

Student Name: Key

Student Number: \_\_\_\_\_

1. State the Archimedean Principle.

If  $x \in \mathbb{R}$ , then  $\exists$  a natural  $\# n_x$  s.t.  $x < n_x$

or you can write the "form" from the book, both are correct.

2. Let  $t$  be a positive real number, show that  $\exists n_t \in \mathbb{N}$  such that  $0 < \frac{1}{n_t} < t$ . Justify each step.

Consider the real  $\# \frac{1}{t}$ , by the Arch. Principle,  $\exists$  a natural  $\# n_t$  s.t.  $\frac{1}{t} < n_t$

$n_t > 0$  since  $n_t \in \mathbb{N}$  (or since  $t > 0 \Rightarrow \frac{1}{t} > 0 \Rightarrow n_t > 0$ )

$\Rightarrow \frac{1}{n_t} < t$ , also  $\frac{1}{n_t} > 0$  since  $n_t > 0$ .

$\Rightarrow 0 < \frac{1}{n_t} < t$ .