Ex For adults in the US over 5 ft tall, their average weight w is related to height h by

$3w + 110 = 11(h - 20)$ where w is the weight in lbs and h is the height in inches.

(a). Find the average weight of an adult who is 5 ft 6 in tall.

(b). Find the height when the average weight is 110 lbs.

(c). Solve for h in terms of w.

(d). Find the height when the average weight is ***(i)*** 160 lbs ***(ii)*** 200 lbs.

Ex If the cost of producing x air conditioners is given by $24x + 520$ and the revenue is given by $55x$, how many air conditioners must be sold to break even?

Sometimes the expression involving the variable x is not given to you.

Ex Suppose it costs \$75 to rent a boat plus \$5 per gallon of gas used.

(a). Let x be the number of gallons of gas used. ⟵ The variable is defined in words.

Write an expression for the cost C to rent the boat.

(b). How much, total, would you pay if you used:
i. 3 gallons; ii. 10 gallons?

(c). Suppose that your total bill was \$98.00. How many gallons of gas did you get?

Guidelines for setting up linear word problems

1. Read the problem! Actually read it for comprehension.

- What are you given? What do you know?
- What are you trying to find? (unknown)

  Use variables (e.g. x, t, etc.) to represent the unknown quantities.

  Define the variable in words: "Let x be put a description here.

- If possible/helpful, draw a picture and label known and unknown quantities.

2. (Read again.) Write an algebraic expression using the variables to describe the relationship(s).

3. (Read again.) Use the information to write down an equation .

4. Solve the equation(s).

5. Check your answer.

Ex You hire painters to paint your house. They charge \$20 per hour plus the cost of paint which is \$100.

(a). Let x be the number of hours worked . ⟵ The variable is defined in words.

Write an expression for the total payment to paint your house.

(b). How much, total, would you pay if they worked:
i. 4 hours; ii. 6.5 hours?

(c). Suppose that your total bill was \$300. How long did they work?

Ex Suppose you are 50 miles from home and you are riding your bike at a speed of 12 mph.

(a). Let x be the number of hours riding. ⟵ The variable is defined in words.

Write an expression for how far away you are from home after riding for x hours.

(b). How far away are you from home after 1.25 hours

(c). How long will it take you to get home?