PROBLEM SOLVING

EXAMPLE 2 on p. 301 for Exs. 70–71

70. ENGINEERING A wire rope can safely support a weight W (in pounds) provided $W \leq 8000d^2$ where d is the rope's diameter (in inches). Graph the inequality.

TEXAS @HomeTutor for problem solving help at classzone.com

71. WOODWORKING A hardwood shelf in a wooden bookcase can safely support a weight W (in pounds) provided $W \leq 115x^2$ where x is the shelf's thickness (in inches). Graph the inequality.

TEXAS @HomeTutor for problem solving help at classzone.com

EXAMPLE 6 on p. 303 for Exs. 72–74

72. ARCHITECTURE The arch of the Sydney Harbor Bridge in Sydney, Australia, can be modeled by $y = -0.00211x^2 + 1.06x$ where x is the distance (in meters) from the left pylons and y is the height (in meters) of the arch above the water. For what distances x is the arch above the road?

73. TAKS REASONING The length L (in millimeters) of the larvae of the black porgy fish can be modeled by

$$L(x) = 0.00170x^2 + 0.145x + 2.35, \ 0 \leq x \leq 40$$

where x is the age (in days) of the larvae. Write and solve an inequality to find at what ages a larvae's length tends to be greater than 10 millimeters. *Explain* how the given domain affects the solution.

74. MULTIPLE REPRESENTATIONS A study found that a driver's reaction time $A(x)$ to audio stimuli and his or her reaction time $V(x)$ to visual stimuli (both in milliseconds) can be modeled by

$$A(x) = 0.0051x^2 - 0.319x + 15, \ 16 \leq x \leq 70$$

$$V(x) = 0.005x^2 - 0.23x + 22, \ 16 \leq x \leq 70$$

where x is the driver's age (in years).

a. Writing an Inequality Write an inequality that you can use to find the x-values for which $A(x)$ is less than $V(x)$.

b. Making a Table Use a table to find the solution of the inequality from part (a). Your table should contain x-values from 16 to 70 in increments of 6.

c. Drawing a Graph Check the solution you found in part (b) by using a graphing calculator to solve the inequality $A(x) < V(x)$ graphically. *Describe* how you used the domain $16 \leq x \leq 70$ to determine a reasonable solution.

d. Interpret Based on your results from parts (b) and (c), do you think a driver would react more quickly to a traffic light changing from green to yellow or to the siren of an approaching ambulance? *Explain*.

= WORKED-OUT SOLUTIONS on p. WS1 = TAKS PRACTICE AND REASONING = MULTIPLE REPRESENTATIONS