28. A population of rabbits grows in such a way that the population t days from now is given by $A(t) = 250e^{0.02t}$

a. What is the current rabbit population? → at $t = 0$

$A(0) = 250e^{.02(0)}$
$= 250$

b. How many rabbits will there be after 4 days?

$= 250e^{.02(4)}$
$= 270.82 \approx 271$

c. How many rabbits will there be after three weeks?

$= 250e^{.02(21)} = 380.49 \approx 380$

** d. How many days will it take for the rabbit population to double? ** This means for the initial population to double!

$500 = 250e^{.02t}$
$\ln 2 = \ln e^{.02t}$ → $\frac{\ln 2}{.02} = \frac{.02}{.02}t$
$t = 34.657$ days

29. Write an exponential function of the form $y = ab^x$ whose graph passes through the given points.

a. (0, 5) and (1,15)

$5 = ab^0$ $\frac{15}{5} = \frac{5(b)^1}{5}$ $y = 5 \cdot 3^x$
$5 = a(1)$ $3 = b$
$5 = a$

b. (0, 20) and (2,500)

$20 = ab^0$ $\frac{500}{20} = \frac{20b^2}{20}$ $y = 20 \cdot 5^x$
$20 = a \cdot 1$ $25 = b^2$
$20 = a$ $\pm 5 = b$

30. Starting with the graph of $f(x) = 4^x$, write the equation of the graph that results from

a. Shifting $f(x)$ 4 units upwards
$f(x) = 4^x + 4$

b. Shifting $f(x)$ 3 units downwards
$f(x) = 4^x - 3$

c. Shifting $f(x)$ 2 units left
$f(x) = 4^{x+2}$

d. Shifting $f(x)$ 5 units right
$f(x) = 4^{x-5}$

e. Reflecting $f(x)$ about the x-axis
$f(x) = -1 \cdot 4^x$

f. Reflecting $f(x)$ about the y-axis
$f(x) = 4^{-x}$

31. Match each equation with one of the graphs below:

B a. $f(x) = 2(0.69)^x$
F b. $f(x) = 2(1.28)^x$
A c. $f(x) = 2(0.81)^x$
D d. $f(x) = 4(1.28)^x$
E e. $f(x) = 2(1.59)^x$
C f. $f(x) = 4(0.69)^x$