The City School

**North Nazimabad Boys Campus**

**Second Monthly Test Session 2019 – 20**

**Class - 10**

**Time: 35 Minutes Mathematics Marks 30**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Sec: \_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1** The variables *x* and *y* are connected by the equation

*y* = 1 + 2*x*2 – *x*3.

The table below shows some values of *x*, and the corresponding values of *y*, correct to 1 decimal place where appropriate.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *x* | –1 | – 0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 |
| *y* | 4 | 1.6 | 1 | 1.4 | 2 | 2.1 | 1 | *p* |

**(a)** Calculate *p*.

Give your answer correct to 1 decimal place.

*Answer p* = .............................. [1]

**(b)** On the graph paper opposite, using a scale of 2 cm to represent 1 unit on both axes, draw a horizontal *x*-axis for –2 *x*  3, and

draw a vertical *y*-axis for –3 *y*  5.

On your axes, plot the points given in the table and join them with a smooth curve. [3]

**(c)** Use your graph to find all the solutions of 1 + 2*x*2 – *x*3 = 2.

*Answer x* = .................................................................... [2]

**(d)** By drawing a tangent, find the gradient of the curve at the point where *x* = – 0.5.

*Answer* .................................... [2]

**(e)** By drawing an appropriate straight line on the grid, solve the equation 1 + 2*x*2 – *x*3 = *x*.

*Answer x* = ............................... [2]

**(f)** Find the range of values of *k* such that 1 + 2*x*2 – *x*3 = *k* has 3 solutions.

*Answer* .................................... [2]

**2** f^*x*h = 2^*x* - 3h

**(a)** Evaluate f` 1 j.

2

*Answer*

**(b)** Find f -1 ^*x*h.

............................................. [2]

*Answer* f -1 (*x*) =

............................. [2]

**3** f^*x*h = 2 - 3*x*

Find

**(a)** f^- 5h,

**(b)** f -1 ^*x*h.

*Answer* f^- 5h = ............................................. [2]

*Answer* f -1 ^*x*h = ............................................. [2]

*x*

1 2 3 4

The shaded region on the diagram is represented by three inequalities. One of these is *y*  3*x* – 2 .

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **4** |  |  |  |  | *y*  4 |
|  |  |  |  |  | 3 |
|  |  |  |  |  | 2 |
|  |  |  |  |  | 1 |
|  | –4 | –3 | –2 | –1 | 0 |
|  |  |  |  |  | –1 |
|  |  |  |  |  | –2  –3 |
|  |  |  |  |  | –4 |

Write down the other two inequalities.

*Answer* ........................................

........................................ [2]

5 The diagram in the answer space shows the line and the line *y* = 2*x* + 1.

On this diagram,

**(i)** draw the line *y* = –2,

**(ii)** shade and label the region, *R*, defined by the three inequalities

*y*  –2 *x* + 2*y*  –1 *y*  2*x* + 1 .

*Answer* (*c*)(i)(ii)

*y*

4

*y* = 2*x* + 1

3

2

1

–4 –3 –2

–1 0 1 2 3 4 *x*

–1

–2 [2]

–3

–4

**6** A function is defined by f(*x*) = 2*x* – 3

.

4

**(i)** Find f(2).

*Answer* ........................................ [2]

**(ii)** Given that f –1(*x*) = *cx* + *d*, find the values of *c* and *d*.

*Answer c* = ............. *d* = ............. [2]

**(iii)** Given that f(*g*) = –*g*, find the value of *g*.

*Answer* ........................................ [2]