

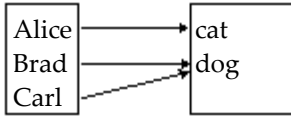
Use Scantron 882E to transfer the answers. Be sure you keep your scantron CLEAN and FLAT before its submission.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the relation represents a function. If it is a function, state the domain and range.

1)

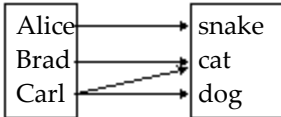
1) _____



- A) function
domain: {Alice, Brad, Carl}
range: {cat, dog}
- B) function
domain: {cat, dog}
range: {Alice, Brad, Carl}
- C) not a function

2)

2) _____



- A) function
domain: {Alice, Brad, Carl}
range: {snake, cat, dog}
- B) function
domain: {snake, cat, dog}
range: {Alice, Brad, Carl}
- C) not a function

3) $\{(-2, 6), (2, 5), (5, -5), (6, -1)\}$

3) _____

- A) function
domain: {6, 5, -5, -1}
range: $\{-2, 2, 5, 6\}$
- B) function
domain: $\{-2, 2, 5, 6\}$
range: {6, 5, -5, -1}
- C) not a function

4) $\{(-1, -3), (-2, -2), (-2, 0), (2, 2), (14, 4)\}$

4) _____

- A) function
domain: $\{-3, -2, 0, 2, 4\}$
range: $\{-1, 2, -2, 14\}$
- B) function
domain: $\{-1, 2, -2, 14\}$
range: $\{-3, -2, 0, 2, 4\}$
- C) not a function

Determine whether the equation defines y as a function of x.

5) $y = x^3$

5) _____

- A) function
- B) not a function

6) $y = \frac{1}{x}$

6) _____

- A) function
- B) not a function

7) $y^2 = 8 - x^2$ 7) _____
A) function B) not a function

8) $y = \pm\sqrt{1 - 8x}$ 8) _____
A) function B) not a function

Find the value for the function.

9) Find $f(3)$ when $f(x) = x^2 - 2x - 1$. 9) _____
A) 4 B) 16 C) 14 D) 2

10) Find $f(-2)$ when $f(x) = \frac{x^2 - 9}{x - 3}$. 10) _____
A) $-\frac{4}{5}$ B) -11 C) $-\frac{13}{5}$ D) 1

11) Find $f(8)$ when $f(x) = \sqrt{x^2 + 2x}$. 11) _____
A) $4\sqrt{5}$ B) $\sqrt{66}$ C) $2\sqrt{17}$ D) $\sqrt{6}$

12) Find $f(x - 1)$ when $f(x) = 3x^2 + 2x + 3$. 12) _____
A) $-4x^2 + 3x + 4$ B) $3x^2 - 4x + 4$ C) $3x^2 + 11x + 8$ D) $3x^2 - 4x + 8$

13) Find $f(2x)$ when $f(x) = 2x^2 - 5x + 1$. 13) _____
A) $8x^2 - 10x + 2$ B) $4x^2 - 10x + 1$ C) $8x^2 - 10x + 1$ D) $4x^2 - 10x + 2$

14) Find $f(x + h)$ when $f(x) = -2x^2 - 3x - 5$. 14) _____
A) $-2x^2 - 2h^2 - 7x - 7h - 5$ B) $-2x^2 - 2h^2 - 3x - 3h - 5$
C) $-2x^2 - 4xh - 2h^2 - 3x - 3h - 5$ D) $-2x^2 - 2xh - 2h^2 - 3x - 3h - 5$

Solve the problem.

15) If a rock falls from a height of 50 meters on Earth, the height H (in meters) after x seconds is 15) _____
approximately
 $H(x) = 50 - 4.9x^2$.
What is the height of the rock when $x = 1.8$ seconds? Round to the nearest hundredth, if necessary.
A) 65.88 m B) 34.45 m C) 41.18 m D) 34.12 m

16) The function F described by $F(C) = \frac{9}{5}C + 32$ gives the Fahrenheit temperature corresponding to the 16) _____
Celsius temperature C . Find the Fahrenheit temperature equivalent to -30°C .
A) -22°F B) -76°F C) -184°F D) -130°F

Find the domain of the function.

17) $f(x) = x^2 + 4$ 17) _____
A) all real numbers B) $\{x \mid x \neq -4\}$
C) $\{x \mid x \geq -4\}$ D) $\{x \mid x > -4\}$

18) $f(x) = \frac{x}{x^2 + 16}$ 18) _____

- A) all real numbers
C) $\{x \mid x \neq -16\}$

- B) $\{x \mid x \neq 0\}$
D) $\{x \mid x > -16\}$

19) $g(x) = \frac{2x}{x^2 - 36}$ 19) _____

- A) $\{x \mid x \neq -6, 6\}$
C) $\{x \mid x > 36\}$

- B) all real numbers
D) $\{x \mid x \neq 0\}$

20) $f(x) = \sqrt{12 - x}$ 20) _____

- A) $\{x \mid x \leq 2\sqrt{3}\}$

- B) $\{x \mid x \leq 12\}$

- C) $\{x \mid x \neq 12\}$

- D) $\{x \mid x \neq 2\sqrt{3}\}$

For the given functions f and g, find the requested function and state its domain.

21) $f(x) = 9x - 9$; $g(x) = 4x - 7$ 21) _____

Find $f - g$.

- A) $(f - g)(x) = 13x - 16$; $\{x \mid x \neq 1\}$

- B) $(f - g)(x) = -5x + 2$; all real numbers

- C) $(f - g)(x) = 5x - 2$; all real numbers

- D) $(f - g)(x) = 5x - 16$; $\{x \mid x \neq \frac{16}{5}\}$

22) $f(x) = 3x + 4$; $g(x) = 2x - 5$ 22) _____

Find $\frac{f}{g}$.

- A) $\left(\frac{f}{g}\right)(x) = \frac{3x+4}{2x-5}$; $\left\{x \mid x \neq -\frac{4}{3}\right\}$
C) $\left(\frac{f}{g}\right)(x) = \frac{3x+4}{2x-5}$; $\left\{x \mid x \neq \frac{5}{2}\right\}$

- B) $\left(\frac{f}{g}\right)(x) = \frac{2x-5}{3x+4}$; $\left\{x \mid x \neq \frac{5}{2}\right\}$
D) $\left(\frac{f}{g}\right)(x) = \frac{2x-5}{3x+4}$; $\left\{x \mid x \neq -\frac{4}{3}\right\}$

23) $f(x) = 5x - 7$; $g(x) = 2x - 2$ 23) _____

Find $f - g$.

- A) $(f - g)(x) = -3x + 5$; all real numbers

- B) $(f - g)(x) = 7x - 9$; $\{x \mid x \neq 1\}$

- C) $(f - g)(x) = 3x - 5$; all real numbers

- D) $(f - g)(x) = 3x - 9$; $\{x \mid x \neq 3\}$

24) $f(x) = 3x + 5$; $g(x) = 5x - 3$ 24) _____

Find $\frac{f}{g}$.

- A) $\left(\frac{f}{g}\right)(x) = \frac{3x+5}{5x-3}$; $\left\{x \mid x \neq -\frac{5}{3}\right\}$
C) $\left(\frac{f}{g}\right)(x) = \frac{5x-3}{3x+5}$; $\left\{x \mid x \neq \frac{3}{5}\right\}$

- B) $\left(\frac{f}{g}\right)(x) = \frac{5x-3}{3x+5}$; $\left\{x \mid x \neq -\frac{5}{3}\right\}$
D) $\left(\frac{f}{g}\right)(x) = \frac{3x+5}{5x-3}$; $\left\{x \mid x \neq \frac{3}{5}\right\}$

Find and simplify the difference quotient of f, $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$, for the function.

25) $f(x) = 4x - 5$ 25) _____

- A) $4 + \frac{-10}{h}$

- B) $4 + \frac{8(x-5)}{h}$

- C) 4

- D) 0

26) $f(x) = 5x^2$

26) _____

A) $\frac{5(2x^2 + 2xh + h^2)}{h}$

B) 5

C) $\frac{10}{h} + x + 5h$

D) $5(2x+h)$

Solve the problem.

27) Express the gross salary G of a person who earns \$15 per hour as a function of the number x of hours worked.

27) _____

A) $G(x) = \frac{15}{x}$

B) $G(x) = 15x^2$

C) $G(x) = 15x$

D) $G(x) = 15 + x$

28) Jacey, a commissioned salesperson, earns \$360 base pay plus \$36 per item sold. Express Jacey's gross salary G as a function of the number x of items sold.

28) _____

A) $G(x) = 360x + 36$

B) $G(x) = 36(x + 360)$

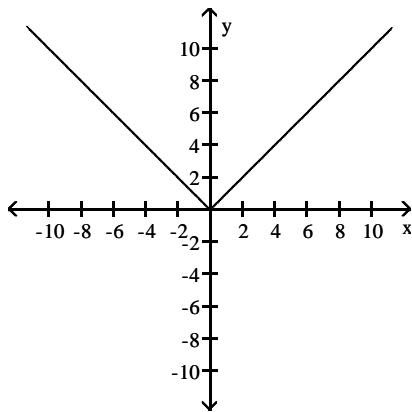
C) $G(x) = 360(x + 36)$

D) $G(x) = 36x + 360$

The graph of a function is given. Decide whether it is even, odd, or neither.

29)

29) _____



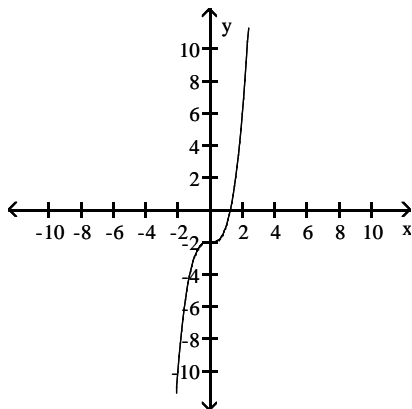
A) even

B) odd

C) neither

30)

30) _____



A) even

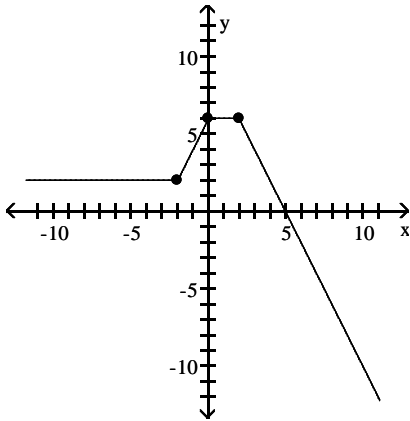
B) odd

C) neither

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

31) $(0, 2)$

31) _____



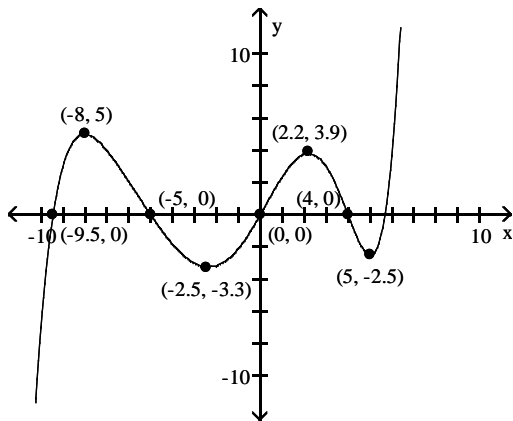
A) constant

B) decreasing

C) increasing

32) $(-\infty, -8)$

32) _____



A) decreasing

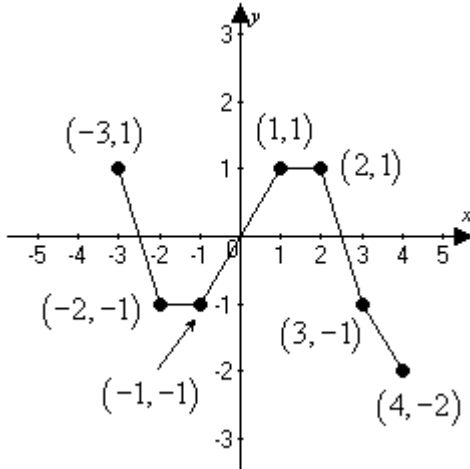
B) increasing

C) constant

Use the graph to find the intervals on which it is increasing, decreasing, or constant.

33)

33) _____

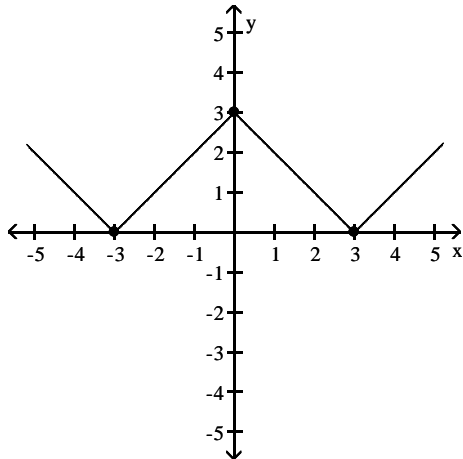


- A) Decreasing on $(-3, -1)$ and $(1, 4)$; increasing on $(-2, 1)$
- B) Increasing on $(-3, -2)$ and $(2, 4)$; decreasing on $(-1, 1)$; constant on $(-2, -1)$ and $(1, 2)$
- C) Decreasing on $(-3, -2)$ and $(2, 4)$; increasing on $(-1, 1)$
- D) Decreasing on $(-3, -2)$ and $(2, 4)$; increasing on $(-1, 1)$; constant on $(-2, -1)$ and $(1, 2)$

The graph of a function f is given. Use the graph to answer the question.

34) Find the numbers, if any, at which f has a local maximum. What are the local maxima?

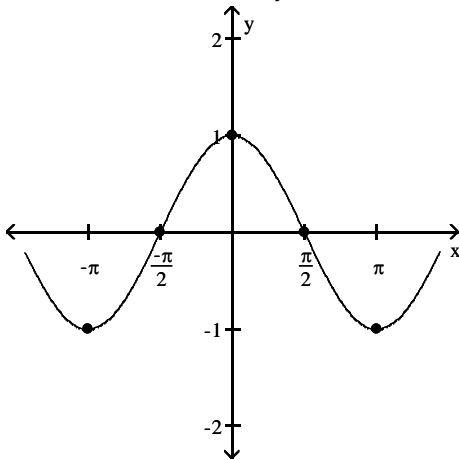
34) _____



- A) f has a local maximum at $x = -3$ and 3 ; the local maximum is 0
- B) f has a local maximum at $x = 3$; the local maximum is 3
- C) f has a local maximum at $x = 0$; the local maximum is 3
- D) f has no local maximum

35) Find the numbers, if any, at which f has a local maximum. What are the local maxima?

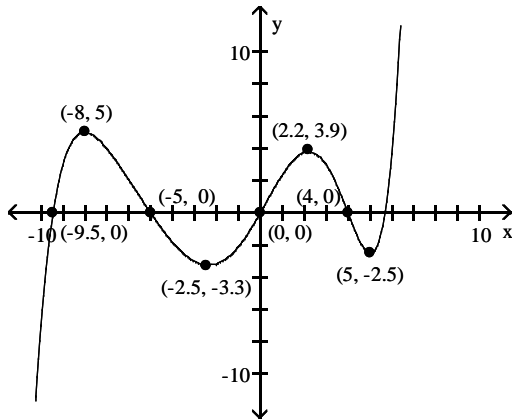
35) _____



- A) f has a local maximum at $x = 0$; the local maximum is 1
- B) f has no local maximum
- C) f has a local maximum at $-\pi$; the local maximum is 1
- D) f has a local maximum at $x = -\pi$ and π ; the local maximum is -1

36)

36) _____



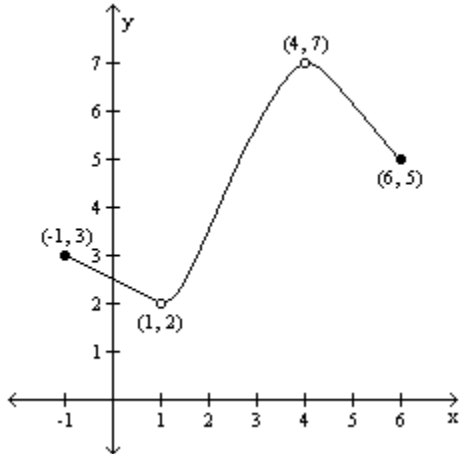
Find the numbers, if any, at which f has a local minimum. What are the local maxima?

- A) f has a local minimum at $x = -2.5$ and 5 ; the local minimum at -2.5 is -3.3 ; the local minimum at 5 is -2.5
- B) f has a local minimum at $x = -3.3$ and -2.5 ; the local minimum at -3.3 is -2.5 ; the local minimum at -2.5 is 5
- C) f has a local maximum at $x = -3.3$ and -2.5 ; the local maximum at -3.3 is -2.5 ; the local maximum at -2.5 is 5
- D) f has a local maximum at $x = -2.5$ and 5 ; the local maximum at -2.5 is -3.3 ; the local maximum at 5 is -2.5

For the graph of the function $y = f(x)$, find the absolute maximum and the absolute minimum, if it exists.

37)

37) _____



- A) Absolute maximum: $f(4) = 7$; Absolute minimum: none
- B) Absolute maximum: $f(4) = 7$; Absolute minimum: $f(1) = 2$
- C) Absolute maximum: none; Absolute minimum: $f(1) = 2$
- D) Absolute maximum: none; Absolute minimum: none

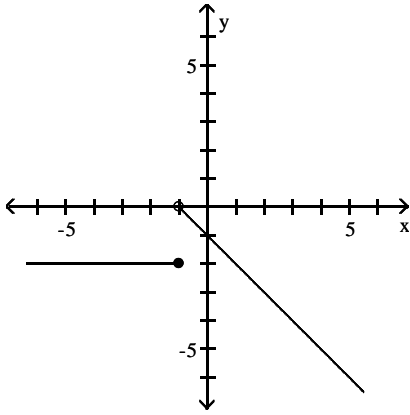
Graph the function.

38)

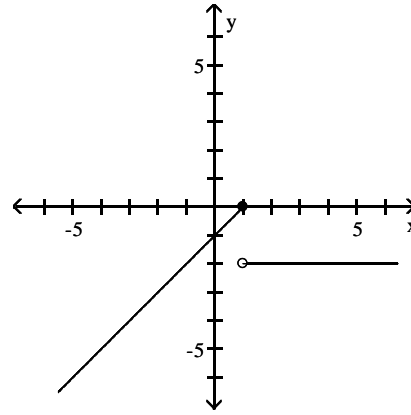
38) _____

$$f(x) = \begin{cases} x - 1 & \text{if } x < 1 \\ -2 & \text{if } x \geq 1 \end{cases}$$

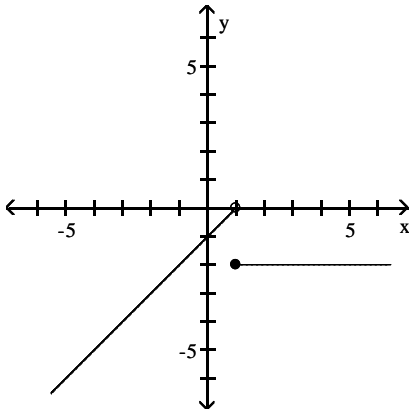
A)



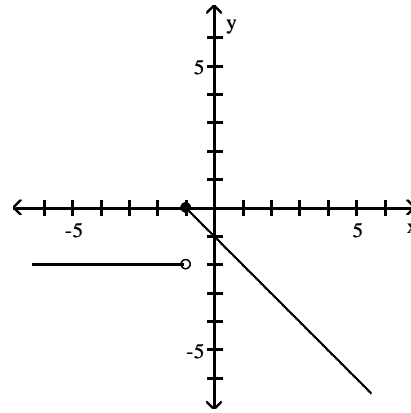
B)



C)



D)

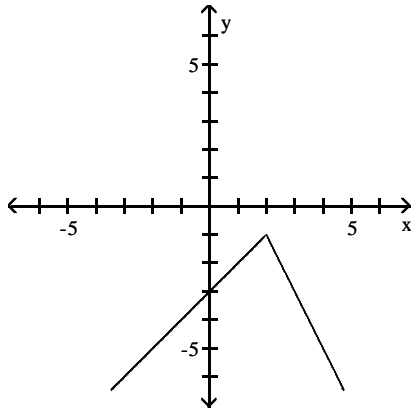


39)

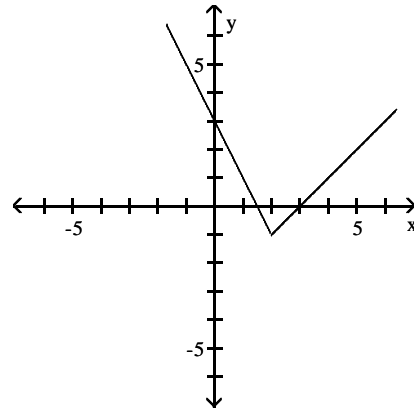
$$f(x) = \begin{cases} -x + 3 & \text{if } x < 2 \\ 2x - 3 & \text{if } x \geq 2 \end{cases}$$

39) _____

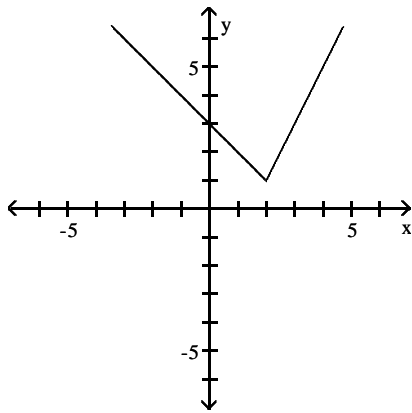
A)



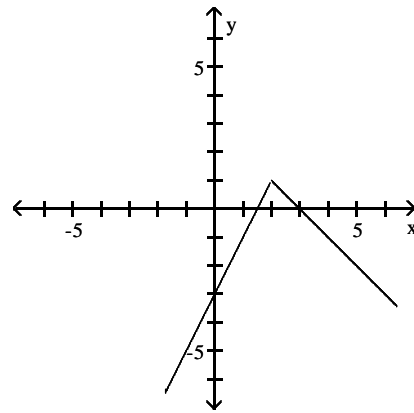
B)



C)



D)



Write the equation of a sine function that has the given characteristics.

40) The graph of $y = x^2$, shifted 8 units upward

40) _____

A) $y = \frac{x^2}{8}$

B) $y = x^2 + 8$

C) $y = 8x^2$

D) $y = x^2 - 8$

41) The graph of $y = |x|$, shifted 9 units to the right

41) _____

A) $y = |x + 9|$

B) $y = |x| - 9$

C) $y = |x - 9|$

D) $y = |x| + 9$

42) The graph of $y = |x|$, shifted 7 units upward

42) _____

A) $y = |x| + 7$

B) $y = |x| - 7$

C) $y = |x + 7|$

D) $y = |x - 7|$

43) The graph of $y = \sqrt{x}$, shifted 9 units to the right

43) _____

A) $y = \sqrt{x - 9}$

B) $y = \sqrt{x} - 9$

C) $y = \sqrt{x + 9}$

D) $y = \sqrt{x + 9}$

44) The graph of $y = \sqrt{x}$, shifted 5 units to the left

44) _____

A) $y = \sqrt{x - 5}$

B) $y = \sqrt{x} - 5$

C) $y = \sqrt{x + 5}$

D) $y = \sqrt{x + 5}$

- 45) The graph of $y = \sqrt{x}$, shifted 7 units upward 45) _____
 A) $y = \sqrt{x+7}$ B) $y = \sqrt{x-7}$ C) $y = \sqrt{x} - 7$ D) $y = \sqrt{x} + 7$
- 46) The graph of $y = \sqrt{x}$, shifted 9 units downward 46) _____
 A) $y = \sqrt{x+9}$ B) $y = \sqrt{x-9}$ C) $y = \sqrt{x} - 9$ D) $y = \sqrt{x} + 9$

Solve the problem.

- 47) Elissa wants to set up a rectangular dog run in her backyard. She has 50 feet of fencing to work with and wants to use it all. If the dog run is to be x feet long, express the area of the dog run as a function of x . 47) _____
 A) $A(x) = 25x - x^2$ B) $A(x) = 26x - x^2$ C) $A(x) = 24x - x^2$ D) $A(x) = 27x^2 - x$
- 48) Bob wants to fence in a rectangular garden in his yard. He has 70 feet of fencing to work with and wants to use it all. If the garden is to be x feet wide, express the area of the garden as a function of x . 48) _____
 A) $A(x) = 37x^2 - x$ B) $A(x) = 36x - x^2$ C) $A(x) = 34x - x^2$ D) $A(x) = 35x - x^2$
- 49) A rectangular sign is being designed so that the length of its base, in feet, is 6 feet less than 4 times the height, h . Express the area of the sign as a function of h . 49) _____
 A) $A(h) = 6h - 2h^2$ B) $A(h) = -6h + 4h^2$
 C) $A(h) = -6h^2 + 2h$ D) $A(h) = -6h + h^2$
- 50) A wire of length $6x$ is bent into the shape of a square. Express the area A of the square as a function of x . 50) _____
 A) $A(x) = \frac{1}{16}x^2$ B) $A(x) = \frac{9}{4}x^2$ C) $A(x) = \frac{3}{2}x^2$ D) $A(x) = \frac{9}{2}x^2$