

## Section 2.4

The Kelvin scale for measuring temperature has a boiling point of  $373^{\circ}\text{K}$  and a freezing point of  $273^{\circ}\text{K}$ . Find an equation relating  $K$  and  $C$  (degrees Celsius).

## Section 3.6

1) The surface area  $S$  of a right circular cylinder (closed at the top and bottom) of radius  $r$  and height  $h$  is  $S = 2\pi r^2 + 2\pi r h$ . If the height is half the radius, express the surface area  $S$  as a function of  $r$ .

2) A rectangle of perimeter 100 has length  $x$ .

a) Express the area  $A$  of the rectangle as a function of  $x$ .

b) What is the domain of  $A$ ?

3) The price  $p$  and the quantity  $x$  sold of a certain product obey the demand equation

$$x = -4p + 200 \quad 0 \leq p \leq 50$$

a) Express the revenue  $R$  as a function of  $x$ .

b) What is the revenue if 10 units are sold?

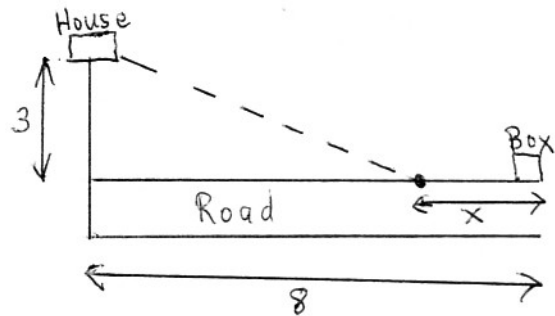
4) Two planes leave an airport at the same time. One is headed east at a constant speed of 400 miles per hour. The other is headed north at a constant speed of 300 miles per hour. Express the distance  $d$  between the planes as a function of the time  $t$ . (At  $t = 0$ , the planes take off.)

5) A cable company is asked to provide service to a customer whose house is located 3 miles from the road along which the cable is buried. The nearest connection box for the cable is located 8 miles down the road.

a) If the installation cost is \$12 per mile along the road and \$15 per mile off the road, express the total cost  $C$  of installation as a function of the distance  $x$  (in miles) from the connection box to the point where the cable installation turns off the road.

b) Give the domain.

c) Compute the cost if  $x = 2$  miles.



## Section 5.2

The volume  $V$  of a sphere of radius  $r$  is given by  $V(r) = \frac{4}{3}\pi r^3$ . Express  $r$  as a function of  $V$ .

## Section 5.8

1. A culture of bacteria obeys the law of uninhibited growth. If 1000 bacteria are present initially and there are 1800 after 1 hour, how many will be present in the culture after 4 hours? How long is it until there are 25,000 bacteria?

2. The amount of plutonium-238 present decays according to the function

$A(t) = A_0 e^{-0.00806t}$ , where  $A_0$  is the initial amount present and  $A$  is the amount present at time  $t$  (in years). Suppose you have a sample of 100 grams of plutonium-238.

- What is the decay rate of plutonium-238?
- How much plutonium-238 would remain after 43 years?
- When will 20 grams of plutonium-238 be left?
- What is the half-life of plutonium-238?

## Section 11.1

A movie theatre charges \$10 for an evening show and \$7 for a matinee. On a day when 300 people paid an admission, the total receipts were \$2745. How many admissions of each type were sold?