41. SWIMMING For a swimmer doing the breaststroke, the function

$$S = -241t^7 + 1060t^6 - 1870t^5 + 1650t^4 - 737t^3 + 144t^2 - 2.43t$$

models the swimmer's speed S (in meters per second) during one complete stroke, where t is the number of seconds since the start of the stroke. Graph the function. According to the model, at what time during the stroke is the swimmer going the fastest?

42. MULTIPLE REPRESENTATIONS You have 600 square feet of material for building a greenhouse that is shaped like half a cylinder.

a. Writing an Expression The surface area S of the greenhouse is given by $S = \pi r^2 + \pi r\ell$. Substitute 600 for S and then write an expression for ℓ in terms of r.

b. Writing a Function The volume V of the greenhouse is given by $V = \frac{1}{2}\pi r^2\ell$. Write an equation that gives V as a polynomial function of r alone.

c. Graphing a Function Graph the volume function from part (b). What are the dimensions r and ℓ that maximize the volume of the greenhouse? What is the maximum volume?

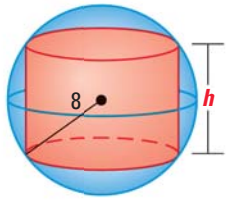
43. EXTENDED RESPONSE From 1960 to 2001, the number of students S (in thousands) enrolled in public schools in the United States can be modeled by $S = 1.64x^3 - 102x^2 + 1710x + 36{,}300$ where x is the number of years since 1960.

a. Graph the function.

b. Identify any turning points on the domain $0 \le x \le 41$. What real-life meaning do these points have?

c. What is the range of the function?

44. CHALLENGE A cylinder is inscribed in a sphere of radius 8. Write an equation for the volume of the cylinder as a function of h. Find the value of h that maximizes the volume of the inscribed cylinder. What is the maximum volume of the cylinder?



MIXED REVIEW FOR TAKS

TAKS PRACTICE at classzone.com

REVIEW
TAKS Preparation p. 608; TAKS Workbook

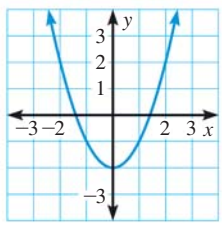
45. TAKS PRACTICE A painter is repainting a spherical section of a sculpture. Which measure would be most useful in determining the amount of paint the painter needs to buy? *TAKS Obj. 10*

Ⓐ Radius Ⓑ Circumference

Ⓒ Volume Ⓓ Surface area

REVIEW
Lesson 4.1; TAKS Workbook

46. TAKS PRACTICE Which equation is the parent function of the graph represented? *TAKS Obj. 2*



Ⓕ $y = x$ Ⓖ $y = |x|$

Ⓗ $y = x^2$ Ⓙ $y = x^3$

EXTRA PRACTICE for Lesson 5.8, p. 1014
ONLINE QUIZ at classzone.com