Chapter 2 Exam Name:_____

Show all relevant work!

1. The table shows the cost, $C(m)$, of a taxi ride as a function of the number of miles, m, traveled.

m	0	1	2	3	4	5
$C(m)$	0	2.50	4.00	5.50	7.00	8.50

(a) Estimate and interpret $C(3.5)$ in practical terms.

(b) Assume C is an invertible function. What does $C^{-1}(3.5)$ mean in practical terms.? Estimate $C^{-1}(3.5)$.

2. If $g(x) = 2^x + \sqrt{x} - 1$, find $g^{-1}(17)$.

3. Write the equation of a quadratic function with zeros ($x-$intercepts) at $x = -2$ and $x = 3$.

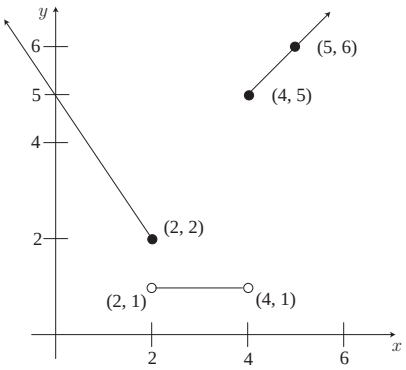
4. If $h(x) = \frac{x}{x-1}$, find $h\left(\frac{1}{x}\right)$ and simplify the result.

5. Find the domain and range for each function.

a) $y = \dfrac{4}{x^2+1}$

b) $y = \sqrt{9 - x^2}$

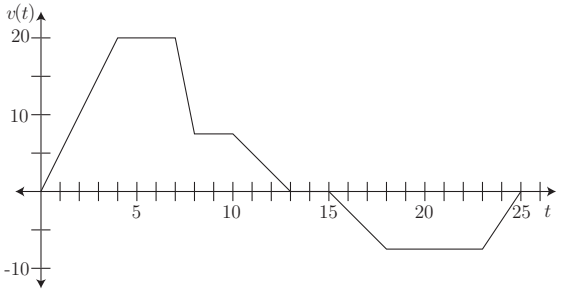
6. Find the equation of the piecewise linear function below.



7. Find the value for k that will make $f(x)$ continuous.

$$f(x) = \begin{cases} 3x^2 - 5 & : \quad x \leq 2 \\ kx + 4 & : \quad x > 2 \end{cases}$$

8. Norbert's velocity (in ft/sec) as he rides his bike away from home is graphed below. Assume that positive velocity is in the direction away from home and negative velocity is towards home. Give the largest interval for which:



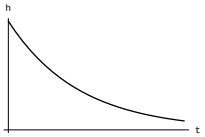
(a) Norbert is traveling the fastest.

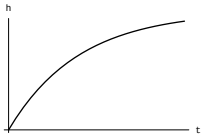
(b) Norbert is farthest from home.

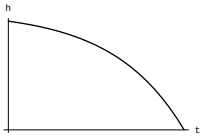
(c) Norbert is stopped.

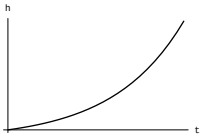
(d) Norbert is accelerating (or decelerating) the fastest.

9. Match each of the time graphs below with the description best suited to it. (Find one description for each graph)

(a) 

(b) 

(c) 

(d) 

(i) Given the graph of height over time, velocity is positive while acceleration is negative.

(ii) Given the graph of population over time, the population is decreasing but not as quickly as it was at first.

(iii) Given the graph of population over time, the population began growing slowly at first, then grew rapidly for a period, and then leveled off.

(iv) We started with a lot of money and sustained small losses over the first years but then the wheels came off and we lost more and more money each year.

(v) Given the graph of defense spending as a function of time, we now spend more than at any time in history and expect the same budget over the next 5 years.

(vi) Given the graph of the height of water in a tank, the water began rising slowly but now is moving rapidly towards the top of the tank.

(a) $\longrightarrow$ _____ (b) $\longrightarrow$ _____ (c) $\longrightarrow$ _____ (d) $\longrightarrow$ _____

10. A rocket is launched from the ground with an initial velocity of 140 ft/sec. Assuming it travels straight up and ignoring air resistance (or any other kind of reality), answer the following questions:

(a) Write an equation for the height of the rocket, h, as a function of time, t.

(b) Find $h(2)$ and interpret the meaning of your result.

(c) When does the rocket return to the earth?

(d) What is the highest altitude the rocket reaches and how long does it take to get there?