# Day 7 – Comparing Linear Functions – Notes

Linear Functions can come in many forms:

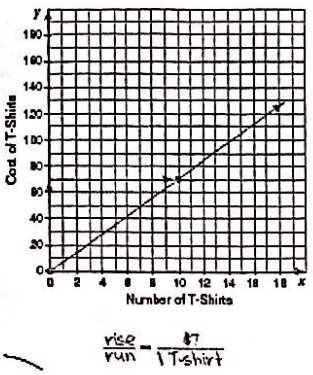
**Context:**

The basketball team won the championship. They are selling special championship T-shirts for a cost of $7 each.

rate of change

y-intercept = 0

**Graph:**




$\frac{rise}{run} = \frac{\$7}{1\ T\text{-shirt}}$

**Table:**

| Number of T-shirts | Cost in Dollars |
|---|---|
| 0 | 0 |
| 1 | 7 |
| 2 | 14 |
| 3 | 21 |
| 4 | 28 |
| 5 | 35 |

rate of change $= \frac{7-0}{1-0} = \frac{\$7}{T\text{-shirt}}$

y-intercept

**Equation:**

Let y represent: total cost of T-shirts
Let x represent: number of T-shirts

$y = 7x$

$y = 7x + 0$

Rate of change y-intercept

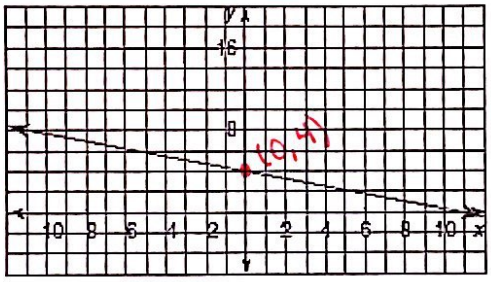
Now that you have studied linear functions and their characteristics for over two weeks, you need to be able to compare and answer questions in whatever form is given to you. The best way to develop your comparing skills is just to practice; there is not actual lesson – just practice problems for you to try.

**Practice 1:** *Which function has the biggest y-intercept?*

Function A:

| x | y |
|---|---|
| 0 | 6 |
| 1 | 9 |
| 2 | 12 |
| 3 | 15 |

Function B:



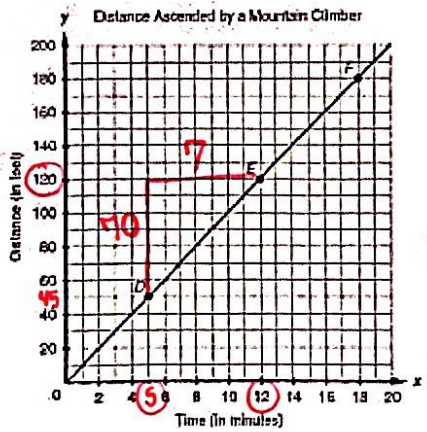

Function C:

$y = -10x + 2.5$

Function A (6 > 4 > 2.5) has the biggest y-int.

**Practice 2:** *Which function has the greatest rate of change?*

Function A:




$\frac{120-50}{12-5} = \frac{70}{7} = 10$

Function B:

| Number of Minutes on an Exercise Bike | Total Number of Calories Burned |
|---|---|
| 15 | 180 |
| 30 | 360 |
| 45 | 540 |
| 60 | 720 |

+15 +180

$\frac{180}{15} = 12$

Function C:

$30x + 2y = -24$

$-30x \quad -30x$

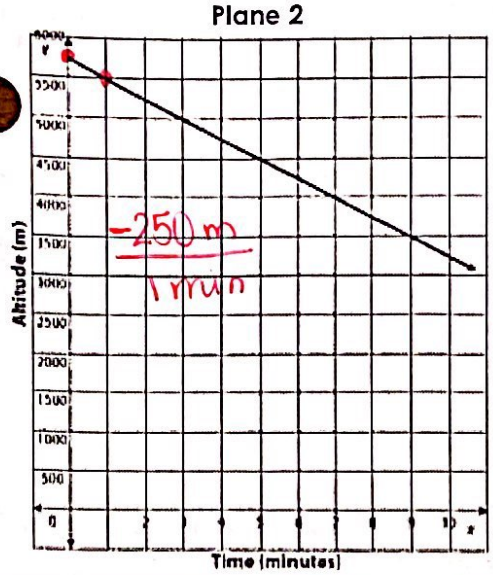
$\frac{2y}{2} = \frac{-30x}{2} - \frac{24}{2}$

$y = -15x - 12$

Function C has the biggest rate of change even though its negative.

**Practice 3:** Two airplanes are in flight. The function $f(x) = 400x + 1200$ represents the altitude, $f(x)$, of Plane 1 after $x$ minutes. The graph below represents the altitude of the second airplane.

**Plane 2**




Compare the starting altitudes of the two planes.

Plane 1: Starts at 1200 meters

Plane 2: Starts at 5,750 meters

Plane 2 starts at a higher altitude.

Compare the rate of change of the two planes.

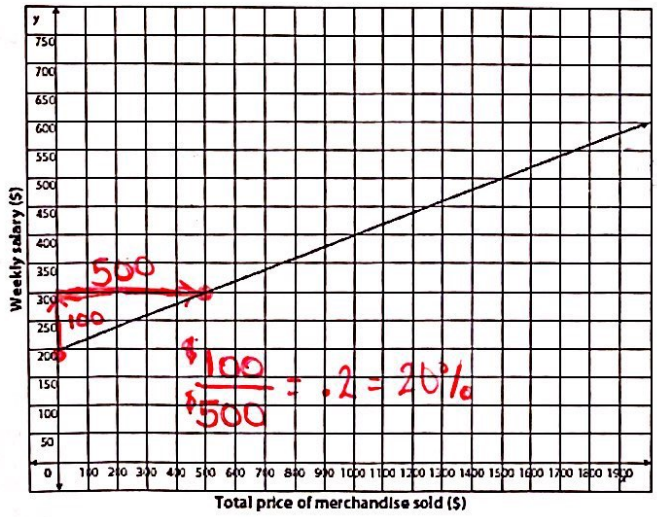
Plane 1: Is ascending 400 meters per second

Plane 2: Is descending 250 meters per second

Plane 1 is going faster and going up, whereas Plane 2 is descending.

**Practice 4:** Your employer has offered two pay scales for you to choose from. The first option is to receive a base salary of $250 a week plus 15% of the price of any merchandise you sell. The second option is represented the graph below.

**Option 2**




a. Create an equation to represent the first option for one week's worth of pay.

$y = .15x + 250$

b. Create an equation to represent the second option for one week's worth of pay.

$y = .20x + 200$

c. Which option has a higher base salary? Explain how you know.

Option 1 has a higher base salary (250 > 200)

d. Which option has a higher rate for selling merchandise? Explain how you know.

Option 2 has a higher commission rate (20% > 15%).