Delta-Epsilon Worksheet #1

PLEASE WRITE SOLUTIONS ON SEPARATE PAPER!!!

In 1-5, use the definition of a limit to prove each limit.

1. $\lim_{x\to\infty} \frac{x}{x-1} = 1$

2. $\lim_{x\to\infty} \frac{2x}{2x+3} = 1$

3. $\lim_{x\to\infty} \frac{x^2-1}{x^2+1} = 1$

4. $\lim_{x\to-\infty} \frac{8x+3}{2x-1} = 4$

5. Prove that $\lim_{x\to\infty} \left(x^2-4\right) = \infty$ by showing that for any $N > 0$ there exists an $M > 0$ such that if $x > M$, then $x^2 - 4 > N$.

6. Give a definition for $\lim_{x\to-\infty} f(x) = -\infty$.

7. Prove that $\lim_{x\to\infty} \left(6-x-x^2\right) = -\infty$. (Hint: You need to give a definition for $\lim_{x\to\infty} f(x) = -\infty$ similar to what you gave in problem 6.)

Delta-Epsilon Worksheet #2

PLEASE WRITE SOLUTIONS ON SEPARATE PAPER!!!

In 1-6, use the definition of a limit to prove each limit.

1. $\lim_{x\to 5}(3x-4)=11$

2. $\lim_{x\to -2}\left(x^2+3x+6\right)=4$

3. $\lim_{n\to\infty}\dfrac{4n}{2n-3}=2$

4. $\lim_{x\to -\infty}\dfrac{3x+5}{2x}=\dfrac{3}{2}$

5. $\lim_{x\to 2^+}\dfrac{4}{x-2}=\infty$

6. $\lim_{n\to\infty}(3n-4)=\infty$