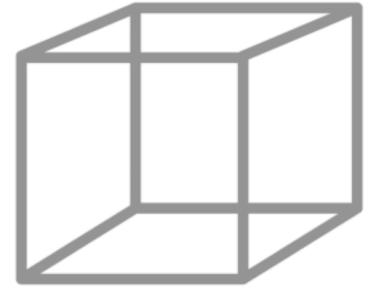


1. Express the area  $A$  of a circle as a function of its circumference  $C$ , and express  $C$  as a function of  $A$ .

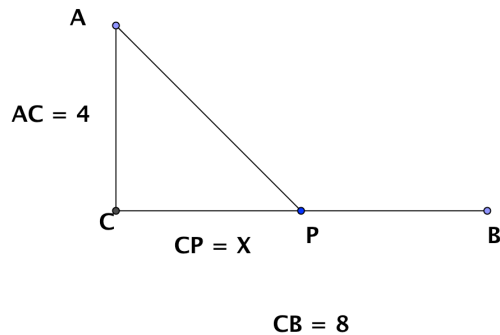
2. a. Express the volume  $V$  of a cube as a function of the length  $e$  of an edge.



- b. The length of a diagonal of the cube is  $d = e\sqrt{3}$ . Express  $V$  as a function of  $d$ .

3. in the figure below, point  $A$  is 4 km north of point  $C$ , point  $B$  is 8 km east of  $C$ , and  $P$  is a point on  $\overline{BC}$  at a distance  $x$  km from  $C$ .

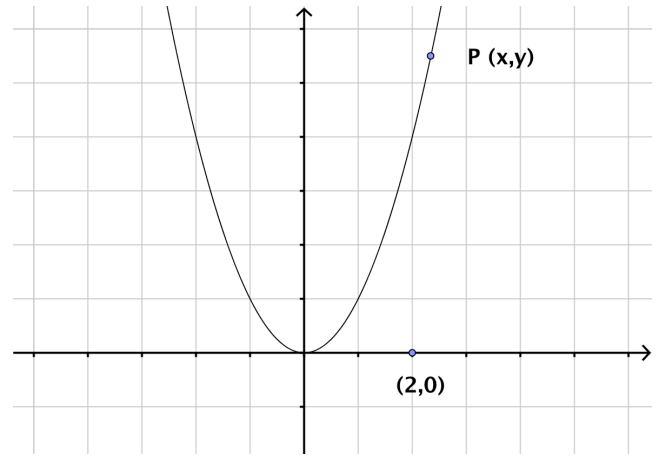
- a. Express  $AP + PB$  as a function of  $x$ .



- b. What is the domain of this function?

4.  $P(x,y)$  is a point on the parabola  $y = x^2$ .

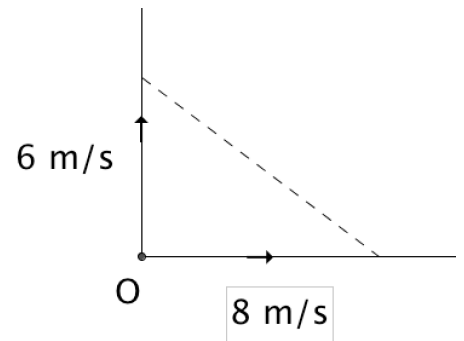
a. Express the distance from  $P$  to  $A(2,0)$  as a function of  $x$  and  $y$ .



b. Express the distance as a function of  $x$  alone.

c. How can you find the minimum value of the function in part (b)?

5. Emily starts running north from point  $O$  at  $6 \text{ m/s}$ . At the same time, Rachel sprints east from  $O$  at  $8 \text{ m/s}$ . Find the distance  $d$  between Emily and Rachel  $t$  seconds later.



6. A box with a square base has a surface area (including the top) of  $3 \text{ m}^2$ .

a) Express the volume as a function of the width of the base.



b) Graph the function and find the maximum volume.