Name_____ Class_____ Date_____

1 Solve by extracting roots. Give exact values for your answers.

$$64\,x^2 = 169$$

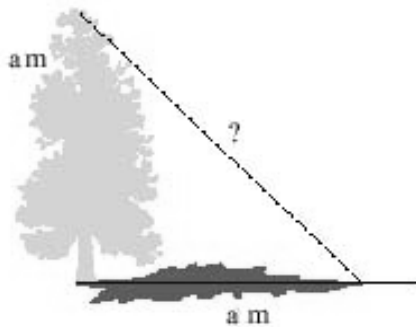a. $x = \dfrac{169}{64}$ b. $x = \dfrac{13}{8}$ c. $x = \pm\,\dfrac{8}{169}$ d. $x = \pm\,\dfrac{8}{13}$ e. $x = \pm\,\dfrac{13}{8}$

2 Solve by extracting roots. Round your answers to two decimal places.

$$1.6x^2 = 0.8x^2 + 28.7$$

3 If a *x*-meter pine tree casts a shadow of *x* meters, how far is the tip of the shadow from the top of the tree if *x* = 40? (See figure) Round the answer to the nearest tenth.
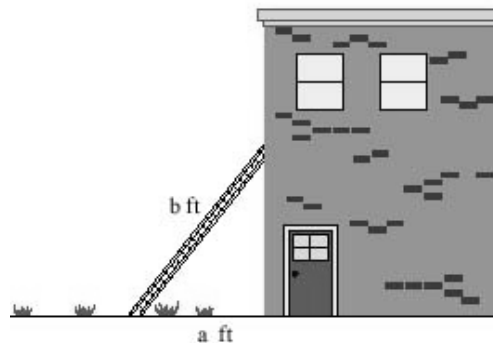

4 Solve by extraction of roots.

$$(\,4x - 1\,)^2 = 25$$

5 Solve by extracting roots. Round your answers to two decimal places.

$$0.3\,x^2 = 2.8\,x^2 - 8.7$$

6 How high on a building will a 35 - foot ladder reach if the base of the ladder is 21 feet away from the wall?

_____ ft

7 The area of the ring in the picture is given by the formula where **R** is the radius of the outer circle and **r** is the radius of the inner circle. Suppose the inner radius of the ring is kept fixed at **r** = 18 centimeters, if the area of the ring is $576\,\pi$ square centimeters, what is the radius of the outer circle?

$$A = \pi R^2 - \pi r^2$$
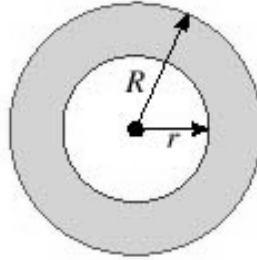
_____ centimeters

8 Solve for *x* in terms of *a*.

$$(x + a)^2 = 100$$

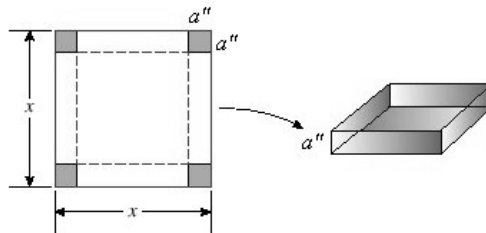a. $x = -\sqrt{a} + 2a \pm 10$ c. $x = -a \pm 10$ e. $x = \pm\sqrt{a} \pm 10$

b. $x = -\sqrt{a} \pm 10$ d. $x = \pm\sqrt{a} + 2a \pm 10$

9 We are going to make an open box from a square piece of cardboard by cutting *a* -inch squares from each corner, and then turning up the edges, as shown in the illustration. Let *a* = 4. Let *x* represent the side of the original sheet of cardboard. Write algebraic expressions for the dimensions of the box and for its volume.
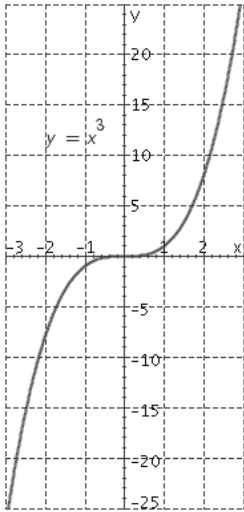

Write the algebraic expression for the length of the box.

Write the algebraic expression for the width of the box.

Write the algebraic expression for the volume of the box.

10 Use the graph of $y = x^3$ to estimate $\sqrt[3]{15}$ to one decimal point.
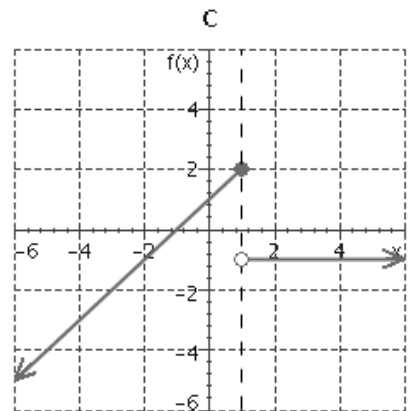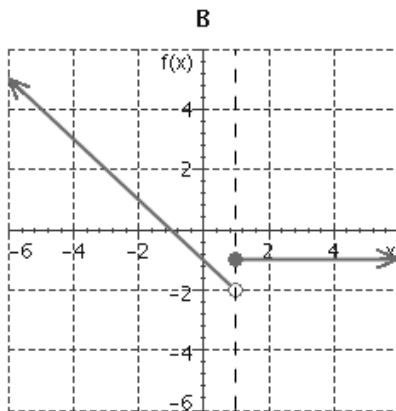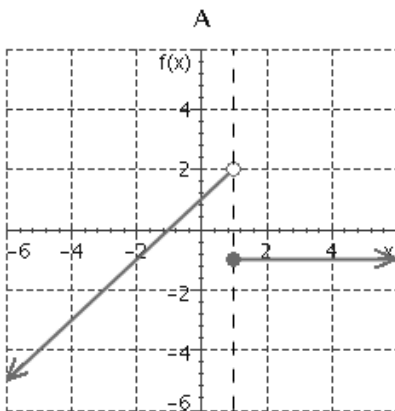
$y = x^3$

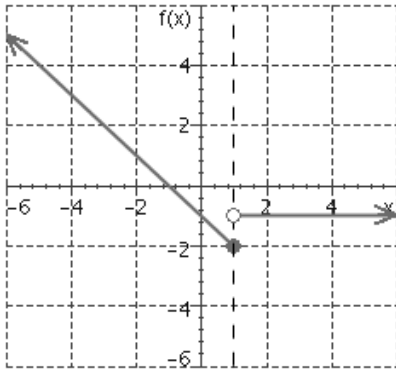**11** Graph

$$F(x) = 2\sqrt{x - 25}$$

and use it to solve the equation

$$2\sqrt{x - 25} = 8$$

12 Graph the function defined by

$$f(x) = \begin{cases} x + 1 & \text{if } x \leq 1 \\ -1 & \text{if } x > 1 \end{cases}$$
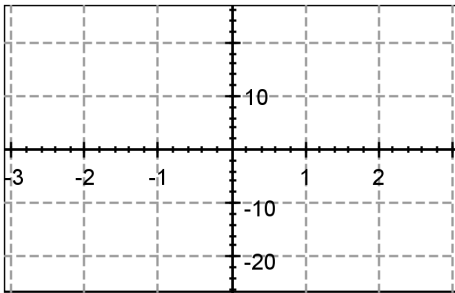
A

B

C

D

Select the letter that corresponds to the correct graph.

13 Sketch both functions on the same grid, paying attention to the shape of the graph. Carefully plot at least three "guide points" for each graph to ensure accuracy. If possible, plot the points with x-coordinates - 1, 0, and 1.

$$f(x) = x^2, \ g(x) = x^3$$

14 Graph $f(x) = \sqrt{x}$ and $s(x) = \sqrt[6]{x}$ on the domain [0, 1] and the range [0, 1]. On the interval (0, 1), which is greater, $f(x)$ or $s(x)$?

15 Graph $h(x) = \dfrac{1}{x}$ and $g(x) = \dfrac{1}{x^6}$ on the domain [1, 10] and the range (0, 1]. On the interval $(1, \infty)$, which is greater, $h(x)$ or $g(x)$.

  a. $g(x)$ b. $h(x)$ c. $h(x) = g(x)$

16 Use the graph of the function $g(x) = \dfrac{4}{x+2}$, for $x > -2$ to estimate the solution of the equation.

$$\dfrac{4}{x+2} = 4$$

_____
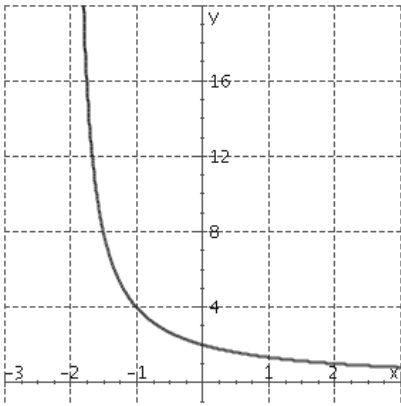
17 Graph the following piecewise-defined function.

$$G(t) = \begin{cases} 4t + 7 & \text{if } t < -2 \\ -4 - \dfrac{1}{3}t & \text{if } t \geq -2 \end{cases}$$

a.

c.

b.

d.
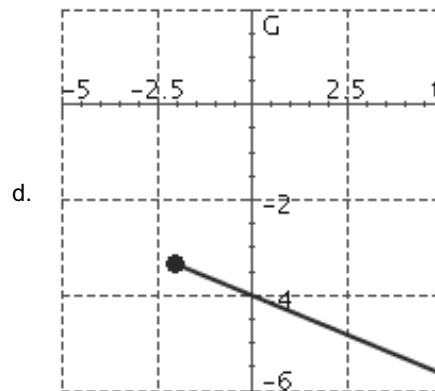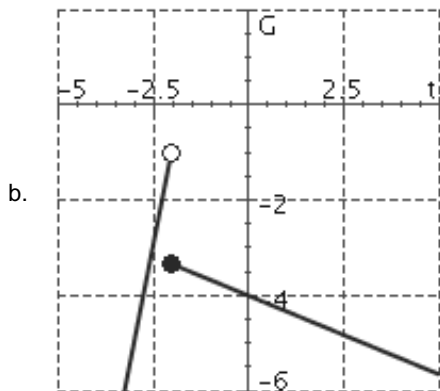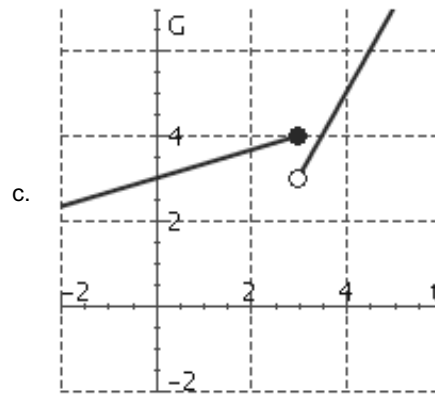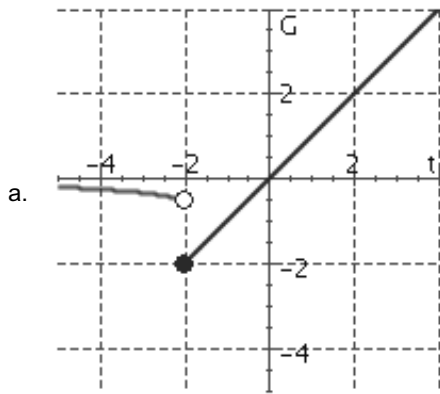
18 Graph the function.

$$h(x) = \frac{1}{x} - 2$$

Select the correct graph.

A	B	C
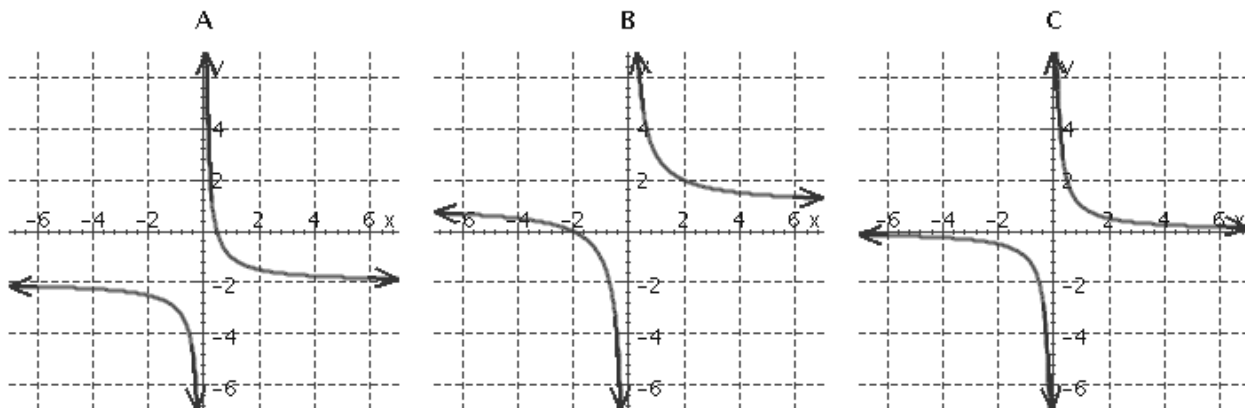
19 Graph the function.

$$f(x) = (x + 2)^3 + 4$$

Select the correct graph.

A	B	C
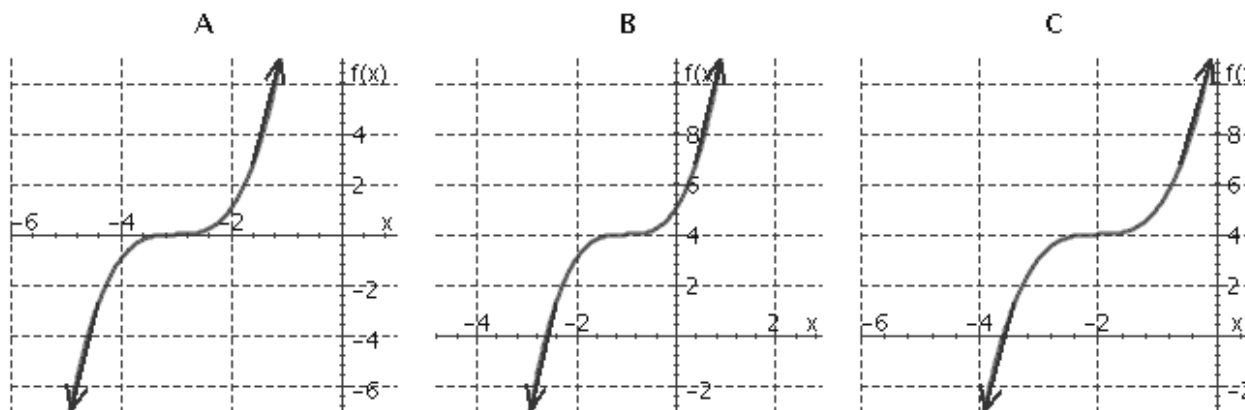
20 Find the correct transformation of one of the basic graphs to obtain the graph of the given function.

$$G(r) = (r + 4)^2$$

a. Shift the graph of
$G(r) = r^2$ 4
units left

b. Shift the graph of
$G(r) = r^2$ 4
units down

c. Shift the graph of
$G(r) = r^2$ 4
units up

d. Shift the graph of
$G(r) = r^2$ 4
units right

21 Give an equation for the graph shown.

22 The table shows how the amount of water, A, flowing past a point on a river is related to the width, W, of the river at that point.

Width (feet)	11	23	34	46
Amount of water (ft^3/second)	13	19	23	27

Which equation describes the information?

$$\text{I. } A = k\sqrt{W} \quad \text{III. } A = kW^2$$

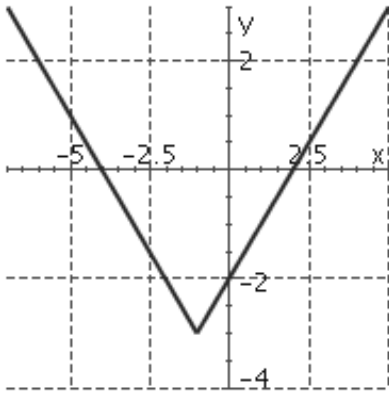$$\text{II. } A = kW \quad \text{IV. } A = \frac{k}{W}$$

23 The table shows how the amount of water, A, flowing past a point on a river is related to the width, W, of the river at that point. What equation describes A in terms of W?

Width (feet)	12.25	25	31.36	44.89
Amount of water (ft^3/second)	22.75	32.5	36.4	43.55

24 Find the domain and range of the following function from its graph.
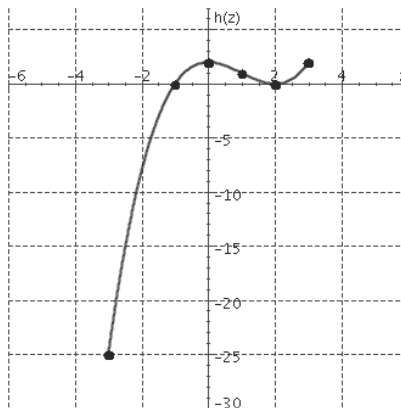
    a. Range: [-3, 3]   c. Domain: [-25, 2]   e. Range : all real numbers

    b. Domain: [-3, 3]   d. Range: [-25, 2]   f. Domain : all real numbers

25 Determine the domain and range of the function *F* graphed in the figure below.

Enter your answer in interval notation.
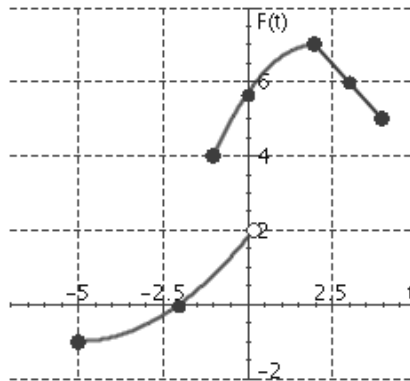
26 Determine the domain and range of the function *F* graphed in the figure below.

Enter your answer in interval and set notations.

27 Find the domain and range of the function.

$$H(x) = \frac{1}{x^5}$$

Enter your answers in interval notation.

28 Find the domain and range of the following function from its graph.

What is the domain of this function?

What is the range of this function?

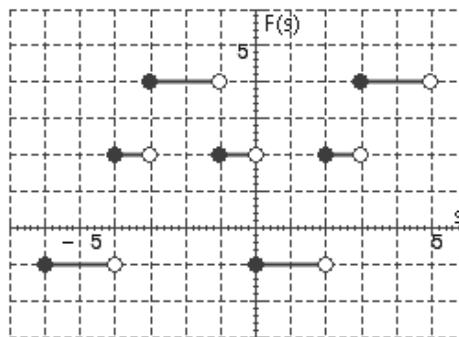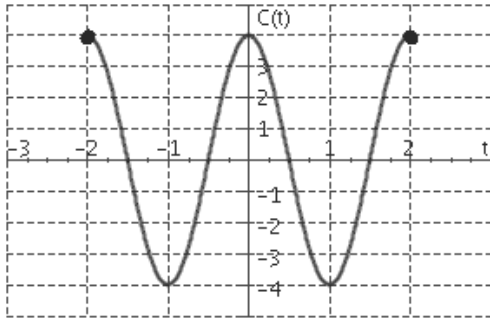29 Find the domain of the following function algebraically. Then graph the function, and use the graph to help find the range.

$$h(n) = 7 + (n - 4)^2$$

a. The domain is $[- 7, \infty)$,
   the range is $[23, \infty)$.

c. The domain is $[- 7, 4)$, the
   range is $[- \infty, \infty)$.

e. The domain is $(- \infty, \infty)$,
   the range is $[23, \infty)$.

b. The domain is $(- 0, \infty)$,
   the range is $[23, \infty)$.

d. The domain is $(- \infty, 7]$,
   the range is $[0, \infty)$.

30 Use a graphing calculator to graph the following function on the given domain. Adjust *Ymin* and *Ymax* until you can estimate the range of the function, using the **TRACE** key. Verify your answer algebraically by evaluating the function.

$$f(x) = x^2 - 4x \qquad - 1 \le x \le 7$$

What is the domain of this function?

What is the range of this function?

31 Delbert's credit card statement lists three purchases he made while on a business trip in the Midwest. His company's accountant would like to know the sales tax rate on the purchases.

Price of the item	15	22	12
Tax	0.825	1.21	0.66

Is the tax proportional to the price?

Express the tax, *T*, as a function of the price, *p*, of the item.

32 If *a* varies inversely with *b* and *b* varies inversely with *c*, does *a* vary inversely with *c*?

33 The marketing department for a paper company is testing wrapping paper rolls in various dimensions to see which shape consumers prefer. All the rolls contain the same amount of wrapping paper.

Express the length, *L*, of the paper as a function of the width, *w*, of the roll.

9

Width (feet)	2	2.5	3
Length (feet)	12	9.6	8

a. $L = \dfrac{8}{w}$ b. $L = w^2 \cdot 24$ c. $L = \dfrac{24}{w}$ d. $L = \dfrac{w}{24}$ e. $L = w \cdot 24$

34 The weight of an object on the moon varies directly with its weight on earth. A person who weighs 240 pounds on earth would weigh only 39.6 pounds on the moon. Find a function that gives the weight m of an object on the moon in terms of its weight w on earth. Complete the table.

w	130	200	250	450
m				

35 Considering that y varies directly with the square of x and $x = 1.9$ agrees with $y = 72.2$, find what value of x agrees with $y = 217.8$.

a. 3.3 b. 1.9 c. 38 d. 3.6 e. 3.1

36 The weight, w, of a bronze statue varies directly with the cube of its height, h. If you increase the height of a statue by 10%, the new weight is what percentage of the original weight?
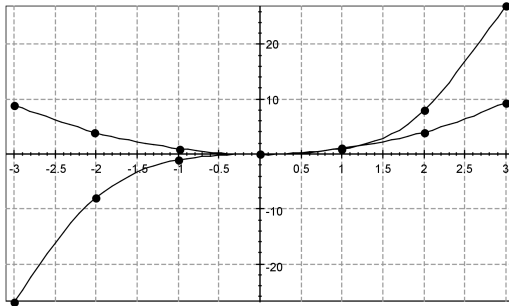
a. 133.1% b. 10% c. 265% d. 0.4% e. 72.9%

Recovered Assignment Template 2-18-08 10-26-24 AM PST

1. e | **2.** $x=\pm 5.99$ | **3.** 56.6

4. $1.5,-1$ | **5.** $1.87,-1.87$ | **6.** 28

7. 30 | **8.** c | **9.** $x-8$; $x-8$; $(x-8)\cdot(x-8)\cdot4$

10. 2.5 | **11.** $x=41$ | **12.** C

13.

14. $s(x)$

15. b

16. $x\approx-1$ | **17.** b | **18.** A

19. C | **20.** a | **21.** $y=|x+1|-3$

22. I | **23.** $A=6.5\sqrt{W}$ | **24.** b,d

25. $[-5,4]$, $[-1,2)\cup[4,7]$ | **26.** $[-6,5)$, $-1,2,4$ | **27.** $(-\infty,0)\cup(0,\infty)$, $(-\infty,0)\cup(0,\infty)$

28. $[-2,2]$; $[-4,4]$ | **29.** e | **30.** $[-1,7]$; $[-4,21]$

31. yes ; $T=p\cdot0.055$ | **32.** no | **33.** c

34.

w	130	200	250	450
m	21.45	33	41.25	74.25

35. a

36. a