

## Section 6-4 Word Problems

**Phrase Math Expression**

Six more than a number

$6+x$

Three less than a number

$x-3$

Eight decreased by two times a number

$8-2x$

Twice a number increase by 4

$2x+4$

of times  
15 =

1. Rob spent \$339.95 on books at the bookstore. In addition to books, he wanted to purchase as many notebooks as possible, but he only has a total of \$350 to spend. If a notebook, including tax, cost \$0.99, how many notebooks can he purchase?

$$339.95 + .99x = 350$$

$$\underline{-339.95}$$

$$.99x = 10.05$$

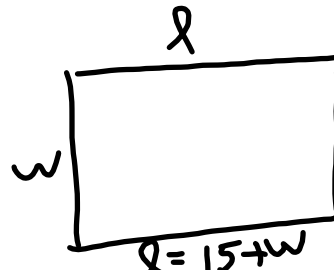
$$\underline{.99}$$

$$x = 10 \text{ notebooks}$$

2. O and G construction purchased 100 acres of land to be split into three parcels of land on which to build houses. One parcel of land will be three times as large as each of the other two. How many acres of land will each parcel contain?

$$\begin{aligned}
 100 &= 3x + x + x & x &= 20 \\
 100 &= 5x & x &= 20 \\
 x &= 20 & 3x &= 60
 \end{aligned}$$

3. Dr. Wright, a veterinarian, wants to fence in a large rectangular region in the yard behind her office for exercising dogs. She has 130 feet of fencing to use for the perimeter of the region. What should the dimensions of the region be if she wants the length to be 15 feet greater than the width?



$$\begin{aligned}
 P &= 2l + 2w \\
 130 &= 2(15 + w) + 2w \\
 130 &= 30 + 2w + 2w \\
 130 &= 30 + 4w \\
 100 &= 4w \\
 25 &= w \\
 40 &= l
 \end{aligned}$$

4. Michael Angelica is selling his original paintings at an art show. Determine the cost of a painting before tax if the total cost of a painting, including an 8% sales tax, is to be \$145.80

$$\begin{aligned}100\%x + 8\%x &= 145.80 \\108\%x &= 145.80 \\1.08x &= \frac{145.80}{1.08} \\x &= 135\end{aligned}$$

5. Nissan is running a 15% sale off all model cars in the month of October. Joe Smoe paid a total of \$16825.75 for his Sentra. What was the original cost of Joe's car?

$$\begin{aligned}100\%x - 15\%x &= 16825.75 \\\cdot 85x &= 16825.75 \\x &= \$19795\end{aligned}$$

The cost of a new shirt is \$37.45 including a 7% sales tax. What is the cost before tax?

$$1.07x = 37.45$$

$$x = 35$$

$$.07(37.45)$$

$$2.62$$

$$34.83$$

The cost of a new iphone is \$239.63 including a 6.5% sales tax. What is the cost before tax?

$$1.065x = 239.63$$

$$x = 225$$

33. **MODELING - Jet Skiing** At Action Water Sports of Ocean City, Maryland, the cost of renting a Jet Ski is \$42 per half hour, which includes a 5% sales tax. Determine the cost of a half hour Jet Ski rental before tax.



$$1.05x = 42$$
$$x = \frac{42}{1.05} = 40$$

34. **MODELING - Pet Supplies** PetSmart has a sale offering 10% off of all pet supplies. If Amanda Miller spent \$15.72 on pet supplies before tax, what was the price of the pet supplies she purchased before the discount?

$$0.90x = 15.72$$
$$x = \frac{15.72}{0.90} = 17.47$$

35. **MODELING - Copying** Ronnie McNeil pays 8¢ to make a copy of a page at a copy shop. She is considering purchasing a photocopier machine that is on sale for \$250, including tax. How many copies would Ronnie have to make in the copy shop for her cost to equal the purchase price of the photocopier machine she is considering buying?

$$\begin{aligned} .08c &= 250 \\ c &= 3125 \end{aligned}$$

36. **MODELING - Number of CDs** Samantha Silverstone and Josie Appleton together receive 12 free compact discs by joining a compact disc club. How many CDs will each receive if Josie is to have three times as many as Samantha?

$$\begin{aligned} 3S + S &= 12 \\ 4S &= 12 \\ S &= 3 \\ J &= 9 \end{aligned}$$

37. **MODELING - *Scholarship Donation*** Each year, Andrea Choi donates a total of \$1000 for scholarships at Mercer County Community College. This year, she wants the amount she donates for scholarships for liberal arts to be three times the amount she donates for scholarships for business. Determine the amount she will donate for each type of scholarship.
38. **MODELING - *Homeowners Association*** Cross Creek Townhouses Homeowners Association needs to charge each homeowner a supplemental assessment to help pay for some unexpected repairs to the townhouses. The association has \$2000 in its reserve fund that it will use to help pay for the repairs. How much must the association charge each of the 50 homeowners if the total cost for the repairs is \$13,350?

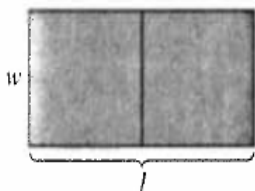
39. **MODELING - *Dimensions of a Deck*** Jim Yuhas is building a rectangular deck and wants the length to be 3 ft greater than the width. What will be the dimensions of the deck if the perimeter is to be 54 ft?



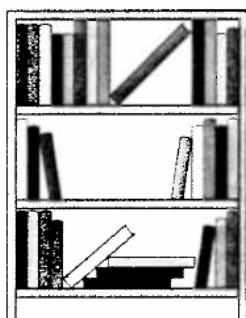
- 40 ). **MODELING - Floor Area** The total floor space in three barns is  $45,000 \text{ ft}^2$ . The two smaller ones have the same area, and the largest one has three times the area of the smaller ones.
- Determine the floor space for each barn.
  - Can merchandise that takes up  $8500 \text{ ft}^2$  of floor space fit into either of the smaller barns?
- 41 ). **MODELING - Wild Mustangs** According to the Bureau of Land Management, the wild mustang population of Nevada in 2004 was 2515 more than six times the wild mustang population in Utah. The total number of wild mustangs in Nevada and Utah was 21,730. Determine the number of wild mustangs in each state in 2004.

42. **MODELING - Counting Calories** According to *The Step Diet Book*, the number of steps it takes for a 150 lb person to burn off the calories from eating a cheeseburger and drinking a 12 oz soda is 11,040. The number of steps it takes to burn off the calories from eating a cheeseburger is 690 more than twice the number of steps it takes to burn off the calories from drinking a 12 oz soda. Determine the number of steps needed for a 150 lb person to burn off the calories from eating a cheeseburger and from drinking a 12 oz soda.

44. **MODELING - Car Purchase** The Gilberts purchased a car. If the total cost, including a 5% sales tax, was \$14,512, find the cost of the car before tax.
45. **MODELING - Enclosing Two Pens** Chuck Salvador has 140 ft of fencing in which he wants to build two connecting, adjacent square pens (see the figure). What will be the dimensions if the length of the entire enclosed region is to be twice the width?



46. **MODELING - Dimensions of a Bookcase** A bookcase with three shelves, as shown in the diagram, is to be built by a woodworking student. If the height of the bookcase is to be 2 ft longer than the length of a shelf and the total amount of wood to be used is 32 ft, find the dimensions of the bookcase.



47. **MODELING - Laundry Cost** The cost of doing the family laundry for a month at a local laundromat is \$70. A new washer and dryer cost a total of \$760. How many months would it take for the cost of doing the laundry at the laundromat to equal the cost of a new washer and dryer?

48. **MODELING - *Renting Videos*** Hollywood Video offers customers two options to rent DVDs. The Unlimited Option costs \$28 a month for unlimited DVD rentals. The Single Option costs \$3.50 per DVD rental. How many DVDs must be rented in a month for the cost of the Unlimited Option to equal the cost of the Single Option?
49. **MODELING - *Airfare*** Rachel James has been told that with her half-off airfare coupon, her airfare from New York to San Diego will be \$257.00. The \$257.00 includes a 7% tax *on the regular fare*. On the way to the airport, Rachel realizes that she has lost her coupon. What will her regular fare be before tax?