

Practice: The Quadratic Relation $y = ax^2 + c$

1. Order the parabolas in each set from narrowest to widest, without graphing.
 - a) $y = 0.5x^2 - 5$
 $y = x^2 - 5$
 $y = 2x^2 - 5$
 - b) $y = -4x^2 + 5$
 $y = -2x^2 + 5$
 $y = -x^2 + 5$
2. Use a graphing calculator. Graph the parabolas from question 1 to verify your order.
3. Consider the relation $y = 4x^2 - 1$.
 - a) Identify the y -intercept.
 - b) Is the y -intercept a maximum or a minimum or neither? Explain.
 - c) Identify the zeros of the relation.
4. Consider the relation $y = \frac{1}{4}x^2 - 1$.
 - a) Identify the y -intercept.
 - b) Is the y -intercept a maximum or a minimum or neither? Explain.
 - c) Identify the zeros of the relation.
5. Consider the relation $y = -\frac{1}{4}x^2 + 1$.
 - a) Identify the y -intercept.
 - b) Is the y -intercept a maximum or a minimum or neither? Explain.
 - c) Identify the zeros of the relation.
6. The path of a volleyball after it is served can be modelled by the relation $h = -4t^2 + 60$, where h represents the height of the ball in centimetres, and t represents time in seconds.
 - a) From what height is the ball served?
 - b) What is the maximum height of the ball?
 - c) How long does the ball take to reach the ground?
7. The path of a skydiver can be modelled by the relation $h = -40t^2 + 6000$, where h represents the height of the skydiver in metres, and t represents time in seconds.
 - a) From what height does the skydiver jump out of the plane?
 - b) How long does the skydiver take to reach the ground?
8. Mark is a competitive diver. The time taken for him to surface from the bottom of the pool can be modelled by the relation $d = 0.15t^2 - 15$, where d represents Mark's depth in metres, and t represents time in seconds.
 - a) How deep is the pool?
 - b) How long does it take mark to reach the surface?
9. The time taken to climb from the bottom of a canyon to the top can be modelled by the relation $d = 20t^2 - 2000$, where d represents the distance in metres between the climber and the top of the canyon, and t represents time in seconds.
 - a) How deep is the canyon?
 - b) How long does it take a climber to reach the top?