87. The quotient of x and 3 is the same as the product of x and 5.

88. The quotient of $x + 3$ and $5y$ is the same as the product of x and y.

89. The square of the sum of a and b is equal to 9.

90. The sum of the squares of a and b is equal to the square of c.

Miscellaneous

Fill in the tables with the appropriate values for the given expressions.

91.

x	$2x - 3$
-2	
-1	
0	
1	
2	

92.

x	$-\frac{1}{2}x + 4$
-4	
-2	
0	
2	
4	

93.

a	a^2	a^3	a^4
2			
$\frac{1}{2}$			
10			
0.1			

94.

b	$\frac{1}{b}$	$\frac{1}{b^2}$	$\frac{1}{b^3}$
3			
$\frac{1}{3}$			
10			
0.1			

Use a calculator to find the value of $b^2 - 4ac$ for each of the following choices of a, b, and c.

95. $a = 4.2$, $b = 6.7$, $c = 1.8$

96. $a = -3.5$, $b = 9.1$, $c = 3.6$

97. $a = -1.2$, $b = 3.2$, $c = 5.6$

98. $a = 2.4$, $b = -8.5$, $c = -5.8$

⟨5⟩ **Applications**

Solve each problem. See Example 7.

99. *Forensics.* A forensic scientist uses the expression $81.7 + 2.4T$ to estimate the height in centimeters of a male with a tibia of length T centimeters. If a male skeleton has a tibia of length 36.5 cm, then what was the height of the person? Use the accompanying graph to estimate the length of a tibia for a male with a height of 180 cm.
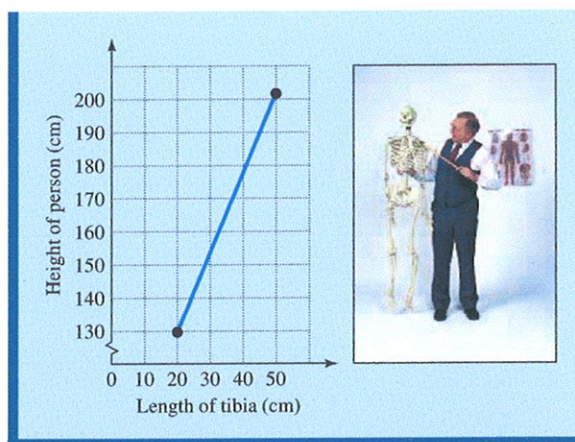

Figure for Exercise 99

100. *Forensics.* A forensic scientist uses the expression $72.6 + 2.5T$ to estimate the height in centimeters of a female with a tibia of length T centimeters. If a female skeleton has a tibia of length 32.4 cm, then what was the height of the person? Find the length of your tibia in centimeters, and use the expression from this exercise or the previous exercise to estimate your height.

101. *Games behind.* In baseball a team's standing is measured by its percentage of wins and by the number of games it

	W	L	Pct	GB
Boston	50	29	0.633	—
NY Yankees	46	33	0.582	?
Toronto	46	35	0.568	?
Baltimore	38	45	0.458	?
Tampa Bay	35	47	0.427	?

Table for Exercise 101

is behind the leading team in its division. The expression

$$\frac{(X - x) + (y - Y)}{2}$$

gives the number of games behind for a team with x wins and y losses, where the division leader has X wins and Y losses. The table shown gives the won-lost records for the American League East on July 3, 2006 (www.espn.com). Fill in the column for the games behind (GB).

102. *Fly ball.* The approximate distance in feet that a baseball travels when hit at an angle of 45° is given by the expression

$$\frac{(v_0)^2}{32}$$

where v_0 is the initial velocity in feet per second. If Barry Bonds of the Giants hits a ball at a 45° angle with an initial velocity of 120 feet per second, then how far will the ball travel? Use the accompanying graph to estimate the initial velocity for a ball that has traveled 370 feet.
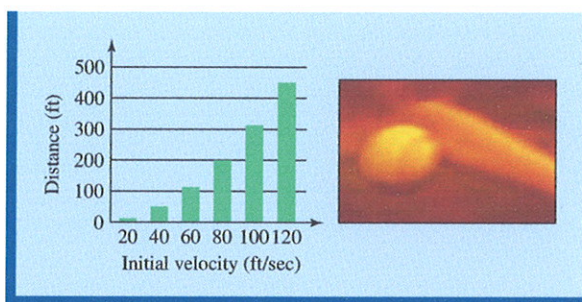

Figure for Exercise 102

103. *Football field.* The expression $2L + 2W$ gives the perimeter of a rectangle with length L and width W. What is the perimeter of a football field with length 100 yards and width 160 feet?
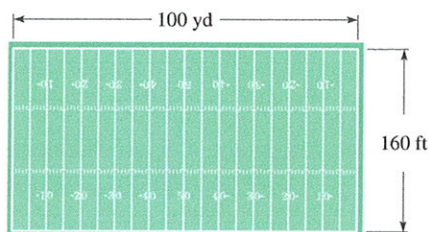

Figure for Exercise 103

104. *Crop circles.* The expression πr^2 gives the area of a circle with radius r. How many square meters of wheat were destroyed when an alien ship made a crop circle of diameter 25 meters in the wheat field at the Southwind Ranch? Round to the nearest tenth. Find π on your calculator.
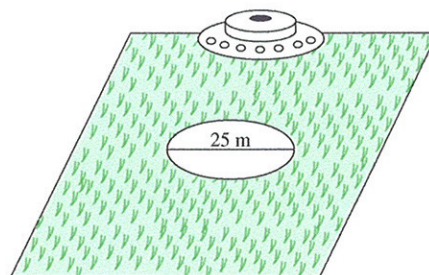

Figure for Exercise 104

Getting More Involved

105. *Writing*

Explain why the square of the sum of two numbers is different from the sum of the squares of two numbers.

106. *Cooperative learning*

The sum of the integers from 1 through n is $\frac{n(n + 1)}{2}$. The sum of the squares of the integers from 1 through n is $\frac{n(n + 1)(2n + 1)}{6}$. The sum of the cubes of the integers from 1 through n is $\frac{n^2(n + 1)^2}{4}$. Use the appropriate expressions to find the following values.

a) The sum of the integers from 1 through 30.
b) The sum of the squares of the integers from 1 through 30.
c) The sum of the cubes of the integers from 1 through 30.
d) The square of the sum of the integers from 1 through 30.
e) The cube of the sum of the integers from 1 through 30.