Name: _____ Score: _____

Teacher: _____ Date: _____

Function notation

1- Find

(i) $f(5)$ **(ii)** $f(-4)$ **(iii)** $f(0)$ **(iv)** $f\left(\frac{2}{3}\right)$ **(v)** $f(m)$

For these functions:

(a) $f(x) = x - 5$ **(b)** $f(x) = 2x$ **(c)** $f(x) = 3x + 2$ **(d)** $f(x) = x^2 - 1$

(e) $f(x) = \frac{1}{2}x$ **(f)** $f(x) = \frac{1}{x}$ **(g)** $f(x) = \frac{1}{x+4}$ **(h)** $f(x) = x^3 + 2x^2 - 3$

2- If $\boldsymbol{f(x) = x^2 - 3,}$ Find

(a) $f(t)$ **(b)** $f(t + 3)$ **(c)** $f(t - 2)$ **(d)** $f(4 - t)$

(e) $f(-t)$ **(f)** $f(t^2 + 1)$ **(g)** $f(3 - t^2)$

3- (a) If $g(x) = \frac{1}{x+4}$ find $g(-7)$

(b) Is there a value where $g(x)$ does not exist? Explain.

4. Given $g(x) = \frac{2x+1}{x-3}$

(a) Evaluate:

(i) $g(5)$ **(ii)** $g(-3)$ **(iii)** $g(0)$ **(iv)** $g\left(\frac{2}{3}\right)$ **(v)** $g(2)$

(b) Evaluate:

(i) $g(2.3)$ **(ii)** $g(2.5)$ **(iii)** $g(2.9)$ **(iv)** $g(2.99)$

(v) $g(2.999)$ **(vi)** $g(2.9999)$ **(vii)** $g(2.99999)$ **(viii)** $g(3)$

(c) What do you notice about your answers to **(b)?**

5- (a) A rock falls off the top of a cliff. Let h be its height above ground in metres, after t seconds. Jane thinks that the function $\boldsymbol{h(t) = -0.25\,t^3 - 2.32\,t^2 + 1.93\,t + 106}$ is a suitable model for the data. Use Jane's model to

(i) write down the height of the cliff;

(ii) find the height of the rock after 4.5 seconds;

(iii) find after how many seconds the height of the rock is 30m.

(b) Kevin thinks that the function $\boldsymbol{g(t) = -5.2\,t^2 + 9.5\,t + 100}$ is a better model for the data. Use Kevin's model to find when the rock hits the ground.

Solutions

1-

	(i)	(ii)	(iii)	(iv)	(v)
(a)	0	–9	–5	$-4\frac{1}{3}$	$m - 5$
(b)	10	–8	0	$\frac{4}{3}$	$2m$
(c)	17	–10	2	4	$3m + 2$
(d)	24	15	–1	$-\frac{5}{9}$	$m^2 - 1$
(e)	2.5	–2	0	$\frac{1}{3}$	$\frac{1}{2}m$
(f)	$\frac{1}{5}$	$-\frac{1}{4}$	undefined	$\frac{3}{2}$	$\frac{1}{m}$
(g)	$\frac{1}{9}$	undefined	$\frac{1}{4}$	$\frac{3}{13}$	$\frac{1}{m+4}$
(h)	172	–35	–3	$-\frac{49}{27}$	$m^3 + 2m^2 - 3$

2-

(a) $t^2 - 3$ (b) $t^2 + 6t + 6$ (c) $t^2 - 4t + 1$ (d) $13 - 8t + t^2$

(e) $t^2 - 3$ (f) $t^4 + 2t^2 - 2$ (g) $6 - 6t^2 + t^4$

3- (a) $-\frac{1}{3}$ (b) When x = –4 the denominator = 0, the fraction is undefined

4-

(a) (i) 5.5 (ii) $\frac{5}{6}$ (iii) $-\frac{1}{3}$ (iv) –1 (v) –5

(b) (i) –8 (ii) –12 (iii) –68 (iv) –698 (v) –6998

(vi) –69998 (vii) –699998 (viii) undefined

5- (a) (i) 106 (ii) 44.9m (iii) 4.91s

(b) 5.39 s