3 100 5% annual growth.

ans. 20 years.

$$A = 100(1.05)^{20} = 265.33$$

165.33% growth.

$100 growing at nominal rate of 100%.

after 1 yr:

- compounding annually → $200
- compound semi-annually: $100\left(1+\frac{1.00}{2}\right)^{2(1)} = 225$ → 125% effective yield
- compounding quarterly: $=100\left(1+\frac{1.00}{4}\right)^{4(1\text{ yr})} = 244$ 144% eff yld
- compounding daily $= 100\left(1+\frac{1.00}{365}\right)^{365} = 271.46$
- compounding hourly $=100\left(1+\frac{1}{8760}\right)^{8760} = 271.81$
- compounding second $=100\left(1+\frac{1}{31\times10^6}\right)^{31\times10^6} = 271.83$

Define e - fundamental constant in mathematics.

$$e = \left(1+\frac{1}{x}\right)^{x} \text{ as } x\to\infty$$
$$\approx 2.7183\ldots$$

In science and math, we replace $y=ab^x$ with $y=ae^{kx}$

① a is still y-intercept
② $e^k = b$
③ k is the continuous growth/decay rate

Ex $y=\left[e^{0.20}\right]^x$ 20% continuous growth.

$\Updownarrow$

$y=ab^x$

$y=b^x$ $b = e^{0.20} \approx 1.2214$ 22% growth

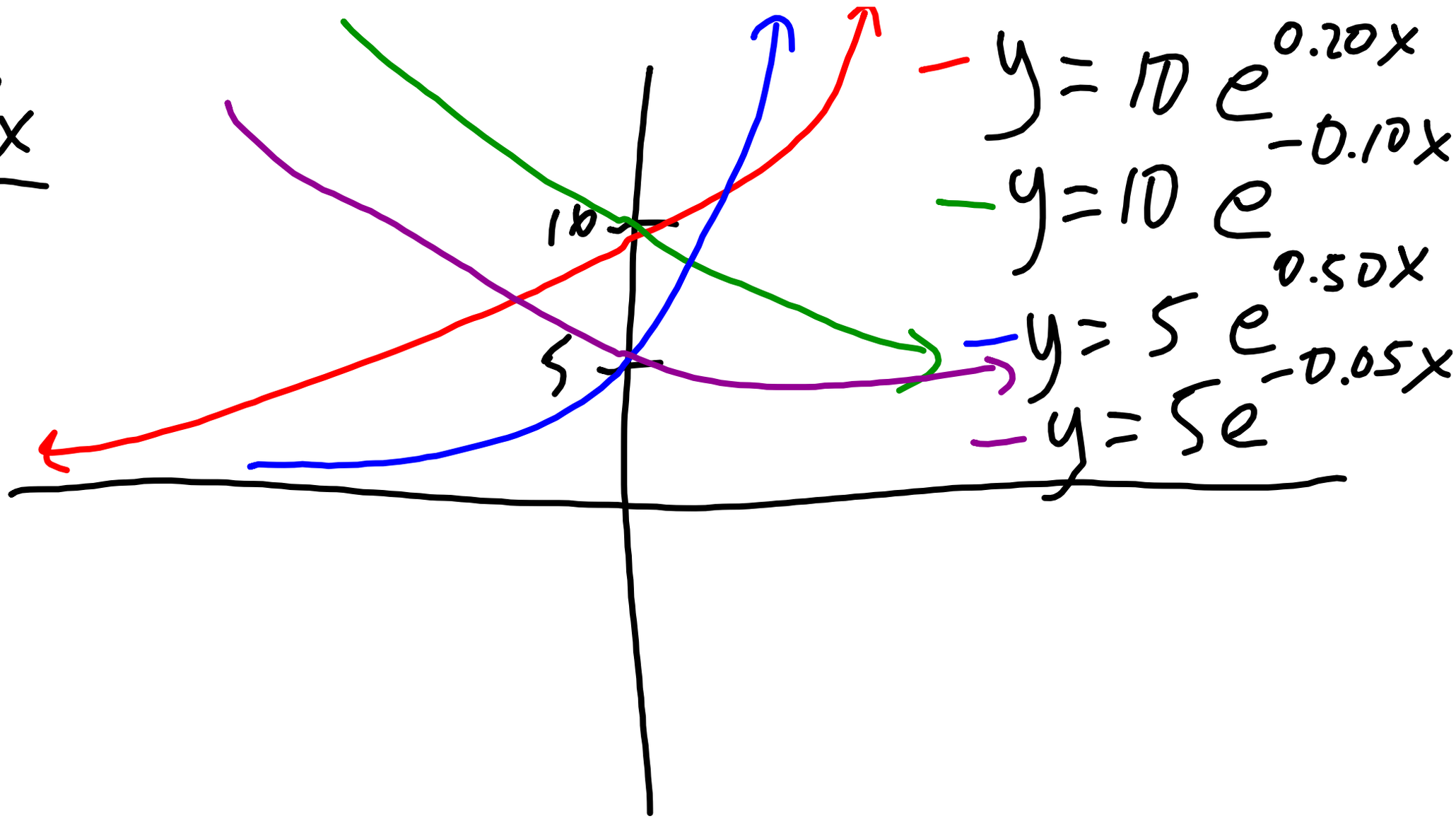
Ex $y=e^{-0.20x}$

$y=ab^x$

$y=b^x$ $e^{-0.20}=b$

$0.819\ldots \approx b$

Ex



- $y = 10\,e^{0.20x}$
- $y = 10\,e^{-0.10x}$
- $y = 5\,e^{0.50x}$
- $y = 5\,e^{-0.05x}$
- $y = 5e$