Worksheet 4 - Lesson 21

1. Given the equation $j(t) = 3t^2 - 5t + 1$ evaluate and simplify the following:

   (a) $j(-2)$

   (b) $j(0)$

   (c) $j(1) - j(0)$

   (d) $j(2)$

   (e) $j(a)$

   (f) $2j(a)$

   (g) $j(a+2)$

   (h) $j(a) + j(2)$

   (i) $j(a) + 2$

   (j) $j(x+h)$

   (k) $j(x+h) - j(x)$

   (l) $\dfrac{j(x+h) - j(x)}{h}$

2. Do the tables below represent y as a function of x? Why or why not?

   (a)
x	-2	0	-1	0	4
y	5	1	3	1	5

   (b)
x	2	-2	0	2	4
y	5	4	3	2	1

   (c)
x	1	2	1	4
y	0	3	-2	1

   (d)
x	1	2	3	4
y	3	1	3	-1

3. Identify the equations that determine y as a function of x:

$$(1)\, x^2 + y^2 - 4 = 0 \qquad (2)\, 3y^2 + 2x = 7 \qquad (3)\, x^2 y + 5y = -2$$

   (a) 1 and 3 only
   (b) 2 only
   (c) 2 and 3 only
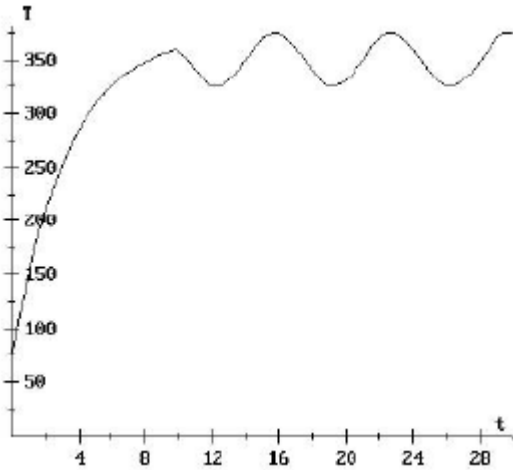   (d) All of them
   (e) None of them

4. Find an equation for a function with the given domain:

   (a) All real numbers except -5.

   (b) All real numbers greater than 7.

   (c) All real numbers except 2 and 5.

5. The graph below represents the actual temperature T of an oven (in degrees Fahrenheit) as a function of the time t (in minutes since the oven was turned on), where the oven was set at $350°F$.

(i) What was the temperature of the oven when it was turned on?

   (a) $0°F$

   (b) $350°F$

   (c) $75°F$

   (d) $100°F$

   (e) None of these

(ii) Estimate $T(20)$ and give a practical interpretation.

(iii) When did the oven first reach its desired temperature?

(iv) Estimate the maximum value of the temperature function.

6. Let $t = \sqrt{w^2 + 16}$

    (a) Is t a function of w? Explain.

    (b) Is w a function of t? Explain.

7. Determine the domain of the following functions:

    (a) $g(x) = \dfrac{1}{x^3 - x}$

    (b) $h(t) = \sqrt[3]{t^2 - 1}$

    (c) $r(w) = \dfrac{3w}{\sqrt{7w + 9}}$

8. Solve each of the following equations for y, and determine if the equations represent functions of x. A and b are constants.

    (a) $3x - y^2 = 2$

    (b) $2x - 3xy + 4y = -4$

    (c) $Ay + b = y + 7$

9. Write an function for each of the following, using appropriate variable notation. Interpret the horizontal and vertical intercepts, if applicable.

(a) A machine with an initial value of \$5,000 depreciates in value by \$1,000 per year. Write an equation that gives the value of the machine after t years.

(b) A boy who is 4 feet tall is growing at a rate of 2 inches per year. Write the height of the boy, in feet, as a function of the time, t, in years.

(c) A person is paying \$10 a week to a friend in order to pay back a \$100 loan. Write the amount the person still owes his friend after w weeks.

(d) A rental car company charges \$39 for a car, plus \$0.20 per mile driven. Write the amount the customer pays in terms of the m miles driven.