



## Vocabulary: Exponential Growth and Decay



### Vocabulary

- **Exponential decay** – a relationship in which a quantity decreases (decays) by a fixed percent each time period.

- An exponential decay function can be written in the form  $y = C(1 + r)^t$ , where  $C \neq 0$  and  $r < 0$ .

- $C$  is the *initial value* ( $y$ -value when  $t = 0$ ) and  $r$  is the *rate of change* of the function.
- For example,  $y = 5(1 - 0.20)^t$ , graphed to the right, is an exponential decay function.
  - $C = 5$ , so the initial value (and  $y$ -intercept) of this function is 5.
  - $r = -0.2$ , or  $-20\%$ , so each time  $x$  increases by 1,  $y$  loses 20% of its value (or, retains 80%).



- **Exponential growth** – a relationship in which a quantity increases (grows) by a fixed percent each time period.

- An exponential growth function can be written in the form  $y = C(1 + r)^t$ , where  $C \neq 0$  and  $r > 0$ .

- For example,  $y = 5(1 + 0.20)^t$ , graphed to the right, is an exponential growth function.
  - $C = 5$ , so the initial value (and  $y$ -intercept) of this function is 5.
  - $r = 0.2$ , or  $20\%$ , so each time  $x$  increases by 1,  $y$  gains 20% of its value.

