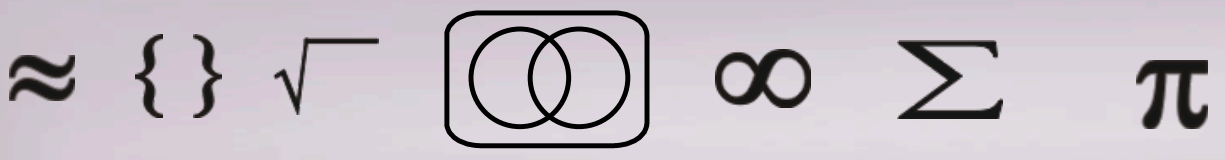

APR

# Math 1030 # 8a

compound interest

effective yield

## The Power of Compounding

principal

## Simple vs. Compound Interest

balance

Simple Interest is paid only on the principal amount.

Compound Interest is paid on the principal and the interest added to to the principal.

EX 1: Calculating Compound Interest on $1000 at 10% interest compounded annually.

| After n years | Interest | Balance |
|---|---|---|
| 1 | $1000(0.1) = 100$ | $1000+100=\boxed{1100}$ $=1000+1000(0.1)=1000(1.1)$ |
| 2 | $1100(0.1) = 110$ | $1100+110=\boxed{1210}=1000(1.1)^2$ |
| 3 | $1210(0.1) = 121$ | $1210+121=\boxed{1331}=1000(1.1)^3$ |
| 4 | $1331(0.1) = 133.1$ | $1331+133.1=\boxed{1464.1}=1000(1.1)^4$ |
| 5 | $1464.1(0.1) = 146.41$ | $1464.10+146.41=\boxed{1610.51}$ $=1000(1.1)^5$ |
| ⋮ | | |
| n | | $1000(1.1)^n$ |

ex 20

$A=1000(1.1)^{20}$

$\approx \$6727.50$

Compound Interest Formula (when compounding only once per year)

$$A = P(1+APR)^Y$$

A = Account balance after Y years
P = Principal amount invested
APR = annual percentage rate (as a decimal)
Y = number of years

EX 1: Find the balance if you invest $3000 at an APR of 4% for 12 years.

$P = \$3000$, $APR = 0.04$, $Y = 12$ yrs.

$A = 3000(1+0.04)^{12}$

$= 3000(1.04)^{12} \approx \$4803.10$

Compound Interest Formula (when compounding more than once a year)

$$A = P\left(1 + \frac{APR}{n}\right)^{(nY)}$$

A = Amount after Y years
P = Principal amount
APR = Annual interest rate as a decimal
n = number of times compounded each year
Y = number of years of compounding

EX 2: Find the balance if you invest $3000 for 12 years at 4%, in an account which compounds daily.

$P = \$3000$, $APR = 0.04$, $Y = 12$ yrs, $n = 365$

$$A = 3000\left(1 + \frac{0.04}{365}\right)^{(365(12))}$$

$$\approx 3000(1.000109589)^{4380}$$

$$\approx \$4848.10$$

(Compare w/ $4803.10 from compounding only once per year)