

The Natural Exponential "e"

Let's invest some money...

\$1 @ 10% per year for 10 years.

$$A = P(1+i)^n$$

$$= 1(1+0.10)^{10} \text{ compounded 1x per year}$$

$$= \$2.59$$

$$= 1\left(1+\frac{0.10}{2}\right)^{10 \times 2}$$

$$= 1(1+0.05)^{20}$$

$$= \$2.65 \quad 2x \text{ per year}$$

$$= \left(1+\frac{0.10}{12}\right)^{10 \times 12} \text{ compounded monthly}$$

$$= \$2.70$$

$$= \left(1+\frac{0.10}{365}\right)^{10 \times 365} \text{ compounded daily}$$

$$= \$2.717 \dots$$

$$= \left(1+\frac{0.10}{365 \times 24}\right)^{10 \times 365 \times 24} \text{ compounded hourly}$$

$$= \$2.718 \dots$$

$$= \left(1+\frac{0.10}{365 \times 24 \times 60}\right)^{10 \times 365 \times 24 \times 60} \text{ compounded by minute}$$

$$= \$2.7182 \dots$$

$$= \left(1+\frac{0.10}{\infty}\right)^{10 \times \infty} \text{ compounded infinitely (instantaneously)}$$

$$= \$2.718281828 \dots$$

This is e.