Pretest DC

MTH-3051

1. (5 marks) Draw a graph of the following situation:

   For rides on my bicycle rickshaw I charge $10 plus $2 per kilometer. My friend also has a rickshaw taxi and he charges $5 plus $2 per kilometer, but his taxi holds 1 fewer passenger than mine.

   Draw a graph showing straight lines for both my friend and I.

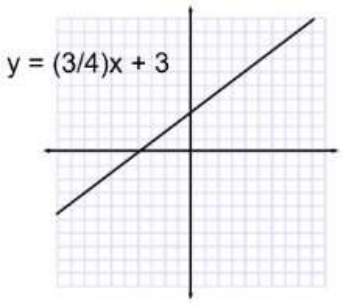
   Are the lines parallel? Why, or why not?

2. (5 marks) Solve the following two systems of equations:

   a) $2x - y - 11 = 0$ and $y = -5x + 10$

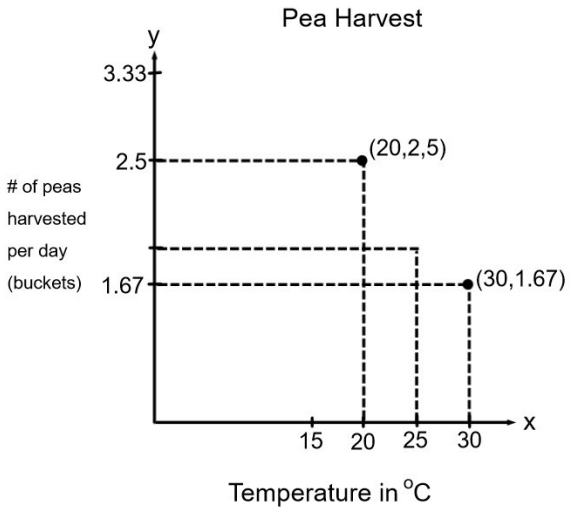
   b) $-x + \frac{1}{3}y = -\frac{4}{9}$ and $y - 3x = \frac{5}{3}$

3. (5 marks) Given the following linear function, draw a graph that shows the effect of each suggested change, and then describe the geometric transformation the change makes upon the graphed line.

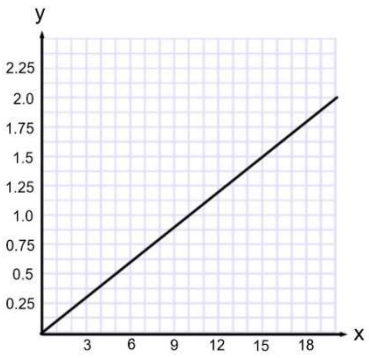


   a) Multiply parameter a by -1
   b) Multiply parameter b by -1
   c) Add 6 to parameter b
   d) Multiply both parameters a and b by -1

4. (27 marks) Peas are planted in the spring because they do not do as well in warmer weather. The number of peas harvested varies such that the product of the number of peas and the temperature is always constant and is equal to 50. The following graph illustrates this relationship:



a) Insert two more points on the graph. Use a ruler to test if the function is linear.
b) Check all four points for a constant product. Show your work. Find the rule for this situation.
c) At 34 degrees Celsius, how many buckets of peas would be harvested?
d) Here is another graph that shows the number of buckets of peas I harvest as a function of the amount of bowls of pea soup I need to make.



How many bowls of soup did I need to make?

5. (5 marks) Using used hockey rink boards that are each 1m wide, I make a rectangular fence around a new ball-hockey rink that our school needs. The length of this rectangle is 6m less than double its width. I am asked to make sure the total length of my new fencing is at least 73m, but no more than 83m. How long and how wide will the rectangular fence be, and many boards will I use?

6. (27 marks) I work in an ice cream shop and occasionally we get bulk orders, usually from schools who are out on field trips in a nearby Science Park.
   I can make 12 ice cream cones per minute when I handle a bulk order. The shop has recently purchased a machine that makes 21 ice cream cones per minute, but the machine takes 2.4 minutes to chill its components before it starts making cones.
   Today two customers came in at the same time, each wanting to purchase 100 ice cream cones. I handled one customer while my coworker used the machine to serve the other customer.

   a) Which of us finished first, and by how many seconds? Round your answer to the nearest second.
   b) Is there a moment when the machine and I have each made the exact same amount of cones? If so, how long after the orders were given did that happen?

      Note: Use a system of equations to solve this problem. Answer both a) and b) algebraically.

7. (26 marks) Two families measured their bathroom water usage. They determined that each family used 150L of water from the sink each day, added to 10L that was used each time the toilet was flushed. This situation is shown in the following table of values:

# of uses	Water used (L)
0	150
5	200
10	250
15	300

   a) Test the table of values for constant difference. Show your work. Is the function linear?
   b) Make a graph of this situation.
   c) Both families wanted to reduce their water consumption. Family 1 decided to turn off the tap while lathering their hands and then turn it on again to rinse, and the result was that they used only 80L per day of sink water from then on. Family 2 decided to put bricks in the toilet tank, and found that this caused the amount of water per flush to decrease by 4L. Add both of these new situations to the graph you made in part a).
   d) On a day that each toilet was flushed 20 times, which family used less water?