BECA / Huson / 12.1 IB Math SL Name:
31 October 2017

Homework: Vectors, review of calculus and logarithms

Complete these problems on loose leaf paper.

1. Let the vector $\mathbf{v} = 3\mathbf{i} + 2\mathbf{j} - 5\mathbf{k}$.
   (a) Write down $\mathbf{v}$ as a column vector.
   (b) Find $|\mathbf{v}|$.
2. Let the vector $\mathbf{v} = \begin{pmatrix} 5 \\ -2 \\ 1 \end{pmatrix}$
   (a) Write down $\mathbf{v}$ in unit vector form.
   (b) Find $|\mathbf{v}|$.
3. The two vectors $\mathbf{r} = \begin{pmatrix} 6 \\ -3 \\ 2 \end{pmatrix}$ and $\mathbf{s} = \begin{pmatrix} 9 \\ k \\ 3 \end{pmatrix}$ are parallel. Find k.
4. Let $f(x) = \dfrac{2x}{x^2 - 5}$. Use the quotient rule to show that $f'(x) = \dfrac{-2x^2 - 10}{(x^2 - 5)^2}$.
5. Let $f(x) = \dfrac{g(x)}{h(x)}$, with $g(2) = 18$, $h(2) = 6$, $g'(2) = 5$, and $h'(2) = 2$. Find the equation of the normal to the graph of f at $x = 2$.
6. Consider a geometric sequence where the first term is 768 and the second term is 576. Find the least value of n such that the n^{th} term of the sequence is less than 7.