

Exponential Growth and Decay Models Notes

Coach
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Name _____

Date _____

Exponential **GROWTH** can be modeled
by the formula

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

Exponential **DECAY** can be modeled
by the formula

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

y = the ending amount (also called balance)a = the starting amount (also called deposit)r = the interest rate (must be written as a decimal)t = the time (typically in years, but depends on the problem)Write a model and solve for the starting/ending value. Round answers appropriately.EX 1: You deposit \$1500 into an account that pays 6.2% interest. What will the balance be after 5 years?

a

 $\frac{6.2}{100}$
 $r = .062$

y?

t

$$y = 1500(1 + .062)^5 = \boxed{2026.35}$$

a

EX 2: Eight students returned to school today with the flu virus. If the virus is expect to spread at a rate of 11% each day, how many students will be affected after one week? $\frac{11}{100}$
 $r = .11$

t = 7

$$y = 8(1 + .11)^7 = 16.6 = \boxed{17 \text{ students}}$$

a

decay

EX 3: You purchased a car in 2010 for \$22,000 which is given to have an annual depreciation rate of 9.4%. Approximate the resale value of the car today. $\frac{9.4}{100}$
 $.094 = r$

t = 2020 - 2010

t = 10

y?

$$y = 22000(1 - .094)^{10} = \boxed{8197.94}$$

2020 - 1960 = 60

.045 = r

EX 4: Your grandparents purchased an acre of land in 1960 which has appreciated at a rate of 4.5% each year. The land is worth \$2,458.43 today, how much did they originally purchase the land for?

a?

divide

$$a = \boxed{175.26}$$

$$2458.43 = \frac{a(1 + .045)^{60}}{(1 + .045)^{60}}$$