Formula sheet provided on recent MATH 1100 common finals

Factoring: $x^3 - a^3 = (x-a)(x^2+xa+a^2)$, $x^3 + a^3 = (x+a)(x^2-xa+a^2)$

Circle: $(x-h)^2 + (y-k)^2 = r^2$ **Lines :** $y - y_0 = m(x - x_0)$; $y = mx + b$

Quadratic formula: $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Difference quotient: $\dfrac{f(x+h) - f(x)}{h}$

Average rate of change: of $f(x)$ on $[a, b]$: $\dfrac{f(b) - f(a)}{b - a}$

Parabola Vertex: $\left(\dfrac{-b}{2a}, f\left(\dfrac{-b}{2a}\right)\right)$, $a \neq 0$

Logarithms:

$$\begin{aligned}
\log_b(xy) &= \log_b(x) + \log_b(y) \\
\log_b(x^p) &= p \log_b(x) \\
\log_b\left(\frac{x}{y}\right) &= \log_b(x) - \log_b(y) \\
\ln(x) &= \log_e(x) \\
\log_b(x) &= \frac{\ln x}{\ln b} = \frac{\log_{10} x}{\log_{10} b} \\
\ln e^a &= a = e^{\ln a} \\
\log_b b^a &= a = b^{\log_b a}
\end{aligned}$$

Compound Interest: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

Continuous Interest: $A = Pe^{rt}$

Annuity: $A = \dfrac{P\left[\left(1 + \frac{r}{n}\right)^{nt} - 1\right]}{\frac{r}{n}}$

Sinking Fund: $P = \dfrac{A\left(\frac{r}{n}\right)}{\left(1 + \frac{r}{n}\right)^{nt} - 1}$

Exponential Growth: $A(t) = A_0 e^{rt}$, $r > 0$

Exponential Decay: $A(t) = A_0 e^{-rt}$, $r > 0$