1. Review

    (a) $\forall n \in \mathbb{N}, 2n^2 - n \geq 1$

    (b) $\exists n \in \mathbb{N}, 2n^2 - n > 10$

2. For each statement below, write it using universal and/or existential quantifiers. Then determine their truth values

    (a) Every integer is a rational number.

    (b) There are rational numbers whose square is rational.

    (c) $a = \sqrt{a^2}$ for all real numbers

(d) There are squares with integer values for the sides and the diagonals.

(e) Every integer that is not positive must be negative.

(f) For every real number a, there is some quadratic polynomial $p(x)$ where a is a root of $p(x)$.

(g) For every quadratic polynomial $p(x)$, there is some real number a, where a is a root of $p(x)$.

(h) If $r \in \mathbb{R}$, then $f(x) = \frac{x+r}{x^2+r^3}$ is continuous on $\mathbb{R}$.

(i) If $f : \mathbb{R} \to \mathbb{R}$ has a horizontal asymptote, then at least one of the limits $\lim_{x\to\infty} f(x)$ or $\lim_{x\to-\infty} f(x)$ is defined.