Version A

Solutions

1.

Find the domain of $g(t) = \sqrt{t - 9}$.

All real numbers t for which ____

Solution:

Since negative numbers do not have real square roots, $g(t)$ can be evaluated only when $t - 9 \geq 0$, so the domain of g is the set of all numbers t such that $t \geq 9$.

Correct answer is: All real numbers t for which $t \geq 9$

2.

Market research indicates that consumers will buy x thousand units of a particular kind of coffee maker when the unit price is

$$p = -0.22x + 52$$

dollars. The cost of producing the x thousand units is

$$C(x) = 3.26x^2 + 2.7x + 82$$

thousand dollars. What is the profit function, $P(x)$, for this production process?

$P(x) =$ ____

Solution:

The demand function is $D(x) = -0.22x + 52$, so the revenue is

$$R(x) = xD(x) = -0.22x^2 + 52x$$

thousand dollars, and the profit is

$$P(x) = R(x) - C(x)$$
$$= -0.22x^2 + 52x - (3.26x^2 + 2.7x + 82)$$
$$= -3.48x^2 + 49.3x - 82$$

thousand dollars.

Correct answer is: $P(x) = -3.48x^2 + 49.3x - 82$

3.

Find the composite function $f(g(x))$, where $f(u) = u^2 + 2u + 1$ and $g(x) = x + 4$.

$f(g(x)) =$ ____

Solution:

Replace u by $x + 4$ in the formula for $f(u)$ to get

$$f(g(x)) = (x + 4)^2 + 2(x + 4) + 1$$
$$= (x^2 + 8x + 16) + (2x + 8) + 1$$
$$= x^2 + 10x + 25$$

Correct answer is: $f(g(x)) = 10x + 25 + x^2$

4.

If $f(x) = \dfrac{5}{x - 3} + 7(x - 3)^3$, find functions $g(u)$ and $h(x)$ such that $f(x) = g(h(x))$.

$g(u)=$ ____ and $h(x)=$ ____

Solution:

The form of the given function is

$f(x) = \frac{5}{\square} + 7(\square)^3$

where each box contains the expression $x - 3$. Thus, $f(x) = g(h(x))$, where

$g(u) = \frac{5}{u} + 7u^3$ and $h(x) = x - 3$

outer function *inner function*

Correct answer is: $g(u)=u^3 7 + \frac{5}{u}$ and $h(x)=x - 3$

5.

Find the indicated function.

$f(x + 2)$ where $f(x) = \frac{x - 72}{x}$

$f(x + 2) = \frac{\_\_\_\_}{\_\_\_\_}$

Solution:

$$f(x + 2) = \frac{(x + 2) - 72}{x + 2}$$

$$= \frac{x - 70}{x + 2}$$

Correct answer is: $f(x + 2) = \frac{x - 70}{x + 2}$
