

PROBLEM SOLVING

Question 1

A rocket fired from Earth travels in a parabolic path. The equation for the path is :
 $h = -0.04x^2 + 6x$ where h is the height of the rocket in km above the earth's surface and x is the horizontal distance travelled in km.

- a. Find the height of the rocket after it has travelled a horizontal distance of:
 - i. 20 km

 - ii. 80 km

- b. Factorize: $-0.04x^2 + 6x$

- c.
 - i. Find the values of x for which $h = 0$.

 - ii. Hence, state the horizontal distance from its launching site at which the rocket returns to the ground.

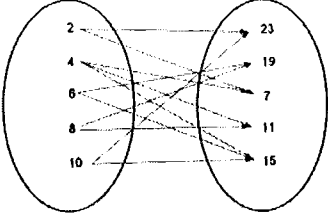
- d.
 - i. What is the value of x at which the rocket reaches its maximum height?

 - ii. By doing an appropriate calculation, determine the maximum height reached by the rocket.

e. Sketch the graph of the path of the rocket. Indicate clearly the x -intercepts and the coordinate of the turning point.

f. Determine the values of x for which the rocket is 161 m above the ground.

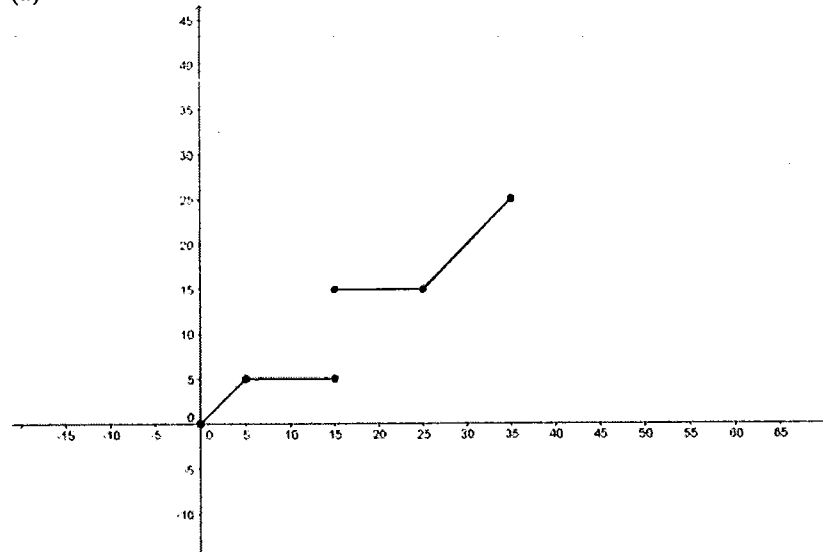
g. What is the practical domain of the function $h(x)$?

4	<p>Describe the mapping shown below.</p> 																
5	<p>Complete a table of values for the function $f(x) = 3x + 4$.</p> <table border="1" data-bbox="539 775 1091 902"> <tr> <td>x</td> <td>-3</td> <td>-1</td> <td>0</td> <td>1</td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>$f(x)$</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>22</td> <td>34</td> </tr> </table>	x	-3	-1	0	1	3			$f(x)$						22	34
x	-3	-1	0	1	3												
$f(x)$						22	34										
6	<p>State the domain and range of the following relation. Is the relation a function?</p> <p>$\{(2, -3), (4, 6), (3, -1), (6, 6), (2, 3)\}$</p>																
7	<p>State the domain and range of the following relation. Is the relation a function?</p> <p>$\{(-3, 5), (-2, 5), (-1, 5), (0, 5), (1, 5), (2, 5)\}$</p>																

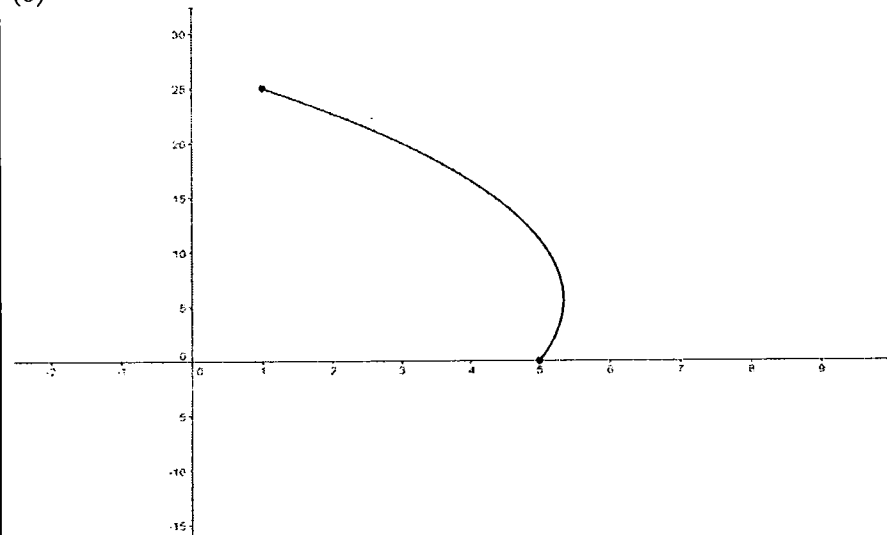
8

For the graphs shown, state the domain and range.

(a)



(b)



9	<p>If $f(x) = 3x + 10$, what is</p> <p>(a) $f(2)$</p> <p>(b) $f(0)$</p> <p>(c) $f(-3)$</p> <p>(d) $f(a)$</p>																
10	<p>What is the range of this function?</p> <p>$f(x) = 2x - 5, x < 2$</p>																
11	<p>Complete a table of values for the function:</p> <p>$f(x) = 3x^2 - 2x + 7$.</p> <table border="1" data-bbox="411 1413 965 1550"> <tr> <td>x</td> <td>-3</td> <td>-1</td> <td>0</td> <td>1</td> <td>3</td> <td>5</td> <td>10</td> </tr> <tr> <td>$f(x)$</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	x	-3	-1	0	1	3	5	10	$f(x)$							
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