1) a) $v(8) = 4$ and $v(10) = 2$

$$m = \frac{v(10) - v(8)}{10 - 8} = \frac{2-4}{2} = \frac{-2}{2} = -1.$$

or

$$m = \frac{v(8) - v(10)}{8 - 10} = \frac{4-2}{-2} = \frac{2}{-2} = -1.$$

Note that from above I can use $v(8)$ or $v(10)$ to find b.

$v(8) = -1 \cdot 8 + b$

$4 = -8 + b$

$b = 12$

$v(10) = -1 \cdot 10 + b$

$2 = -10 + b$

$b = 12$

So

$v(t) = -t + 12$.

b) $v(1) = 4 \quad v(3) = 5$

$$m = \frac{v(1) - v(3)}{1 - 3} = \frac{-1}{-2} = \frac{1}{2}$$

$m = \frac{1}{2}$

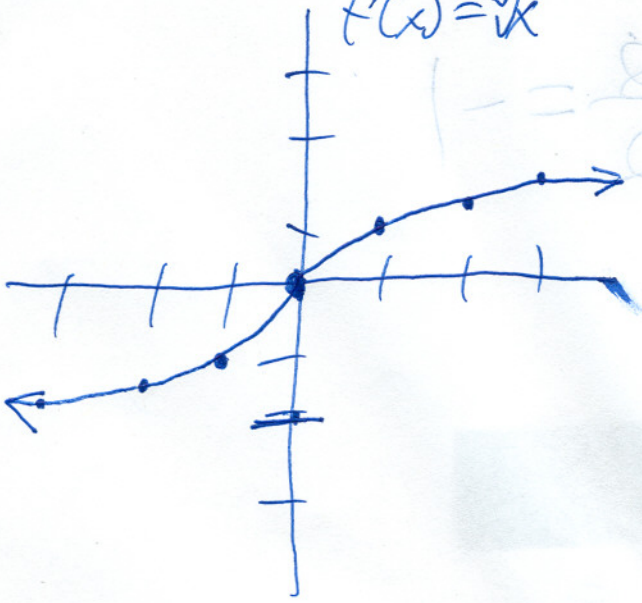
or

$$m = \frac{v(3) - v(1)}{3 - 1} = \frac{5 - 4}{3 - 1} = \frac{1}{2}.$$

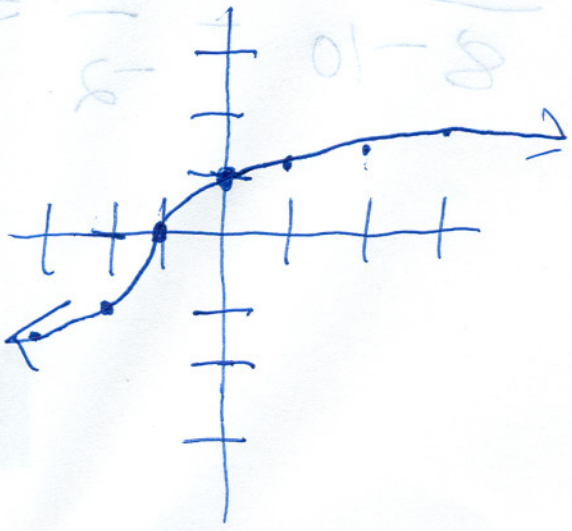
c) Note: Since the question does not specify positive or negative acceleration, overall acceleration could be considered. However, it doesn't make a difference here. The greatest acceleration is from $t = 0$ to $t = 1$. The reason it is from 0 to 1 is that it is the "steepest" on that interval. One could also do the algebra to find the slope of the line segments.

2)

$f(x) = \sqrt[3]{x}$



$f(x) = \sqrt[3]{x+1}$



$f(x) = \sqrt[3]{x+1} + 2$