PROBLEM SOLVING

EXAMPLE 3 on p. 439 for Exs. 46–48

46. EXCHANGE RATES The *euro* is the unit of currency for the European Union. On a certain day, the number E of euros that could be obtained for D dollars was given by this function:

$$E = 0.81419D$$

Find the inverse of the function. Then use the inverse to find the number of dollars that could be obtained for 250 euros on that day.

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47. MULTI-STEP PROBLEM When calibrating a spring scale, you need to know how far the spring stretches for various weights. Hooke's law states that the length a spring stretches is proportional to the weight attached to it. A model for one scale is $\ell = 0.5w + 3$ where ℓ is the total length (in inches) of the stretched spring and w is the weight (in pounds) of the object.

a. Find the inverse of the given model.

b. If you place a weight on the scale and the spring stretches to a total length of 6.5 inches, how heavy is the weight?

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48. EXTENDED RESPONSE At the start of a dog sled race in Anchorage, Alaska, the temperature was 5°C. By the end of the race, the temperature was −10°C. The formula for converting temperatures from degrees Fahrenheit F to degrees Celsius C is $C = \frac{5}{9}(F - 32)$.

a. Find the inverse of the given model. *Describe* what information you can obtain from the inverse.

b. Find the Fahrenheit temperatures at the start and end of the race.

c. Use a graphing calculator to graph the original function and its inverse. Find the temperature that is the same on both temperature scales.

EXAMPLES 6 and 7 on pp. 441–442 for Exs. 49–50

49. BOAT SPEED The maximum hull speed v (in knots) of a boat with a displacement hull can be approximated by

$$v = 1.34\sqrt{\ell}$$

where ℓ is the length (in feet) of the boat's waterline. Find the inverse of the model. Then find the waterline length needed to achieve a maximum speed of 7.5 knots.

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50. BIOLOGY The body surface area A (in square meters) of a person with a mass of 60 kilograms can be approximated by the model

$$A = 0.2195h^{0.3964}$$

where h is the person's height (in centimeters). Find the inverse of the model. Then estimate the height of a 60 kilogram person who has a body surface area of 1.6 square meters.

= WORKED-OUT SOLUTIONS on p. WS1

= TAKS PRACTICE AND REASONING