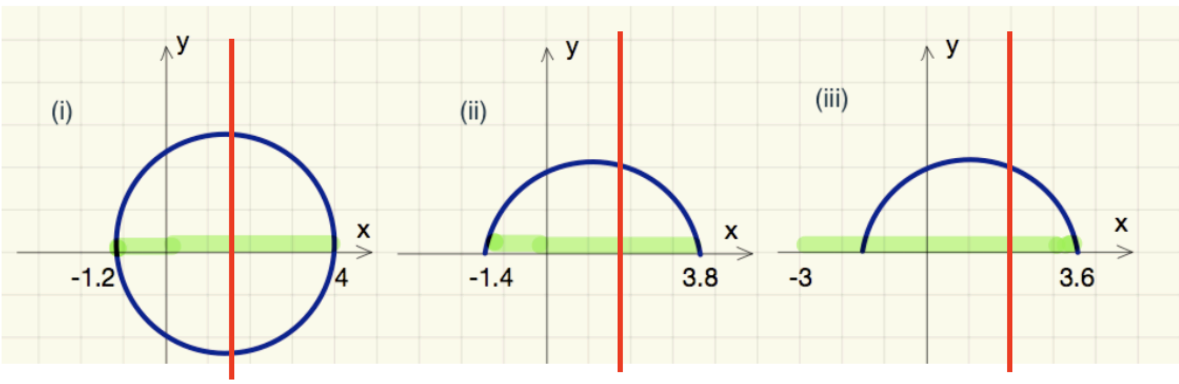
MTHS100 - Assignment 6

Question 1

- i) 30 minutes
- ii) [2pm, 2:30pm] - she was moving towards Armidale
- iii) 650km
- iv) 2 hours

Question 2



- i) - Is not a function because it does not pass the vertical line test indicating that it has more then 1 possible output for a single input
- ii) - Is indeed a function, it passes the vertical line test and for every input on the domain it has an output on the codomain
- iii) Is not a function, although it passes the vertical line test, not every input on the domain has an output on the codomain. Restricting the domain to [-1.5, 3.6] would make this example a function.

Question 3

- i) $f(x) = -3x + 2$ @ $x = -4$
  $= f(4) = -3 * -4 + 2$
  $= 12 + 2$
  $f(4) = 14$

- ii) $f(x) = x^2$ for $x = 1/5$ and $x=-1/5$
  Any number squared will be positive so for $x = 1/5$ and $x = -1/5$, the answer will be the same.

$= (1/5)^2$	$= (-1/5)^2$
$= 1/5 * 1/5$	$= -1/5 * -1/5$
$= 1/25$	$= 1/25$
$= 0.04$	$= 0.04$

- iii) $f(x) = 8/x+1$ for $x = 8$ and $x = 1/8$

$X = 8$	$x = 1/8$
$= 8 / 8 + 1$	$= 8 / (1/8 + 1)$
$= 8 / 9$	$= 8 / (1/8 + 1/1)$
$= 0.89$	$= 8 / 2/8$
	$= 8/1 / 2/8$
	$= 8/1 * 8/2$
	$= 64/9 = 7.11$

Question 4

i) Range = [-2.5, 4.8]

ii) function = 0 at - [-4, 0], [-1, 0], [1, 0]

iii) Positive at [-5, -4), (-1, 1)
Negative at (-4, -1), (1, 5]

iv) Increasing from [-3, 0] and [3.5, 5]
Decreasing from [-5, -3], [0, 3.5]

v) Concave up at [-4.5, -1]

vi) End points [-5, 4.8] and [5, -0.1]
Local max [0, 0.4]
Local min [3.5, -2.5]

vii) Local max [0, 0.4]
Local min [3.5, -2.5]

viii) Global max [-5, 4.8]
Global min   [3.5, -2.5]

ix) The red line on the image below shows that it is not invertible.

x) The pink box highlights shows an area you can restrict the domains to make the function invertible.
Domain = [-3, 0]
Codomain = [-0.4, 0.6]

Question 5

$f(x) = -x + 2$

To define if a function is increasing or decreasing we simply look to see that if any number (a) in the domain is less than any number (b) then b - a > 0 should return True. If that is the case then the function is increasing, if b - a < 0 then the function is decreasing.

An example:
We take any R number, or any real number as the domain is stated as such.
Where a = -10 and b = - 5, (a < b)
$= - (b + 2) - (a + 2)$
$= - (-5 + 2) - (-10 + 2)$
$= \quad 5 - 2 \quad + \quad 10 - 2$
$= 3 + 8 > 0$

Therefore this function is increasing.