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

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

$f(-2) = 5(-2)^3 - 4$

$= 5(-8) - 4$

$= -40 - 4$

$= -44$

$g(5) = \dfrac{3(5) + 6}{2}$

$= \dfrac{15 + 6}{2}$

$= \dfrac{21}{2}$

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

$\dfrac{-44}{1} - \dfrac{21}{2}$

$\dfrac{-88}{2} - \dfrac{21}{2}$

$= \dfrac{-109}{2}$

b) Evaluate

$$g(f(0))$$

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

$= 5(0) - 4$

$= 0 - 4$

$= -4$

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

$= \dfrac{-12 + 6}{2}$

$= \dfrac{-6}{2}$

$= -3$

c) Evaluate

$$f(x) = 316$$

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

$316 = 5x^3 - 4$

$316 + 4 = 5x^3 - 4 + 4$

$320 = 5x^3$

$\dfrac{320}{5} = \dfrac{5x^3}{5}$

$64 = x^3$

$\sqrt[3]{64} = \sqrt[3]{x^3}$

$\boxed{4 = x}$

d) Evaluate

$$g(x) = 15$$

$15^{x^2} = \left(\dfrac{3x + 6}{2}\right)^{x^2}$

$30 = 3x + 6^{-6}$

$\dfrac{24}{3} = \dfrac{3x}{3}$

$\boxed{8 = x}$

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

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

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

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

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

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

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

$t\left(-\dfrac{9}{2}\right) = \frac{1}{2}\left(-\dfrac{9}{2}\right) + 2\left(-\dfrac{9}{2} - \dfrac{3}{1}\right)$
　　　$= -\dfrac{9}{4} + 2\left(-\dfrac{9}{2} - \dfrac{6}{2}\right)$
　　　$= -\dfrac{9}{4} + 2\left(-\dfrac{15}{2}\right)$　　　　simplify h(x) first
　　　$= -\dfrac{9}{4} + \dfrac{-30}{2}$　　　$h\left(-\dfrac{69}{4}\right) = 6\left(-\dfrac{69}{4}\right) - 4$
　　　$= -\dfrac{9}{4} + \dfrac{-15}{1}$　Reduce　$= \dfrac{-207}{2} - \dfrac{4}{1}$
　　　$= -\dfrac{9}{4} + \dfrac{-60}{4}$　　　$= \dfrac{-207}{2} - \dfrac{8}{2}$
　　　$= -\dfrac{69}{4}$　　　　　　$= \dfrac{-215}{2}$
　　　≈ -17.25　　　　　　$= -107.5$

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

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

i) $m(3) = 3(3)^2 - 4$　　　$a(2) = \dfrac{5(2) - 4}{2}$　　$t(20) = \frac{1}{2}(20) + 2(10-3)$
　　　　$3 \cdot 9 - 4$　　　　　$= \dfrac{10 - 4}{2}$　　　　　$10 + 2(7)$
　　　　$27 - 4$　　　　　　$= \dfrac{6}{2}$　　　　　　$10 + 14$
　　　　23　　　　　　　$= 3$　　　　　　　24
　　　　　　　　　　　　　　　　　$h(4) = 6(4) - 4$
　　　　　　　　　　　　　　　　　　　$24 - 4$
　　$m(3) + a(2) + t(20) + h(4)$　　　　　　20
　　$23 + 3 + 24 + 20$
　　　　$\boxed{70}$

j) $m\left(\dfrac{1}{3}\right) = 3\left(\dfrac{1}{3}\right)^2 - 4$
　　　　　　$3 \cdot \left(\dfrac{1}{9}\right) - 4$
　　　　　　$\dfrac{1}{3} - \dfrac{4}{1}$
　　　　　　$\dfrac{1}{3} - \dfrac{12}{3}$
　　　　　　$\boxed{\dfrac{-11}{3}}$

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

a) $116 = 6x - 4$

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

$120 = 6x$

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

$\boxed{20 = x}$

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

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

$188 = x + 4x - 12$

$188 = 5x - 12$

$188 + 12 = 5x - 12 + 12$

$200 = 5x$

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

$\boxed{40 = x}$

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

$236 = 5x - 4$
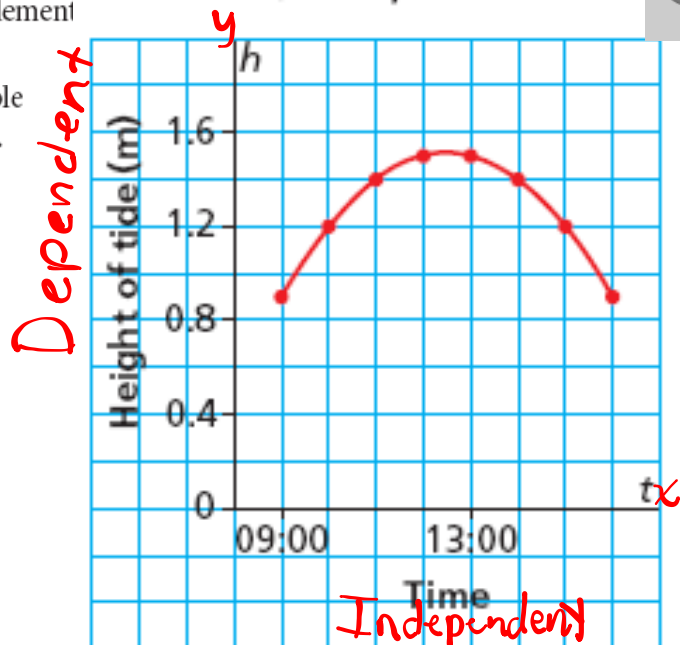
$236 + 4 = 5x - 4 + 4$

$240 = 5x$

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

$\boxed{48 = x}$

CHECK YOUR UNDERSTANDING

3. This graph shows the approximate heigh[t] as a function of time, t, at Port Clement[s] 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.

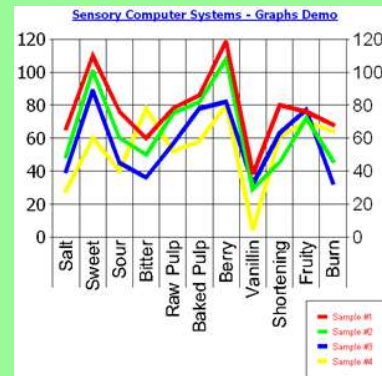   c) Determine the domain and range of the graph.
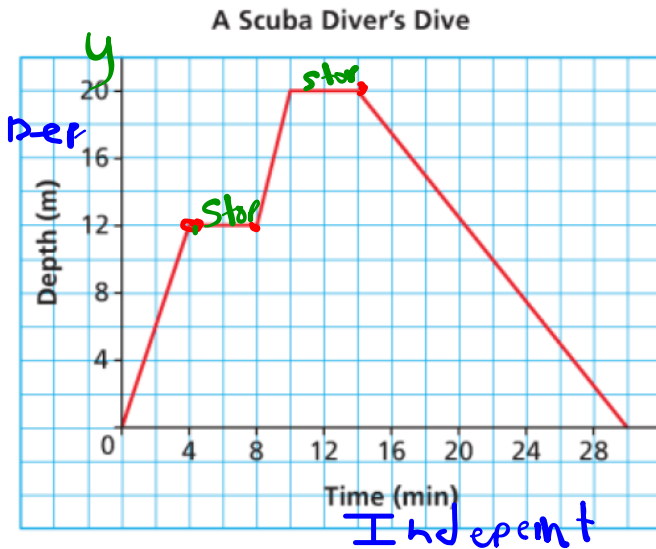
Height of Tide at Port Clements June 17, 2009

Dependent

y

h

Height of tide (m)

1.6

1.2

0.8

0.4

0

09:00   13:00

Time

Independent

t *x*

5.5 Graphs of Relations and Functions

Interpreting & Sketching Graphs

Section 5.3

Sensory Computer Systems - Graphs Demo

A Scuba Diver's Dive

y

Dep

stor

Stop

Depth (m)

Time (min)

Indepemt

Graphs provide much information !!

How many minutes did the dive last? 30 min.

At what times did the diver stop her descent? 4 to 8 min she stop and 12 to 16 min

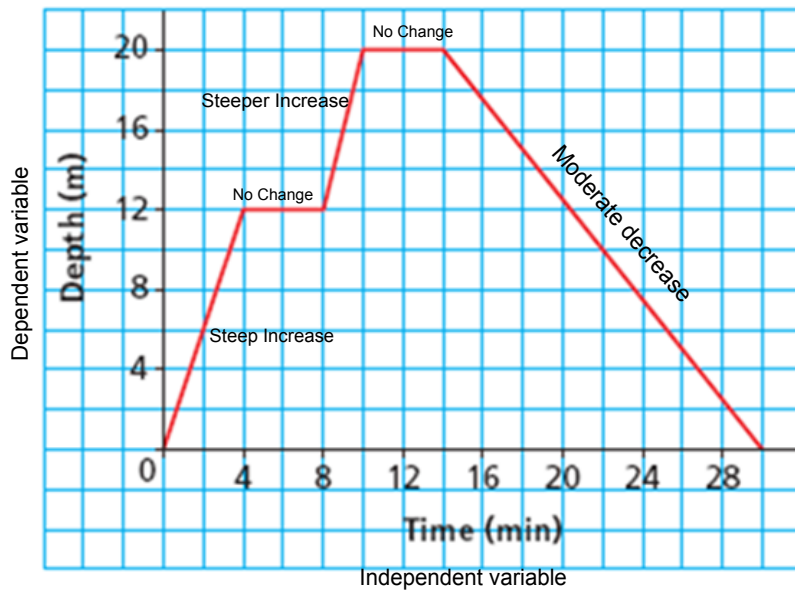What was the greatest depth the diver reached? 20m

For how many minutes was the diver at that depth? 4 min
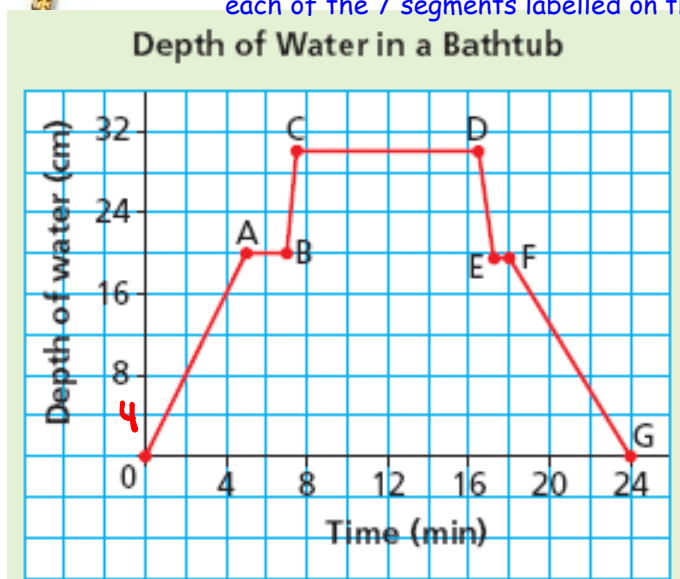
16 - 12 = 4

Lets hit the slopes!

A Scuba Diver's Dive

Dependent variable

Depth (m)

20 — No Change

Steeper Increase

16 —

12 — No Change

8 —

Steep Increase

4 —

Moderate decrease

0   4   8   12   16   20   24   28

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?   filling up the tub for 5 min to a depth of 20cm

What does segment AB represent?   the water was turned off.

What does segment BC represent?   2 min later the person got into the tub

What does segment CD represent?   the person stayed in the tub for approximately 9

What does segment DE represent?   the person got out of the tub

What does segment EF represent?   the person dried off

What does segment FG represent?   the person pulled the plug, and it took 6 min for tub to drain

Try This!!

a) Which bag is the most expensive? What does it cost? C , $7

b) Which bag has the least mass? What is this mass? B , 500g

c) Which bags have the same mass? What is this mass? D, E 1800g
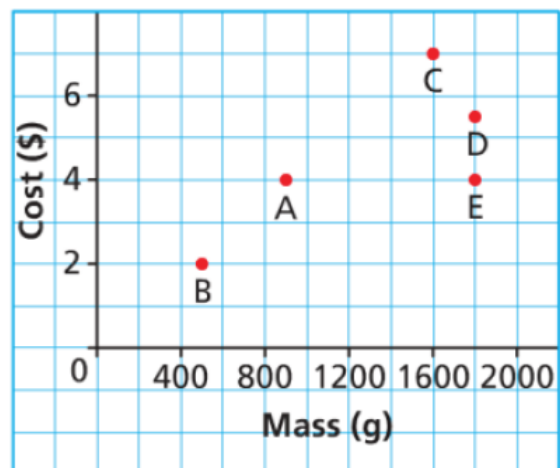
d) Which bags cost the same? What is this cost? A, E $4
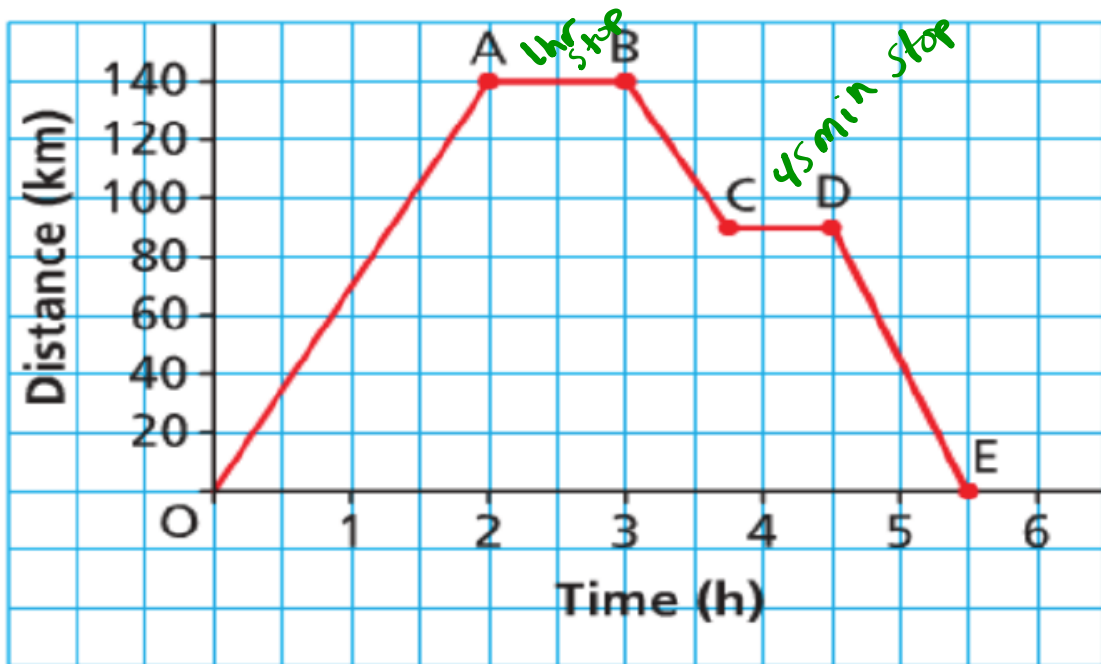
e) Which of bags C or D has the better value for money? $7 for 1600g $5.50 for 1800g   D

Costs and Masses of Various Bags of Popcorn

Cost ($) vs Mass (g)

- C at (2000, 6.5)
- D at (2000, 5.5)
- A at (1000, 4)
- E at (2000, 4)
- B at (400, 2)

Day Trip from Miramichi to Moncton

OA   It took 2 hr to drive 140 km
AB   Parked the car for 1 hr

BC   Left Moncton started back   then stoppe

CD   Stopped for 45 min
DE   Drove 1 hr and drove 90 km

Homework

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Questions:

3, 4, 5, 6, 7,

test
Wednesday