# Formulas for the Final 

Math 1030 - Patrick Dylan Zwick's Class

Fall 2007

Here are some formulas you should know for the final.
NOTE - I am neither guaranteeing that you will need to know all these formulas for the final, nor that they will necessarily be the only formulas you need to know. They're just the formulas I would suggest having down before the final.

## Compound Interest Formulas

Discrete Compounding

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

$\mathrm{A}=$ Amount ofter Y years. $\mathrm{P}=$ Starting principle.
$\mathrm{n}=$ Compoundings per year. $\mathrm{Y}=$ Number of years. APR = Annual percentage rate.

## Continuous Compounding

$$
A=P \times e^{A P R \times Y}
$$

## Percentage Change Formula

Percentage Change $=\frac{O-N}{O} \times 100 \%$.
$\mathrm{O}=$ Old value. $\mathrm{N}=$ New value.

## Exponential Growth Formulas

Exponential Growth Formula:

$$
P=P_{0}(1+r)^{t}
$$

$P=$ Value at time t. $P_{0}=$ Initial amount. (Amount at time 0).
$r=$ Growth rate, expressed as a decimal. $t=$ Elapsed time.
Note - This formula has an equivalent expression in terms of either the doubling time or the half life, depending on if $r$ is positive (increasing) or negative (decreasing).

Doubling Time Growth Formula: (Used when the growth rate $r$ is positive)

$$
P=P_{0} \times 2^{\frac{t}{T_{2}}}
$$

$T_{2}=$ Doubling time.
Doubling Time Formula:

$$
T_{2}=\frac{\log 2}{\log 1+r}
$$

Half-Life Decay Formula: (Used when the growth rate $r$ is negative)

$$
\begin{aligned}
P & =P_{0} \times 2^{\frac{t}{T_{1}}} \\
T_{\frac{1}{2}} & =\text { Half-Life }
\end{aligned}
$$

Half-Life Formula:

$$
T_{\frac{1}{2}}=\frac{-\log 2}{\log 1+r}
$$

## Formulas From Geometry

Circle:

$$
C=\pi d=2 \pi r
$$

$\mathrm{C}=$ Circumference $\mathrm{d}=$ Diamter $\mathrm{r}=$ Radius $\pi \approx 3.14159$

$$
\begin{gathered}
A=\pi r^{2} \\
\mathrm{~A}=\text { Area }
\end{gathered}
$$

Rectangle:

$$
P=2 l+2 w
$$

$$
\mathrm{P}=\text { Perimter } \mathrm{l}=\text { Length } \mathrm{w}=\text { Width }
$$

$$
\begin{aligned}
A & =l \times w \\
\mathrm{~A} & =\text { Area }
\end{aligned}
$$

Triangle:

$$
P=a+b+c
$$

$\mathrm{a}, \mathrm{b}, \mathrm{c}=$ Lengths of respective legs

$$
A=\frac{1}{2} b \times h
$$

$$
\mathrm{b}=\text { Base length } \mathrm{h}=\text { Height }
$$

Right Triangle:

$$
a^{2}+b^{2}=c^{2}
$$

$a, b=$ Lengths of legs $c=$ Length of hypotonuse

## Sphere

$$
S A=4 \pi r^{2}
$$

$$
\begin{aligned}
& \mathrm{SA}=\text { Surface Area } \mathrm{r}=\text { Radius } \\
& \qquad V=\frac{4}{3} \pi r^{3}
\end{aligned}
$$

$$
\begin{gathered}
\mathrm{V}=\text { Volume } \\
\text { Cube } \\
S A=2 l w+2 l h+2 h w \\
\text { SA }=\text { Surface Area } 1=\text { Length } \mathrm{h}=\text { Height } \mathrm{w}=\text { Width } \\
V=l h w \\
\mathrm{~V}=\text { Volume } \\
\text { Cylinder } \\
S A=2 \pi r h \\
\text { SA }=\text { Surface Area } \mathrm{h}=\text { Height } \mathrm{r}=\text { Radius } \\
V=\pi r^{2} h \\
\mathrm{~V}=\text { Volume }
\end{gathered}
$$

