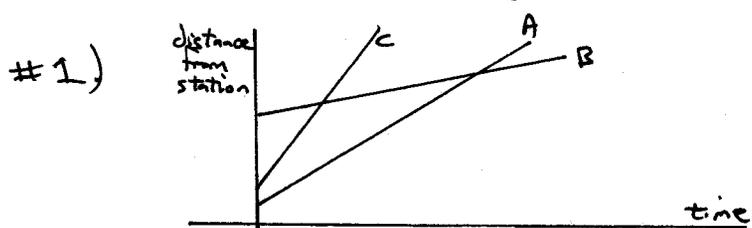


# Assignment #1

Math X assigned on Sept. 25<sup>th</sup>

§1.2 #1, 3, 12 (a) v-ix (b) v-ix, 13, 15 and 20



Train B is traveling the slowest (its graph has the least slope), so it must be the train in the People's Republic of China. The fastest train is C, whose graph has the greatest slope (i.e. steeper), showing that it's covering the greatest distance in the least amount of time. So C is the Japanese bullet train. Train B must then be the Amtrak train.

- #3) (a) You can recognize which ones are functions by noting which have just one arrow going out from each input (i.e. there needs to be just one output for each input). So I and II are functions, but III and IV are not.
- (b) For function I the domain is the set of all possible input values, i.e.  $\{a, b, c, d, e\}$ . Its range is just  $\{c\}$ . For function II the domain is still  $\{a, b, c, d, e\}$ , but its output, or its range, includes  $\{a, b, x, d, z\}$ .

- #12) (a) i. distance travelled in the first 2 hours is  $f(2)$   
ii. distance travelled in the second 2 hours is  $f(4) - f(2)$   
(note this is not necessarily the same thing as  $f(4-2) = f(2)$ !!)  
iii. half the distance travelled in second 3 hours is  $\frac{1}{2}(f(6) - f(3))$   
viii. average speed in first five hours:  
distance travelled is  $f(5)$ , time taken is 5 hours,  
so average speed is  $\frac{f(5)}{5}$  or  $\frac{1}{5}f(5)$   
ix. average speed between hour 6 and hour 12:  
distance travelled is  $f(12) - f(6)$ , time taken is 6 hours,  
so average speed is  $\frac{f(12) - f(6)}{6}$  or  $\frac{1}{6}(f(12) - f(6))$

(b) v. in words  $f(h)$  represents the distance travelled after  $h$  hours, which is when the friends reach Gallup

- 12) (b) v. continued, so  $f(h)-2$  is "2 miles less than the distance from Flagstaff to Gallup"
- vi.  $f(h)+2$  is then "2 miles more than the distance from Flagstaff to Gallup"
- vii. since  $h+2$  represents 2 hours after the friends reached Gallup, then  $g(h+2)$  means "the speed that the friends were going 2 hours after they reached Gallup."
- viii. Since  $g(h)$  represents the speed they were travelling right as they reached Gallup, then  $g(h)+2$  means "2 mph faster than the speed they were travelling when they reached Gallup."
- ix. and  $g(h)-2$  means "2 mph slower than the speed they were going when they reached Gallup."

- #13) (a)  $C(A)$  represents the cost of mailing something weighing  $A$  ounces, i.e. the cost of mailing the birthday gift.
- (b)  $C(2A)$  represents the cost of mailing something that weighs twice as much as the birthday gift.
- (c)  $2C(A)$ , however, represents twice the cost of mailing the birthday gift. (This might be different from (b))
- (d)  $C(A+1)$  means the cost of mailing something that weighs one ounce more than the birthday gift
- (e)  $C(A)+1$  is one more dollar than the cost of mailing the birthday gift.

#15)  $g(x) = \frac{\sqrt{x^2+4}}{2}$  so (a)  $g(0) = \frac{\sqrt{0^2+4}}{2} = \frac{\sqrt{4}}{2} = \frac{2}{2} = 1$

(b)  $g(2) = \frac{\sqrt{2^2+4}}{2} = \frac{\sqrt{8}}{2} = \frac{\sqrt{2} \cdot \sqrt{4}}{2} = \frac{\sqrt{2} \cdot 2}{2} = \sqrt{2}$

(c)  $g(\sqrt{5}) = \frac{\sqrt{(\sqrt{5})^2+4}}{2} = \frac{\sqrt{5+4}}{2} = \frac{\sqrt{9}}{2} = \frac{3}{2}$

(d)  $g\left(\frac{1}{\sqrt{2}}\right) = \frac{\sqrt{\left(\frac{1}{\sqrt{2}}\right)^2+4}}{2} = \frac{\sqrt{\frac{1}{2}+4}}{2} = \frac{\sqrt{4\frac{1}{2}}}{2} = \frac{\sqrt{\frac{9}{2}}}{2}$   
 $= \frac{\sqrt{9}}{\sqrt{2}} = \frac{3}{2\sqrt{2}} = \frac{3\sqrt{2}}{4}$

#15) continued

$$(e) -g(3t) = -\frac{\sqrt{(3t)^2+4}}{2} = -\frac{\sqrt{9t^2+4}}{2}$$

$$(f) g(\sqrt{t-4}) = \frac{\sqrt{(\sqrt{t-4})^2+4}}{2} = \frac{\sqrt{(t-4)+4}}{2} = \frac{\sqrt{t}}{2}$$

#20)  $g(x) = x^2 - 1$ 

$$(a) g(0) = 0^2 - 1 = -1$$

$$g(1) = 1^2 - 1 = 0$$

$$g(-1) = (-1)^2 - 1 = 1 - 1 = 0$$

(b) solve  $x^2 - 1 = 0$ , so  $x^2 = 1$ ,  $x = 1$  or  $-1$   
 (or you can write  $x = \pm 1$  or  $\{1, -1\}$ )

solve  $x^2 - 1 = 1$ , so  $x^2 = 2$ ,  $x = \pm\sqrt{2}$

solve  $x^2 - 1 = -1$ , so  $x^2 = 1 - 1 = 0$ , so  $x = 0$

Solutions to Friday Problems will be given with the rest of the solutions to the next assignment, to be posted on Monday, Oct 2<sup>nd</sup>.