Question 1: The function $f(x) = xe^{2x}$

a) is increasing on $(-1, +\infty)$.

b) is increasing on $(-\infty, -\frac{1}{2})$.

c) has a local maximum at $x = -\frac{1}{2}$.

d) has a local minimum at $x = -1$.

e) is increasing on $(-\frac{1}{2}, +\infty)$.

Question 2: If $M$ and $m$ are respectively the absolute maximum and absolute minimum values of the function $f(x) = 2 - |x|$ on $[-1, 3]$, then $2M - m = $

a) $-4$.

b) $5$.

c) $2$.

d) $6$.

e) $-3$. 

Question 3:  If $f(-1) = 3$ and $f'(x) = 0$ for all $x$. Then $f(2x) =$

a) $-1$.

b) $0$.

c) $1$.

d) $2$.

e) $3$.

Question 4:  \[ \lim_{x \to -\infty} \left( \frac{3x + e^{2x}}{2x + e^{3x}} \right) = \]

a) $0$.

b) $\frac{2}{3}$.

c) $\frac{1}{2}$.

d) $\frac{3}{2}$.

e) $1$. 
Question 5: Sketch the graph of the function $f(x) = 2x^3 - x^4$ showing all your work.
Question 6: If the point \((a, b)\) on the line \(y + 3x = 3\) is the closest to the origin, then \(a + 2b = \ldots\) (show your work)