

QUIZ 2 SOLUTIONS

$$P' = 0.017 P$$

$P(t)$:= size of a population

- (a) The name "population growth model" is appropriate since, for any positive value $P(t)$, $P'(t)$ will also be positive. This indicates that the population size is increasing.
- (b) The rate of change with respect to time, of the population $P(t)$, is directly proportional to the population size at time t . The constant of proportionality is equal to 0.017.
- (c) Assumptions upon which the model is based include: (but are not limited to)
- Reproduction/growth is continuous.
 - Growth rate is constant.
 - Population size is not (explicitly) affected by death, migration, catastrophes, etc.
- (d) Because the population size is always increasing, the model suggests the population will grow infinitely large. This is very unrealistic.
- (e) $P(t)$ must be an exponential function since its derivative is equal to a constant multiplied by itself.