

## 8.5-8.6 Exponential Growth and Decay

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rate given as %  
change to decimal

Growth

$$y = C(1+r)^t$$

initial amt.  $\nearrow$

$\uparrow$  time

Decay

$$y = C(1-r)^t$$

$(1+r)$ Growth Factor $1+r > 1$	$(1-r)$ Decay Factor $0 < 1-r < 1$
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ex 1 You deposit \$500 at 8% interest for 6 yrs. Find the balance.

$$y = C(1+r)^t$$

$$= 500(1+.08)^6$$

Step 1:

$$(1+.08) = 1.08 \quad \text{Parentheses}$$

Step 2:

$$(1.08)^6 \text{ or } 1.6 \quad \text{exponent}$$

$$\underline{\underline{1.5868}}$$

Step 3:

$$1.5868 (500) \quad \text{multiply}$$

$$\underline{\underline{793.437}}$$

\$793.44 Final Answer

ex-2 A baby catfish weighs .3 grams. During the first six weeks of life, it grows 10% each day.

a) Write a model.

$$y = C(1+r)^t$$

$$y = .3(1+.1)^t$$

(Plug All  
#s in  
but t)

$$y = .3(1.1)^t$$

b) How much does it weigh in 6 wks?

change 6 wks to days  
 $6 \cdot 7 = 42 = t$

$$y = .3(1.1)^{42}$$

16.4g

Ex. 3 You bought a car for \$18,000. The value depreciates every yr. at a rate of 12%.

a) write a model

$$y = C(1-r)^t$$

$$y = 18,000(1-.12)^t$$

$$y = 18,000(.88)^t$$

b) Estimate the value in 8 yrs.

$$y = 18,000(.88)^8$$

6473.421  
 \$6473.42

## Quiz

In 1995, you buy a baseball card for \$50 that will increase in value by 5% each year for 10 years.

- a) Write a model.
- b) How much is the card worth in 2002?
- c) what is the growth/decay factor?