Warm Up

For the following state:
a) Function or ~~Non-Function~~
b) Linear or ~~Non- Linear~~
c) Continuous or Discrete
d) Domain $\{x \mid 3 \le x \le 7, x \in R\}$
e) Range $\{y \mid 1 \le y \le 5, y \in R\}$

2) $f(x) = 5x^3 - 4$ $g(x) = \dfrac{3x + 6}{2}$

a) Evaluate
$f(-2) - g(5)$

b) Evaluate
$g(f(0))$

c) Evaluate
$f(x) = 316$

d) Evaluate
$g(x) = 15$

a) $f(x) = 5x^3 - 4$

$f(-2) = 5(-2)^3 - 4$
$= 5(-8) - 4$
$= -40 - 4$
$= -44$

$g(x) = \dfrac{3x + 6}{2}$
$g(5) = \dfrac{3(5) + 6}{2}$
$= \dfrac{15 + 6}{2}$
$= \dfrac{21}{2}$
$g(5) = 10.5$

$f(-2) - g(5)$
$-44 - 10.5$
$\boxed{-54.5}$

$f(0) = 5(0)^3 - 4$
$5(0) - 4$
$f(0) = -4$

$g(-4) = \dfrac{3(-4) + 6}{2}$
$= \dfrac{-12 + 6}{2}$
$= \dfrac{-6}{2}$
$= -3$

2) $f(x) = 316$

$f(x) = 5x^3 - 4$
$316 + 4 = 5x^3 - 4 + 4$
$\dfrac{320}{5} = \dfrac{5x^3}{5}$
$64 = x^3$
$\sqrt[3]{64} = \sqrt[3]{x^3}$
$\boxed{4 = x}$
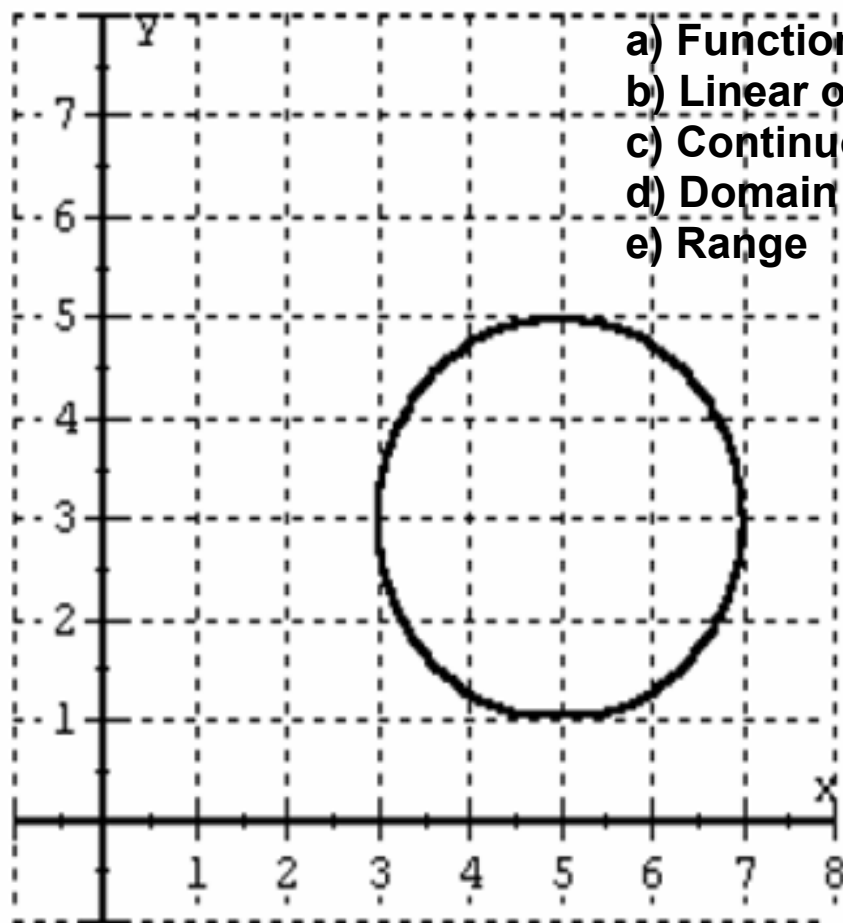
a) **Function or Non-Function**
b) **Linear or Non- Linear**
c) **Continuous or Discrete**
d) **Domain**
e) **Range**

$$(x - 5)^2 + (y - 3)^2 = 4$$

Function?

Domain:

Range:

W.S.   Solutions

1) a) $m(2) = 3(2)^2 - 4$ $m(7) = 3(7)^2 - 4$
         $3 \times 4 - 4$ $= 3 \times 49 - 4$
            $12 - 4$ $= 147 - 4$
      $m(2) = 8$ $= 143$

      $m(2) + m(7)$
        $8 + 143$
      $\boxed{151}$

b) $t(a(4))$ $a(4) = \frac{5(4)-4}{2}$ $t(8) = \frac{1}{2}(8) + 2(8-3)$
                              $= \frac{20-4}{2}$ $= 4 + 2(5)$
                              $= \frac{16}{2}$ $= 4 + 10$
                              $= 8$ $= \boxed{14}$

c) $m(a(t(h(1))))$ $h(1) = 6(1) - 4$
      $h(x) = 2x + 4x - 3 - 1$ $= 6 - 4$
      $\boxed{h(x) = 6x - 4}$ $= 2$

                              $t(2) = \frac{1}{2}(2) + 2(2-3)$
                                   $= 1 + 2(-1)$
                                   $= 1 + (-2)$
                                   $= -1$

                              $a(-1) = \frac{5(-1)-4}{2}$
                                   $= \frac{-5-4}{2}$
                                   $= \frac{-9}{2}$ or -4.5

                              $m(-\frac{9}{2}) = 3(-\frac{9}{2})^2 - 4$
                                   $= 3(\frac{81}{4}) - 4$
                                   $= \frac{243}{4} - 4$
                                   $= \frac{243}{4} - \frac{16}{4}$
                                   $= \frac{227}{4}$

d) $h(t(a(m(1))))$

      $m(1) = 3(1)^2 - 4$ $a(-1) = \frac{5(-1)-4}{2}$
         $= 3 \times 1 - 4$ $= \frac{-5-4}{2}$
         $= 3 - 4$ $= \frac{-9}{2}$
         $= -1$

$t(-\frac{9}{2}) = \frac{1}{2}(-\frac{9}{2}) + 2(-\frac{9}{2} - \frac{3}{1})$
      $= -\frac{9}{4} + 2(-\frac{9}{2} - \frac{6}{2})$
      $= -\frac{9}{4} + 2(-\frac{15}{2})$
      $= -\frac{9}{4} + \frac{-30}{2}$ Reduce
      $= -\frac{9}{4} + \frac{-15}{1}$
      $= -\frac{9}{4} + \frac{-60}{4}$
      $= -\frac{69}{4}$
      ≈ -17.25

simplify first
$h(-\frac{69}{4}) = 6(-\frac{69}{4}) - 4$
      $= \frac{-207}{2} - \frac{4}{1}$
      $= \frac{-207}{2} - \frac{8}{2}$
      $= \frac{-215}{2}$
      $= -107.5$

e) $t(10) = \frac{1}{2}(10) + 2(10-3)$ f) $a(-8) = \frac{5(-8)-4}{2}$
         $5 + 2(7)$ $= \frac{-40-4}{2}$
         $5 + 14$ $= \frac{-44}{2}$
         19 $= -22$

g) $m(7) - t(-4)$ h) $h(0) = \frac{6(0)-4}{0-4}$
      from e
      $t(-4) = \frac{1}{2}(-4) + 2(-4-3)$ $= \boxed{-4}$
            $-2 + 2(-7)$
            $-2 + (-14)$
      $m(7) - t(-4)$ -16
      $143 - (-16)$
      $143 + 16$
      $\boxed{159}$

i) $m(3) = 3(3)^2 - 4$ $a(2) = \frac{5(2)-4}{2}$ $t(20) = \frac{1}{2}(20) + 2(20-3)$
      $3 \cdot 9 - 4$ $= \frac{10-4}{2}$ $10 + 2(17)$
      $27 - 4$ $= \frac{6}{2}$ $10 + 14$
      23 $= 3$ 24

                                          $h(4) = \frac{6(4)-4}{}$
                                             $24 - 4$
                                             20

      $m(3) + a(2) + t(20) + h(4)$
      $23 + 3 + 24 + 20$
      $\boxed{70}$

j) $m(\frac{1}{3}) = 3(\frac{1}{3})^2 - 4$
         $3(\frac{1}{9}) - 4$
            $\frac{1}{3} - \frac{4}{1}$
            $\frac{1}{3} - \frac{12}{3}$
            $\boxed{\frac{-11}{3}}$

$h(x) = 6x - 4$ simplified

a) $116 = 6x - 4$

$116 + 4 = 6x - 4 + 4$

$120 = 6x$

$\dfrac{120}{6} = \dfrac{6x}{6}$

$\boxed{20 = x}$

b) $94 = \frac{1}{2}x + 2(x-3)$

$188 = x + 4(x-3)$

$188 = x + 4x - 12$

$188 = 5x - 12$

$188^{+12} = 5x - 12 + 12$

$200 = 5x$

$\dfrac{200}{5} = \dfrac{5x}{5}$

$\boxed{40 = x}$

c) $53 = \dfrac{5x - 4}{2} x^2$

$106 = 5x - 4$

$106^{+4} = 5x - 4 + 4$

$110 = 5x$

$\dfrac{110}{5} = \dfrac{5x}{5}$

$\boxed{22 = x}$

d) $359 = 3x^2 - 4$

$359^{+4} = 3x^2 - 4 + 4$

$363 = 3x^2$

$\dfrac{363}{3} = \dfrac{3x^2}{3}$

$121 = x^2$

$\sqrt{121} = \sqrt{x^2}$

$\pm 11 = x$

e) $154 = \frac{1}{2}x^2 + 2(x-3)$

$308 = x + 4(x-3)$

$308 = x + 4x - 12$

$308 = 5x - 12$

$308^{+12} = 5x - 12 + 12$

$320 = 5x$

$\dfrac{320}{5} = \dfrac{5x}{5}$

$\boxed{64 = x}$

f) $118 = \dfrac{5x - 4}{2} x^2$

$236 = 5x - 4$

$236^{+4} = 5x - 4 + 4$

$240 = 5x$

$\dfrac{240}{5} = \dfrac{5x}{5}$

$\boxed{48 = x}$
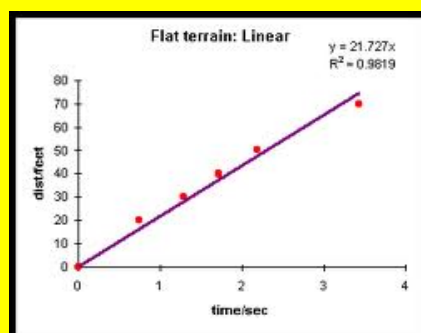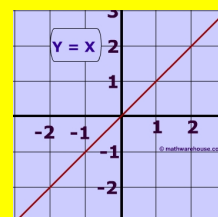
Compare the Graph with the Ordered Pairs!!

First set represents the number of days the car is rented.
Second set represents the total cost of renting the car.
{ (1, 65) , (2, 130) , (3, 195) , (4, 255) , (5 , 315) , (6, 375) }
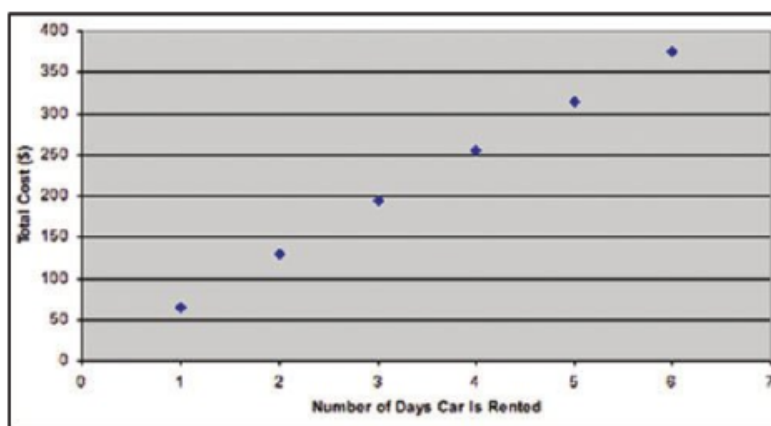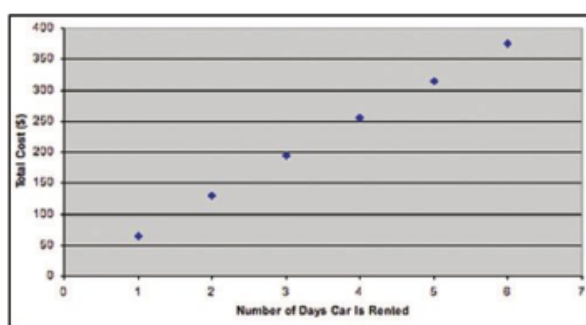

What do you notice?

They are the same as the points on the graph.

Take a look at Domain & Range!!

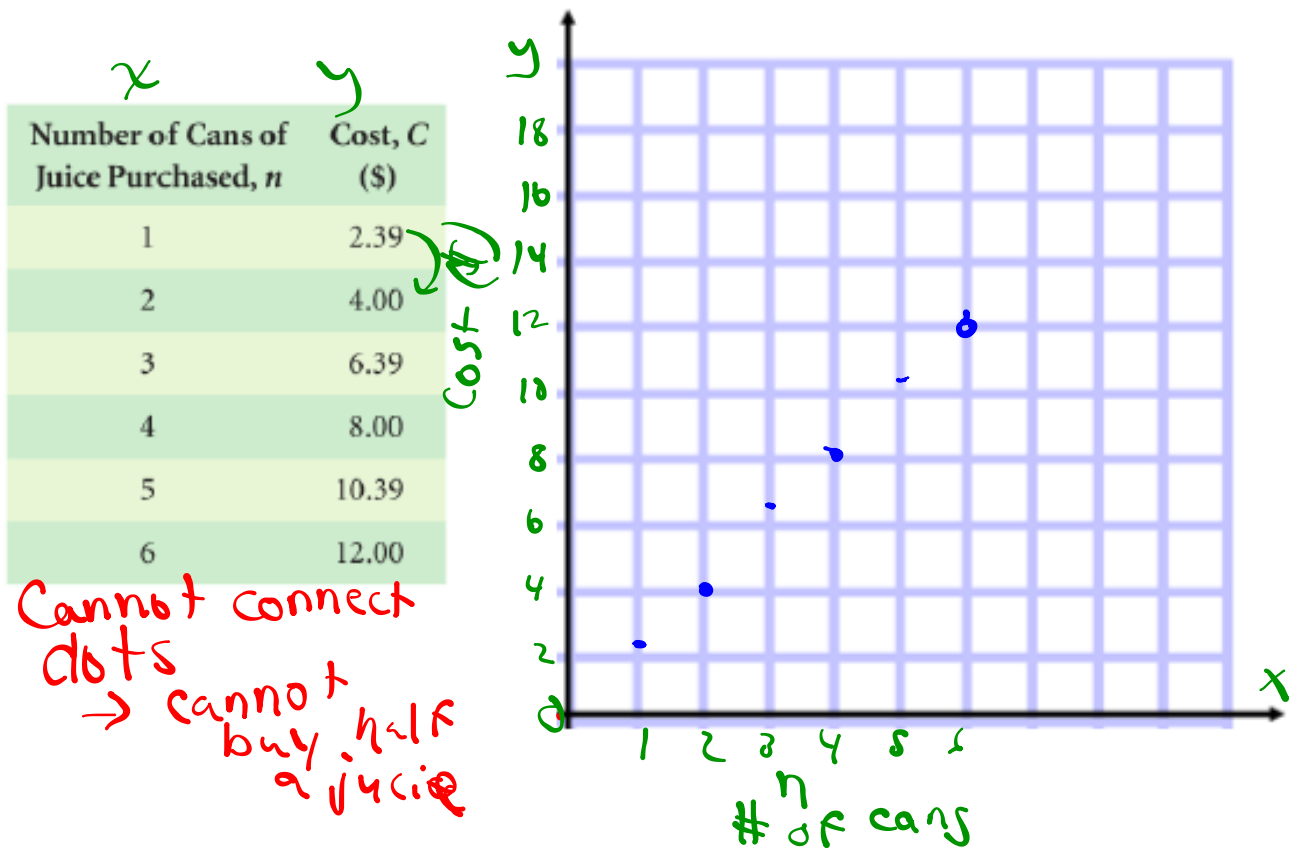**Domain** {1, 2, 3, 4, 5, 6}
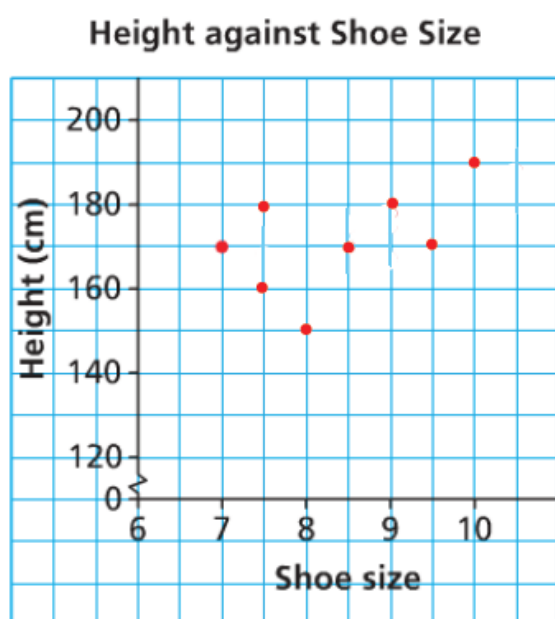**Range** {65, 130, 195, 255, 315, 375}

What do you notice?

Domain : represents the values of x (limits on x)
Range: represents the values of y (limits on y)
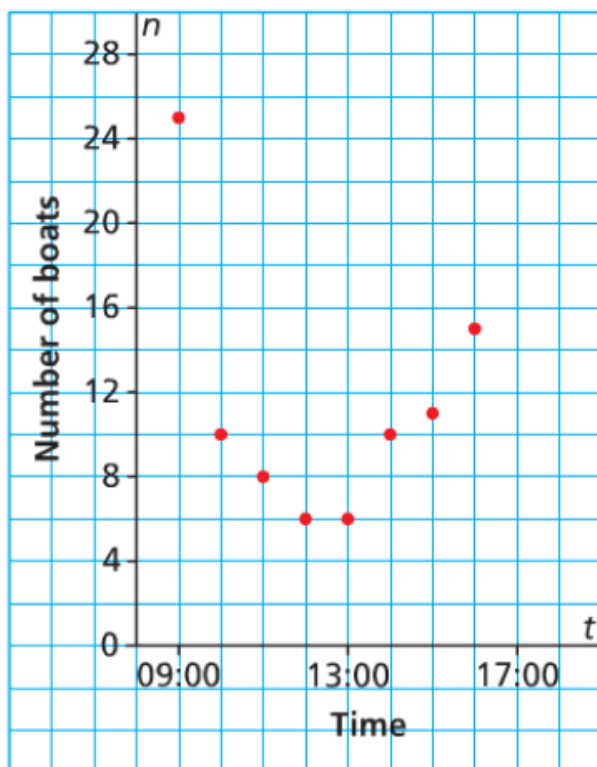
Graph the Following Relation

| x | y |
Number of Cans of Juice Purchased, n	Cost, C ($)
1	2.39
2	4.00
3	6.39
4	8.00
5	10.39
6	12.00

Cannot connect dots
→ cannot buy half a juice

Cost (C)

# of cans

did already

Height against Shoe Size

a) State the domain & range.

b) Is this relation a function?

c) Why are the points not connected? Explain.

did already

**Number of Fishing Boats
Anchored in an Inlet**

a) State the domain & range.

b) Is this relation a function
   Funct

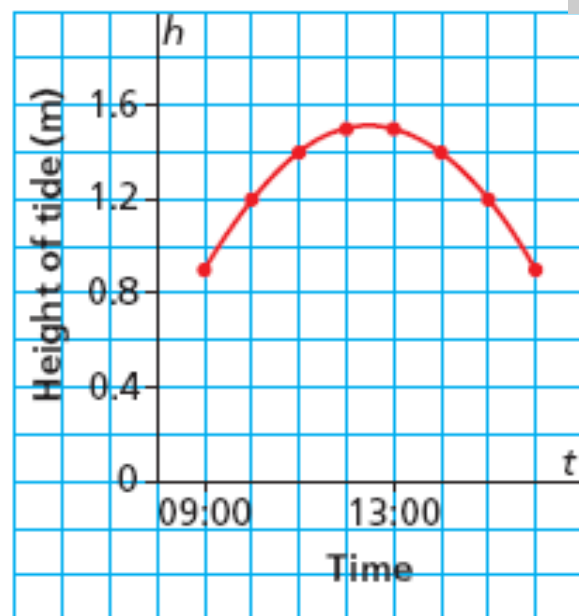c) Why are the points not
   connected? Explain Can't
                       hav
                       half
                       a boat

   Non Linear

CHECK YOUR UNDERSTANDING

3. This graph shows the approximate heigh as a function of time, t, at Port Clement on June 17, 2009.

   a) Identify the dependent variable and the independent variable. Justify your choices.

   b) Why are the points on the graph connected? Explain.

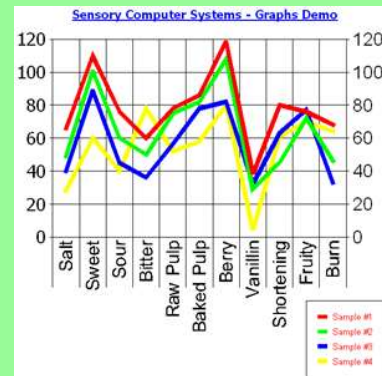   c) Determine the domain and range of the graph.

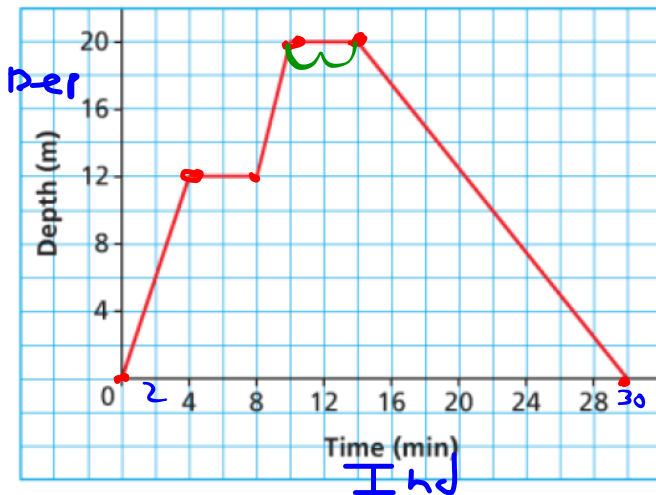**Height of Tide at Port Clements June 17, 2009**

5.5 Graphs of Relations and Functions

Interpreting & Sketching Graphs

Section 5.3

Sensory Computer Systems – Graphs Demo

A Scuba Diver's Dive

Per

Depth (m)

20
16
12
8
4

0   2   4   8   12   16   20   24   28 30

Time (min)

I hd

Graphs provide much information !!

How many minutes did the dive last? 30 min

At what times did the diver stop her descent? stopped between 4-8 min at depth 12m

What was the greatest depth the diver reached? 20m

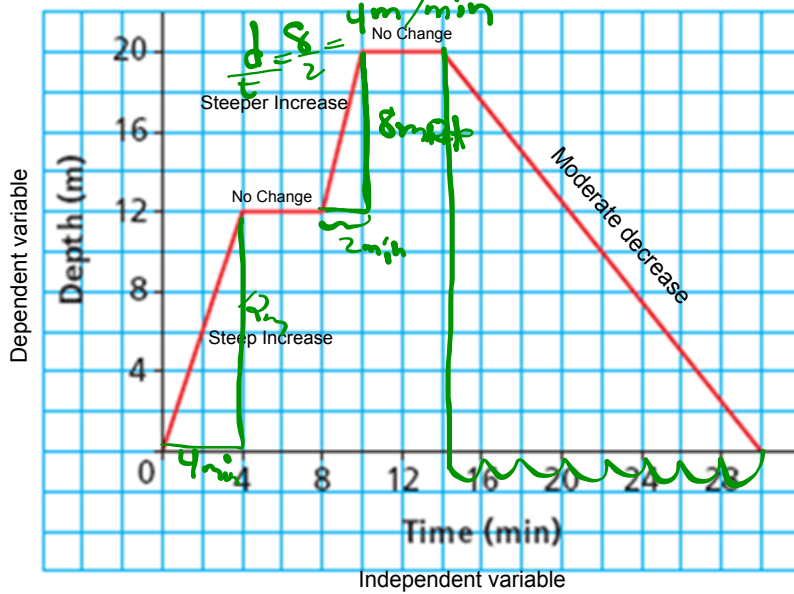For how many minutes was the diver at that depth?
from 12 min to 16 min
so 4 min at depth 20m

Lets hit the slopes!

A Scuba Diver's Dive

$$\frac{d}{t} = \frac{8}{2} = 4\text{m/min}$$

No Change

Steeper Increase

8m/2ft

No Change

2min

Steep Increase

2m

4min

Moderate decrease

$$\frac{d}{t} = \text{speed}$$

$$\frac{12}{4} =$$

$$3\ m/min$$

$$\frac{20m}{16\ min} =$$

Depth (m)

Dependent variable

Time (min)

Independent variable

Given the graph shown , provide a brief explanation of what could possibly be happening at each of the 7 segments labelled on the graph

Depth of Water in a Bathtub
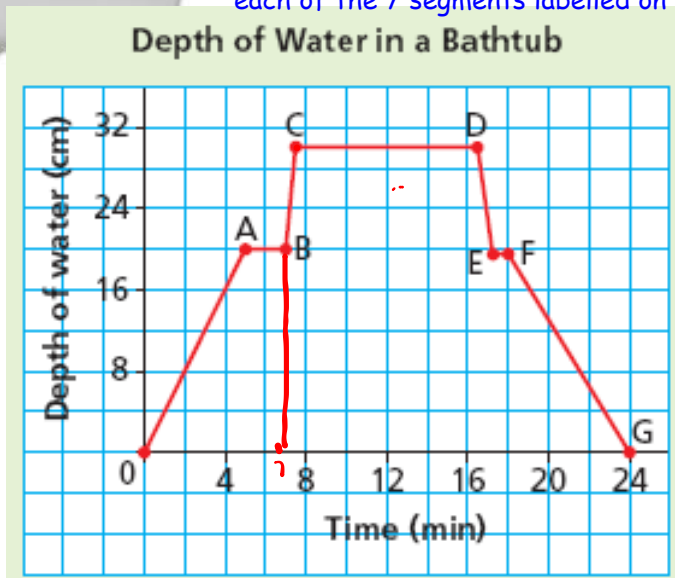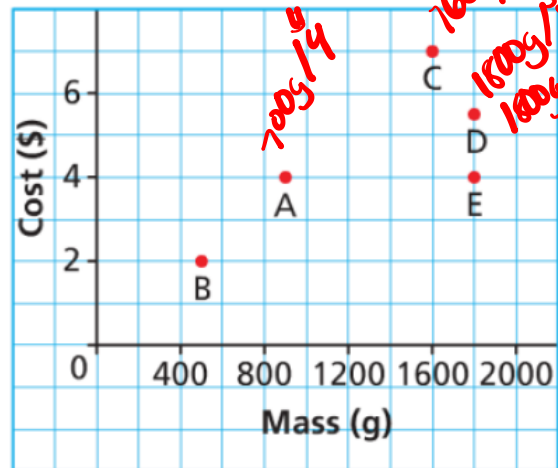
- I will be asking for people to share their description with the class

What does segment OA represent? Emoty gradually fill to 20 cm

What does segment AB represent? Shut wat off for 3 min

What does segment BC represent? Turn on fast for 1 min

What does segment CD represent? Shut off (9 min)

What does segment DE represent? Pull plug for about 1 min (19 cm)   until

What does segment EF represent? Put plug in for min

What does segment FG represent? Pull Plug again (let completely drain)

Try This!!

a) Which bag is the most expensive? What does it cost?

b) Which bag has the least mass? What is this mass? **B**

c) Which bags have the same mass? What is this mass? **D , E**

d) Which bags cost the same? What is this cost? **A , E**

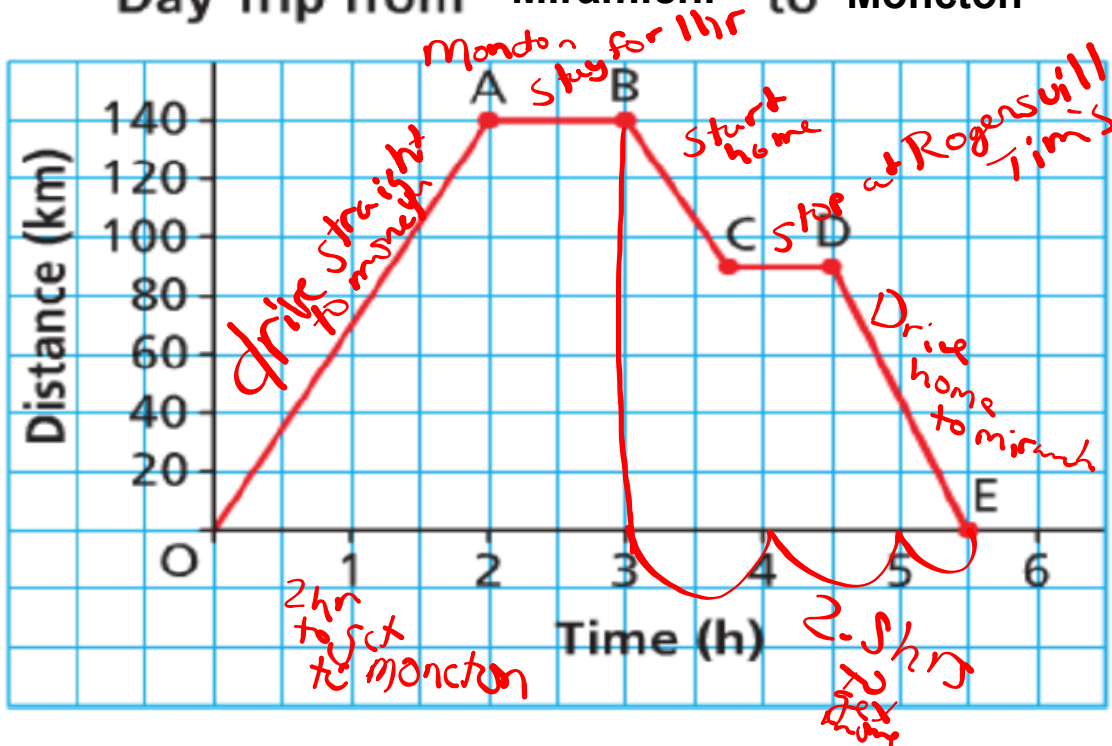e) Which of bags C or D has the better value for money? **D**

↙ more for less money

Costs and Masses of Various Bags of Popcorn

700g/4
1600/7
1600g/4
1000g/5⁵⁰

Cost ($)

6 —

4 —   A   D
           •   • E
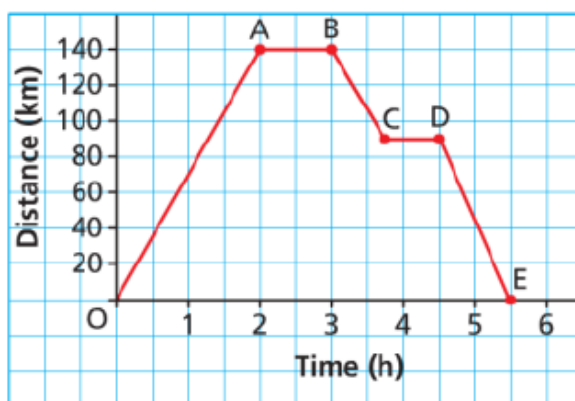2 —
  • B

0   400 800 1200 1600 2000

Mass (g)

B   500g /2

## Day Trip from Miramichi to Moncton

Day Trip from Athabasca to Kikino

[Answer:

Samuel went on a bicycle ride. He accelerated until he reached a speed of 20 km/h, then he cycled for 30 min at approximately 20 km/h. Samuel arrived at the bottom of a hill, and his speed decreased to approximately 5 km/h for 10 min as he cycled up the hill. He stopped at the top of the hill for 10 min.

Sketch a graph of speed as a function of time. Label each section of the graph, and explain what it represents.

Samuel's Bicycle Ride
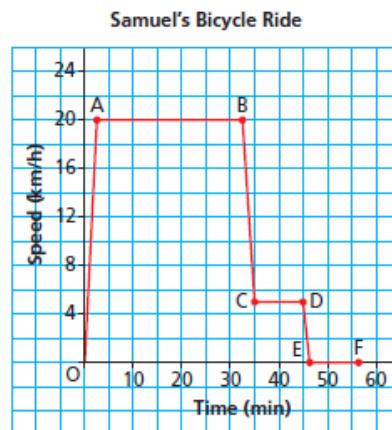
Segment	Journey
OA	Samuel's speed increases from 0 to 20 km/h, so the segment goes up to the right.
AB	Samuel cycles at approximately 20 km/h for 30 min. His speed does not change, so the segment is horizontal.
BC	Samuel's speed decreases to 5 km/h, so the segment goes down to the right.
CD	Samuel cycles uphill at approximately 5 km/h for 10 min. His speed does not change, so the segment is horizontal.
DE	Samuel slows down to 0 km/h, so his speed decreases and the segment goes down to the right.
EF	Samuel remains stopped at 0 km/h for 10 min, so the segment is horizontal.

Graph Story
8th Grade Open Response Question　　

THE PROBLEM

Look at the mystery graph given below. Write a story to describe the data shown on the graph.
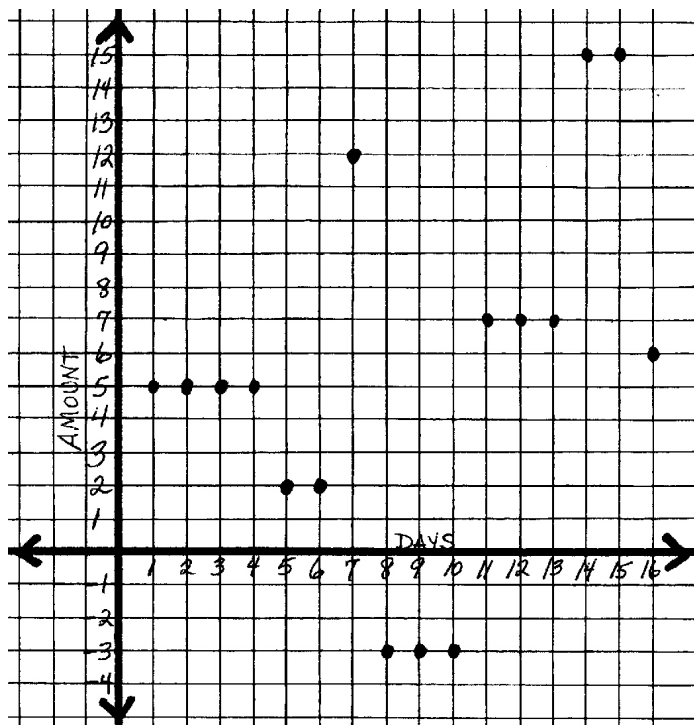
You can make the amount be what ever you would like..be creative!

I will be looking for you to share your story!

Homework

Page 281
Questions:
 3,4,5, 6, ~~7,8,9~~