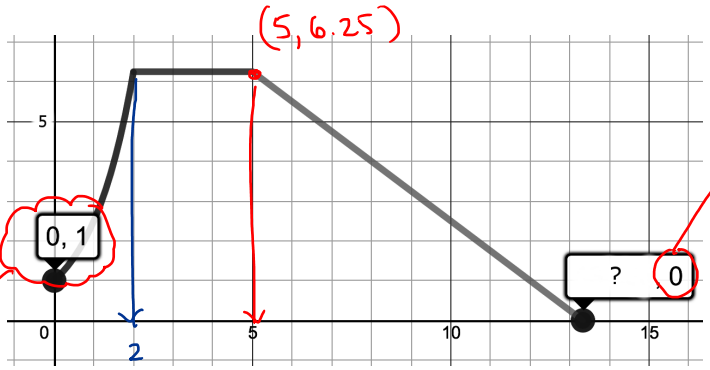
Name: _____ Piece-Wise Functions – 04

Date: _____

1) Complete the **rules** for each of the **3 functions** shown in the **piecewise** function shown below:



$y = -0.75x + 10$

$0 = -0.75x + 10$

$-10 \quad -10$

$-10 = -0.75x$

$-0.75 \quad -0.75$

$13.\overline{3} = x$

Curved

$y = x^2$ doesn't start @ (0, 0).

$y = a \cdot c^x$

starting @ 1

$y = (1)(2.5)^x$

$y = 1(2.5)^x$

$y = 1(2.5)^2$

$y = 6.25$

a)

$$y = \begin{cases} a(2.5)^x & , \quad 0 \le x \le 2 \\ 6.25 & , \quad 2 \le x \le 5 \\ -0.75x + 10 & , \quad 5 \le x \le 13.\overline{3} \end{cases}$$

$y = 1(2.5)^x$

$y = -0.75x + b$

$6.25 = -0.75(5) + b$

$6.25 = -3.75 + b$

$+3.75 \quad +3.75$

$10 = b$

b) Using the **above** piecewise function, what is y when

- x = 3 , y = 6.25
- x = 9 , y = 3.25

$y = -0.75x + 10$

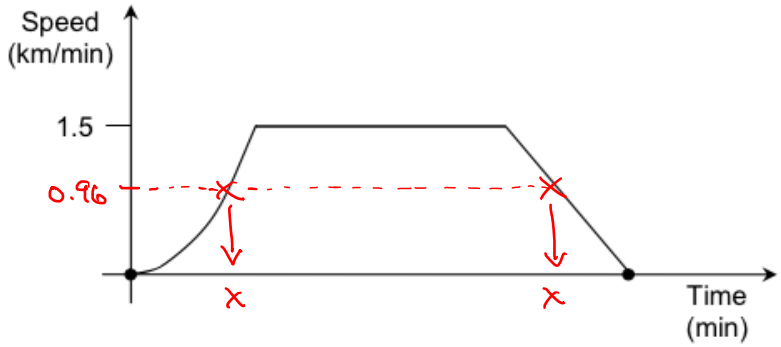
$y = -0.75(9) + 10$

$y = -6.75 + 10$

$y = 3.25$

2) A car set off, accelerated and then travelled at a speed of 1.5 km/min for a few minutes. It then slowed down before coming to a complete stop.

SPEED OF THE CAR ACCORDING TO THE TIME ELAPSED FROM THE MOMENT IT SET OFF



Function *f* described below represents the speed of the car according to the time elapsed from the moment it set off.

$$y = \begin{cases} 0.06x^2 & , \quad 0 \le x \le 5 \\ 1.5 & , \quad 5 \le x \le 15 \\ -0.3x + 6 & , \quad 15 \le x \le 20 \end{cases}$$

$y = 0.06x^2$

$\frac{0.96}{0.06} = \frac{0.06x^2}{0.06}$

$\sqrt{16} = \sqrt{x^2}$

$4 = x$

$y = -0.3x + 6$

$0.96 = -0.3x + 6$

$-6 \qquad -6$

$\frac{-5.04}{-0.3} = \frac{-0.3x}{-0.3}$

$16.8 = x$

Time in between $= 16.8 - 4 = 12.8$

x : time since the car set off
y : speed of the car (km/min)

How much **time passed** between the **two moments** when the car was travelling at a speed of **0.96 km/min?**

A. 4 minutes → trick #1

B. 12 minutes

C. 12.8 minutes

D. 16.8 minutes → trick #2.

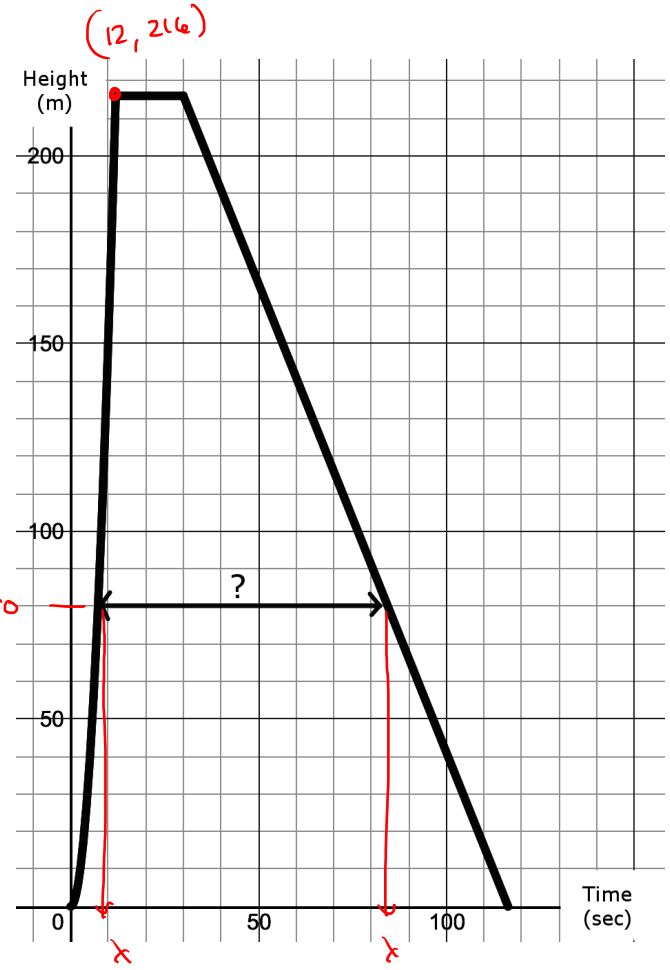
Question 3.

A guinea pig is fired into the air on a rocket, and falls back to the ground with a parachute.

The guinea pig's height as a function of time is represented by the piecewise function below.

For how much time was the adorable little guy at or above a height of 80 m?

$$f(x)\begin{cases} ax^2 & , \ 0 \le x \le 12 \\ 216 & , \ 12 \le x \le 30 \\ -2.5x + 291 & , \ 30 \le x \le 116.4 \end{cases}$$



$y = ax^2$

$216 = a(12)^2$

$\frac{216}{144} = \frac{a(144)}{144}$

$1.5 = a$

$y = 1.5x^2$

$y = 1.5x^2$

$\frac{80}{1.5} = \frac{1.5x^2}{1.5}$

$\sqrt{53.\overline{3}} = \sqrt{x^2}$

$7.303 = x$

$y = -2.5x + 291$

$80 = -2.5x + 291$

$-291 \quad -291$

$\frac{-211}{-2.5} = \frac{-2.5x}{-2.5}$

$84.4 = x$

Diff $= 84.4 - 7.303$

$= 77.097$

$\approx$ 77.1 seconds.

ANSWER: