Monday 1/27

Identify the y-intercept, asymptote and state the domain and range.

1. $y = 2^x + 2$

y-int: (0,3)

asymptote: $y=2$

Domain: $-\infty < x < \infty$

Range: $y > 2$

$2 < y < \infty$

2. $y = 2(3)^x$

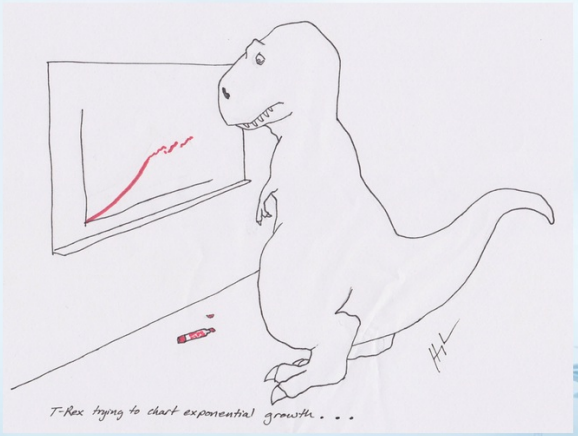
y-int: (0,2)

asymptote: $y=0$

Domain: $-\infty < x < \infty$

Range: $y > 0$

Exponential Growth vs. Decay



Exponential Growth

$$y = ab^x$$

initial value — common ratio

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

y = final amount
a = initial amount
r = rate of growth (decimal)
t = time

The original value of a painting is $1400 and the value increases by 9% each year. Write an exponential growth function to model this situation. Then, find the value of the painting in 5 years.

$a = 1400$

$r = .09$

$t = 5$

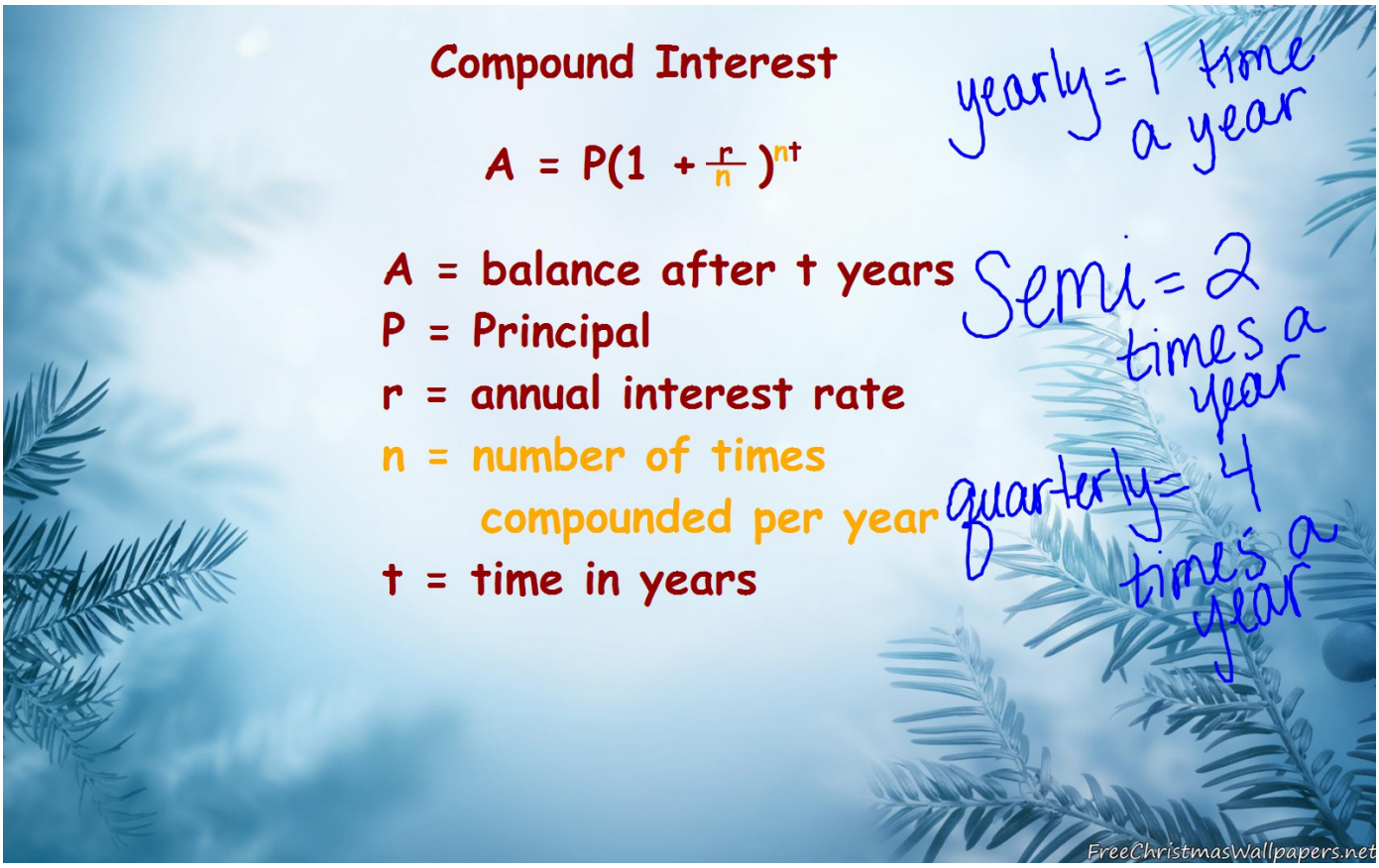
$y = a(1+r)^t$

$y = 1400(1+.09)^t$

$\boxed{y = 1400(1.09)^t}$

$y = 1400(1.09)^5$

$\boxed{y = 2154.07}$


Compound Interest
$A = P(1 + \frac{r}{n})^{nt}$
A = balance after t years
P = Principal
r = annual interest rate
n = number of times compounded per year
t = time in years
yearly = 1 time a year
Semi = 2 times a year
quarterly = 4 times a year
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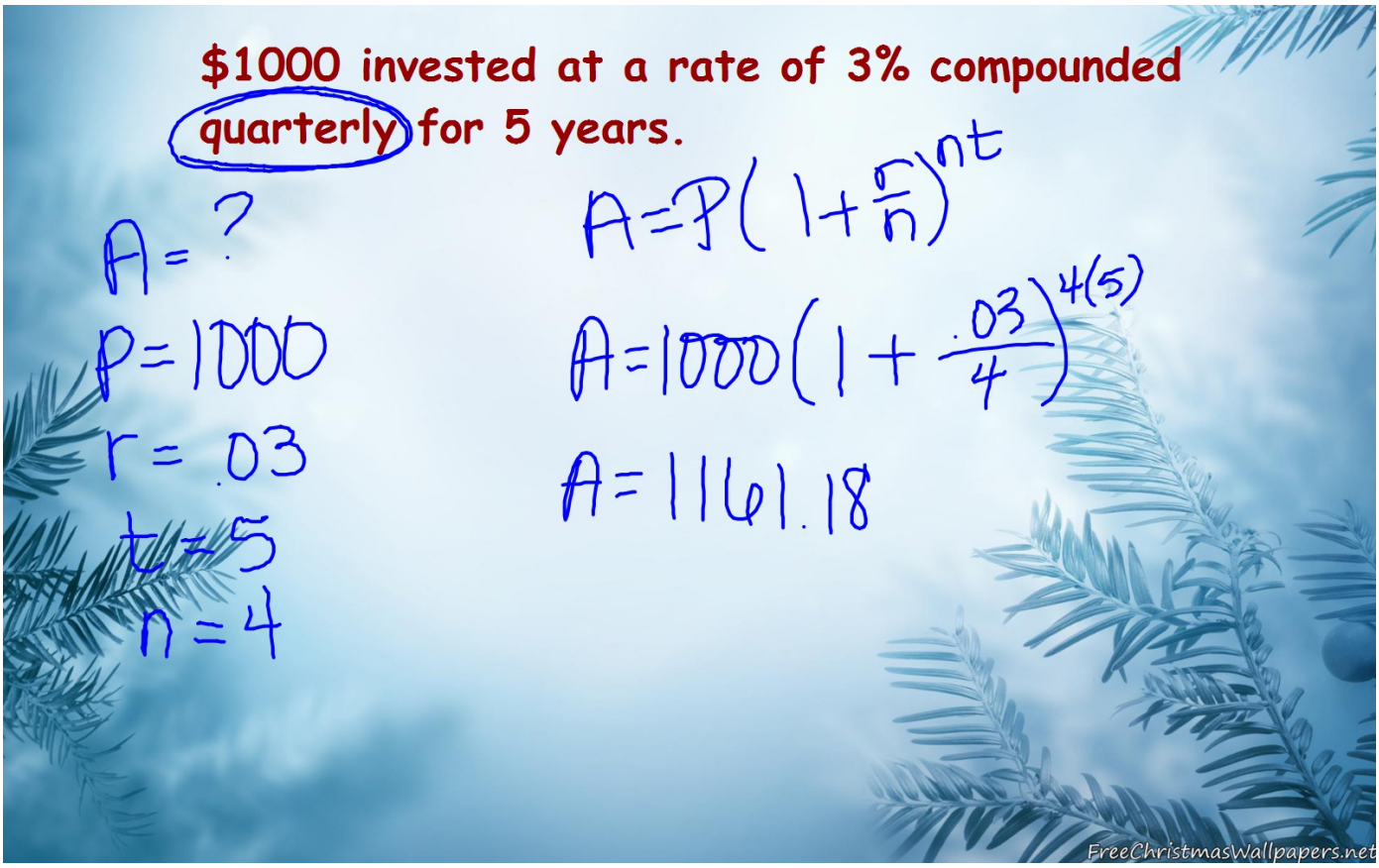
$1000 invested at a rate of 3% compounded quarterly for 5 years.
A = ?
P = 1000
r = .03
t = 5
n = 4
$A = P\left(1 + \frac{r}{n}\right)^{nt}$
$A = 1000\left(1 + \frac{.03}{4}\right)^{4(5)}$
A = 1161.18
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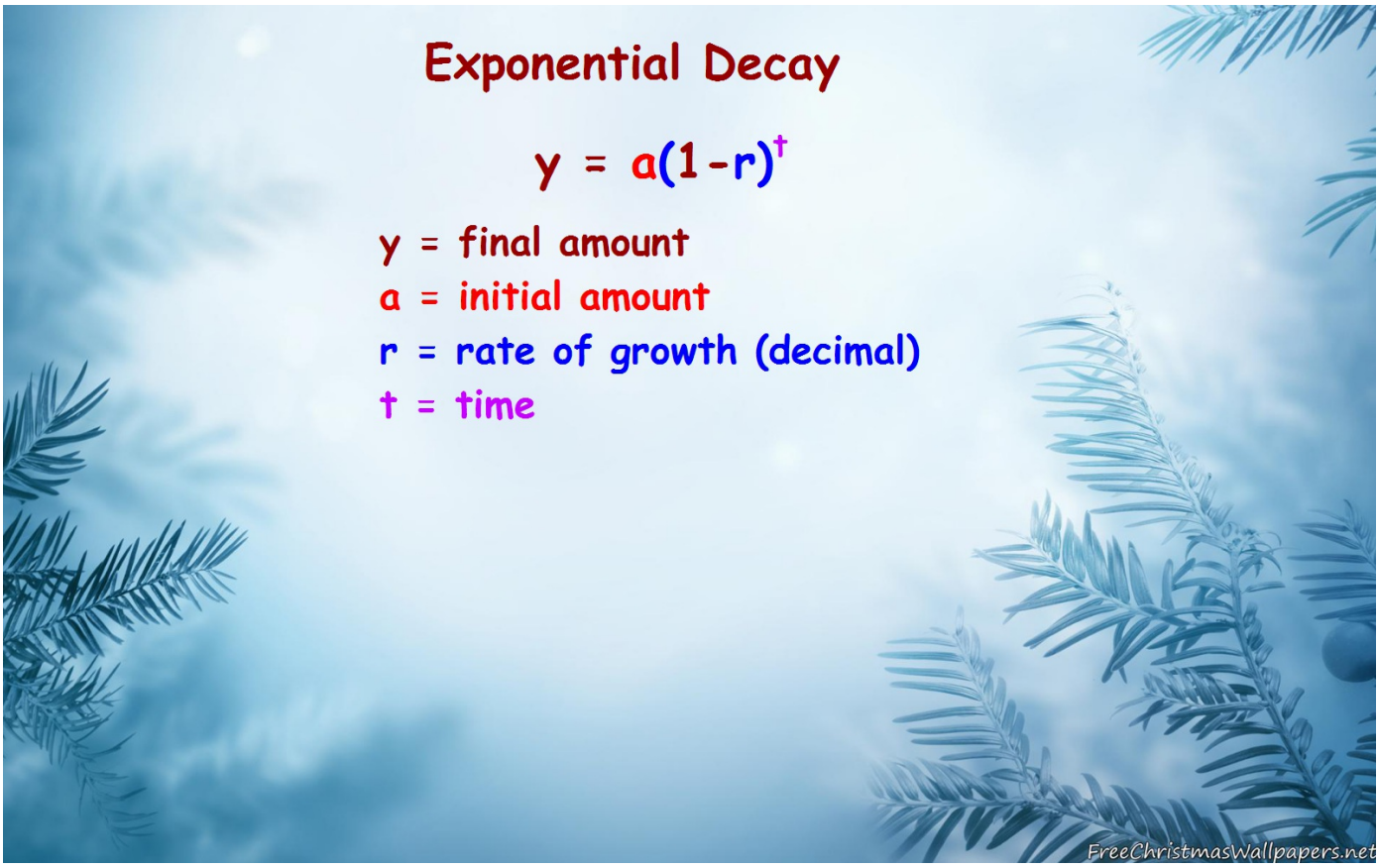
Exponential Decay
$y = a(1-r)^t$
y = final amount
a = initial amount
r = rate of growth (decimal)
t = time
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The population of a town is decreasing at a rate of 1% per year. In 2000, there were 3000 people. Find the population in 2008.

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

$a = 3000$

$r = .01$

$t = 8$

$y = 3000(1-.01)^8$

$y = 3000(0.99)^8$

$y = 2768$

You cannot have .23 of a person

You do not round population.