

1.5 Homework : Harder Questions

GCSE Mathematics
Functions I

Marks Available : 56

Question 1

If $f(x) = 13x + 5$, $x \in \mathbb{R}$, find;

(i) $f(1)$ (ii) $f(-1)$ (iii) $f(2)$

(iv) $f(10)$ (v) $f(0)$ (vi) $f(-3)$

[3 marks]

Question 2

If $g(x) = 17 - 2x$, $x \in \mathbb{R}$, find;

(i) $g(7)$ (ii) $g(10)$ (iii) $g(17)$

(iv) $g(50)$ (v) $g(-1)$ (vi) $g(-8)$

[3 marks]

Question 3

If $h(x) = \sqrt{101 - x}$, $x \in \mathbb{R}$, $x \leq 101$. find;

(i) $h(1)$ (ii) $h(100)$ (iii) $h(65)$

(iv) $h(52)$ (v) $h(20)$ (vi) $h(-20)$

[3 marks]

(vii) Try to find $h(105)$

Hence explain the restriction on the input (domain) that $x \leq 101$

[1 mark]

Question 4

If $k(x) = 10x^2 + 11$, $x \in \mathbb{R}$, find,

(i) $k(2)$ (ii) $k(-2)$ (iii) $k(3)$

(iv) $k(-3)$ (v) $k(5)$ (iv) $k(-5)$

[3 marks]

Question 5

If $L(x) = 4x^2 + 5x + 7$, $x \in \mathbb{R}$, find,

(i) $L(1)$ (ii) $L(3)$ (iii) $L(10)$

(iv) $L(-1)$ (v) $L(7)$ (iv) $L(-3)$

[3 marks]

Question 6

If $m(x) = x^3 + x^2 + x$, $x \in \mathbb{R}$, find,

(i) $m(2)$ (ii) $m(3)$ (iii) $m(-1)$

(iv) $m(10)$ (v) $m(5)$ (iv) $m(-3)$

[3 marks]

Question 7

If $n(x) = \frac{24}{x}$, $x \in \mathbb{R}$, $x \neq 0$, find,

(i) $n(6)$ (ii) $n(8)$ (iii) $n(24)$

(iv) $n(-4)$ (v) $n(48)$ (vi) $n(0.5)$

[3 marks]

(vii) Try to find $n(0)$
Hence explain the restriction on the domain that $x \neq 0$

[1 mark]

Question 8

If $p(x) = \sqrt{3x}$, $x \in \mathbb{R}$, $x \geq 0$ find,

(i) $p(3)$ (ii) $p(12)$ (iii) $p(27)$

(iv) $p(48)$ (v) $p\left(\frac{1}{3}\right)$ (vi) $p\left(\frac{25}{3}\right)$

[3 marks]

(vii) Try to find $p(-3)$
Hence explain the restriction on the input that $x \geq 0$

[1 mark]

Question 9

If $q(x) = x^3 + x$, $x \in \mathbb{R}$, find,

(i) $q(4)$ (ii) $q\left(\frac{1}{2}\right)$ (iii) $q\left(\frac{1}{10}\right)$

[3 marks]

Question 10

If $r(x) = x^{\frac{1}{2}}$, $x \in \mathbb{R}$, $x \geq 0$, find,

(i) $r(25)$ (ii) $r(81)$ (iii) $r\left(\frac{1}{4}\right)$

[3 marks]

(iv) Explain the restriction on the domain that $x \geq 0$

[1 mark]

Question 11

If $s(x) = x^{-2}$, $x \in \mathbb{R}$, $x \neq 0$, find,

(i) $s(2)$ (ii) $s(5)$ (iii) $s(4)$

[3 marks]

(iv) Explain the restriction on the input that $x \neq 0$

[1 mark]

Question 12

If $t(x) = x^{\frac{1}{2}} + x$, $x \in \mathbb{R}$, $x \geq 0$, find,

(i) $t(9)$ (ii) $t(36)$ (iii) $t(121)$

[3 marks]

(iv) Explain the restriction on the domain that $x \geq 0$

[1 mark]

Question 13

If $u(x) = x^{-1} + 1$, $x \in \mathbb{R}$, $x \neq 0$, find

(i) $u(3)$ (ii) $u(10)$ (iii) $u(-10)$

(iv) $u(5)$ (v) $u(-5)$ (iv) $u(-100)$

[3 marks]

Question 14

If $f(x) = x^2$, $x \in \mathbb{R}$, find

(i) $f(z+1)$

HINT: Use FOIL to work out $(z+1)(z+1)$

[1 mark]

(ii) $f(z+5)$

[1 mark]

(iii) $f(2z+3)$

[1 mark]

Question 15

If $f(x) = x + 1$, $x \in \mathbb{R}$, find,

(i) $f(3)$

(ii) $f(-3)$

(iii) $f(w^2)$

(iv) $f(w^2 + w)$

[4 marks]

Question 16

If $f(x) = x^2 + x$, $x \in \mathbb{R}$, find,

(i) $f(4)$

(ii) $f(-4)$

(iii) $f(z + 1)$

(iv) $f(z^2 + z)$

[4 marks]

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