Chapter 1 Quiz

Name_____

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1. Label the axes for a sketch to illustrate the statement "graph the number of units sold q, as a function of the price, p."

*,			
3			
2			
1			
0	2	2	

Solution. The horizontal axis is labeled p and the vertical axis is labeled q.

2. The following table shows the height of a tree (to the nearest foot) as a function of time (in years).

t	0	1	2	3	4	5	6	7	8	9	10	11	12
height	5	5	6	7	9	11	13	14	14	15	15	15	15

What was the average rate of change in the height of the tree between

(a)	t = 1 and t = 3?	
	<i>Solution</i> . $\frac{7-5}{3-1} = \frac{2}{2} = 1$	
(b)	t = 4 and t = 6?	
	Solution. $\frac{13-9}{6-4} = \frac{4}{2} = 2$	

(c)
$$t = 10$$
 and $t = 12$?
Solution. $\frac{15-15}{12-10} = \frac{0}{2} = 0$

(d) Interpret these results in terms of the height of the tree. Solution. The tree grew slowly at first, then more quickly, then essentially stopped growing.

3. Find an equation for the line shown in the following figure. Your equation will involve the constants given on each graph. Be sure to simplify your answer.



Solution. The slope is $\frac{T}{S-R}$. The line passes through the point (R, 0) and so we have

$$0 = b + (\frac{T}{S-R})R$$

and so

$$b = \frac{-RT}{S-R}.$$

Thus,

$$y = \frac{T}{S-R}x - \frac{RT}{S-R},$$

which can be written as

$$y = \frac{Tx - RT}{S - R}.$$

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4. Six linear functions are defined for all values of x by the equations below. (i) $\frac{1}{3}f(x) - 1 = x$ (ii) $-\frac{1}{3}g(x) = x + 1$ (iii) 2h(x) + x = 3(iv) j(x) = -3x (v) k(x) = 3(vi) 2p(x) + x = 5

Without giving reasons, state which of these functions

- (a) are decreasing.
- (b) have graphs which are parallel.
- (c) have graphs which pass through the point (0,3).
- (d) are neither increasing nor decreasing.

Solution. The following forms of the equations should make it a little easier.

- (i) f(x) = 3x + 3 (ii) g(x) = -3x 3 (iii) $h(x) = \frac{-1}{2}x + \frac{3}{2}$ (iv) j(x) = -3x (v) k(x) = 3 (vi) $p(x) = \frac{-1}{2}x + \frac{5}{2}$
- (a) g(x), h(x), j(x), p(x) are decreasing.
- (b) h(x) and p(x) are parallel; g(x) and j(x) are parallel.
- (c) f(x) and k(x) pass through the point (0,3).
- (d) k(x) is neither increasing or decreasing; it is a horizontal line.
- 5. Find an equation for the line that is perpendicular to $y = \frac{-3}{7}x + 2$ and passes through the point (-3, 5). Solution. $m = \frac{-1}{\frac{-3}{7}} = \frac{7}{3}$ so $(y-5) = \frac{7}{3}(x+3)$. In slope-intercept form, we have $y = \frac{7}{3}x + 12$