencing used for side AB costs \$11 per metre. The fencing for the other three sides costs \$3 per metre. The farmer creates an enclosure so that the cost is a minimum. Find this minimum cost.

5. Let $f(x) = 5cos\frac{\pi}{4}x$ and $g(x) = -0.5x^2 + 5x - 8$, for $0 \leq x \leq 9$.

(a) On the same diagram, sketch the graphs of f and g.

(b) Consider the graph of f . Write down

i. the x-intercept that lies between $x = 0$ and $x = 3$;

ii. the period;

iii. the amplitude.

(c) Consider the graph of g. Write down

i. the two x-intercepts;

ii. the equation of the axis of symmetry.