

P is a point on the graph of $y = x^2 - 1$

- a) Find the distance from the origin to the point $x = 0$ on the graph.
- b) Find the distance from the origin to the point $x = 1$ on the graph.
- c) Find the distance from the origin to the point $x = \frac{\sqrt{2}}{2}$ on the graph.
- d) Express the distance, d , from P to the origin as a function of x .
- e) Use a graphing utility to graph the function $d = d(x)$, $x \geq 0$. Find the values at which d has a local minimum and/or maximum.

A rectangle has one corner in Q1 on the graph of $y = 25 - x^2$, another at the origin, a third on the positive y axis, and a fourth on the positive x-axis.

- A) Sketch a basic picture of this information
- B) Express the area, A , of the rectangle as a function of x .
- C) What is the domain of A
- D) Graph $A=A(x)$.
- E) For what value of x is the area the largest?

The hypotenuse of a right triangle is three times the length of its shorter leg.

- (a) Find a function that models the area of the right triangle in terms of the length of the shorter leg.
- (b) What is the domain of the $A(x)$ function.
- (c) If the shorter leg is 5 centimeters long, what is the area of the triangle?
- (d) If the shorter leg is 8 centimeters long, what is the area of the triangle?
- (e) Graph $A = A(x)$ function. Find any local minima/maxima.

Farmer Varner needs to build a rectangular pen next to his driveway. Its area must be 600 square meters. The fence for the driveway side of the pen costs \$5 per meter, and the fence for the other three sides costs only \$3 per meter.

- (a) Find a function that models the cost of the fence in terms of the length of the driveway side.
- (b) What is the domain of this cost function?
- (c) How much will the pen cost if the driveway side is 30 meters long?
- (d) How much will the pen cost if the driveway side is 40 meters long?
- (e) Graph $C = C(x)$ using a graphing utility. Identify any local minima/maxima.