Homework Set 2 - $\{1, 2, 3, 4, 5\}$

Use an $\epsilon - \delta$ proof to prove that $\lim\limits_{x \to 5} (2x + 5) = 15$.

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Use an $\epsilon - \delta$ proof to prove that $\lim\limits_{x \to -5} (-2x - 20) = -10.$

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Use an $\epsilon - \delta$ proof to prove that $\lim\limits_{x \to 0} x^2 \sin \frac{1}{x} = 0$.

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Use an $\epsilon - \delta$ proof to prove that $\lim\limits_{x \to \pi} \left(x^2 - 2\pi x\right) = -\pi^2.$

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Prove that if $f(x) = 1$ for rational x, and if $f(x) = 0$ for irrational x, then $\lim_{x \to a} f(x)$ does not exist for any a.

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