

Quadratic Functions in Mathematics 20-1

Central concept: **Quadratic Functions**

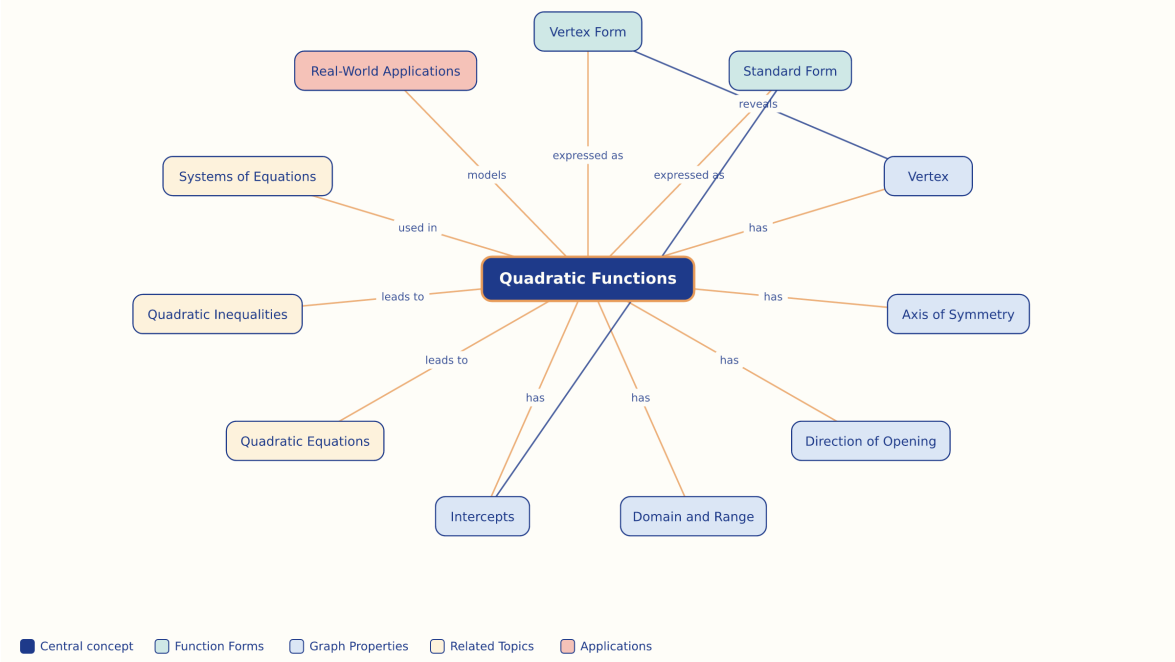
Connections

- Quadratic Functions (expressed as) -> Vertex Form
- Quadratic Functions (expressed as) -> Standard Form
- Quadratic Functions (has) -> Vertex
- Quadratic Functions (has) -> Axis of Symmetry
- Quadratic Functions (has) -> Direction of Opening
- Quadratic Functions (has) -> Domain and Range
- Quadratic Functions (has) -> Intercepts
- Vertex Form (reveals) -> Vertex
- Standard Form (identifies) -> Intercepts
- Quadratic Functions (leads to) -> Quadratic Equations
- Quadratic Functions (leads to) -> Quadratic Inequalities
- Quadratic Functions (used in) -> Systems of Equations
- Quadratic Functions (models) -> Real-World Applications

Notes

- **Quadratic Functions:** Functions of the form $y=ax^2+bx+c$ or $y=a(x-p)^2+q$ analyzed for key characteristics [Outcome](#), [Outcome](#), [Outcome](#)
- **Vertex Form:** $y=a(x-p)^2+q$ where (p,q) is the vertex; reveals vertex and direction directly [Outcome](#), [Outcome](#)
- **Standard Form:** $y=ax^2+bx+c$; used to identify intercepts and requires analysis for vertex [Outcome](#)
- **Vertex:** Maximum or minimum point of the parabola; determined from both forms [Outcome](#), [Outcome](#), [Outcome](#)
- **Axis of Symmetry:** Vertical line $x=p$ through the vertex; divides parabola into mirror halves [Outcome](#), [Outcome](#), [Outcome](#)
- **Direction of Opening:** Determined by sign of a ; upward if $a>0$, downward if $a<0$ [Outcome](#), [Outcome](#), [Outcome](#)
- **Domain and Range:** Domain is all real numbers; range depends on vertex and direction of opening [Outcome](#), [Outcome](#), [Outcome](#)
- **Intercepts:** x-intercepts (zeros) and y-intercept; found algebraically or graphically [Outcome](#), [Outcome](#), [Outcome](#)
- **Quadratic Equations:** Equations of the form $ax^2+bx+c=0$; solved by factoring, completing the square, or quadratic formula [Outcome](#), [Resource](#)
- **Quadratic Inequalities:** Inequalities involving quadratic expressions; solved using graphical and algebraic methods [Outcome](#)
- **Systems of Equations:** Linear-quadratic and quadratic-quadratic systems solved algebraically and graphically [Outcome](#)
- **Real-World Applications:** Parabolic paths, trajectories, structures, and design problems modelled by quadratic functions [Resource](#), [Resource](#), [Resource](#)

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