

Formula Sheet for the Final Exam

1. **Circle:** $(x-h)^2 + (y-k)^2 = r^2$

2. **Parabola** (Quadratic function): $y = f(x) = a(x-h)^2 + k$ $h = -\frac{b}{2a}$, $k = f(h)$ or $k = c - \frac{b^2}{4a}$
 $f(x) = ax^2 + bx + c$

3. **Distance formula:** $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

4. **Quadratic formula:** $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

For the following formulas: S is future value, P is present value, r is the annual interest rate, k is the number of compounding periods in a year, t is time in years, A is the amount of money, and R is the amount of payment; with the formula for the periodic interest rate $i = \frac{r}{k}$.

5. **Future Value** of an Investment with **continuously compounded** interest: $S = Pe^{rt}$
(The amount at the end of an investment when an amount P is allowed to grow with interest compounded continuously.)

6. **Future Value** of an Investment: $S = P(1+i)^{kt}$
(The amount at the end of an investment when an amount P is allowed to grow.)

7. **Present Value** of an Investment: $P = S(1+i)^{-kt}$
(The amount that must be invested now to provide for a future value.)

8. **Effective Rate of Interest:** $E = (1+i)^k - 1$
(The effective rate for an account.)

9. **Future Value** of an Annuity: $S = R \left[\frac{(1+i)^{kt} - 1}{i} \right]$
(The amount at the end for an ordinary annuity with regular payments.)

10. **Present Value** of an Annuity: $P = R \left[\frac{1 - (1+i)^{-kt}}{i} \right]$
(The present value of an ordinary annuity with regular payments.)

11. **'Sinking Fund' Payment** for an Annuity: $R = \frac{Si}{(1+i)^{kt} - 1}$
(The amount of a payment that will provide a future value of an ordinary annuity.)

12. **Amortization Formula** (Installment Payments): $R = A \left[\frac{i}{1 - (1+i)^{-kt}} \right]$
(The amount of an installment payment when the amount borrowed is A .)