

[Q1 – Q18]

1. $\mathrm{f}(x) = 1 + 4x$, $\mathrm{g}(x) = x^2$

   (a) Find

   (i) $gf(3)$, [2] (ii) $\mathrm{fg}(x)$, [1] (iii) $\mathrm{f}^{-1}\mathrm{f}(x)$. [1]

   (b) Find the value of x when $\mathrm{f}(x) = 15$. [2]

   0580/42/F/M/22 Q3)

2. $\mathrm{f}(x) = 7x - 4$, $\mathrm{g}(x) = \frac{2x}{x-3}, x \neq 3$, $\mathrm{h}(x) = x^2$

   (a) Find $\mathrm{g}(6)$.[1]

   (b) Find $\mathrm{fg}(4)$. [2]

   (c) Find $\mathrm{fh}(x)$. [1]

   (d) Find $\frac{\mathrm{f}(x)}{2} + \mathrm{g}(x)$.

   Give your answer as a single fraction, in terms of x, in its simplest form. [3]

   (e) Find the value of x when $\mathrm{f}(x + 2) = -11$. [2]

   (f) Find the values of p that satisfy $\mathrm{h}(p) = p$. [2]

   0580/43/M/J/20 Q11)

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



3. $f(x) = 7x - 2$ $g(x) = x^2 + 1$ $h(x) = 3^x$

(a) Find gh(2). [2] (b) Find $f^{-1}(x)$ [2]

(c) $gg(x) = ax^4 + bx^2 + c$ Find the values of a, b and c. [4]

(d) Find x when $hf(x) = 81$. [3]

0580/41/M/J/19 Q9)

4. $f(x) = 8 - 3x$ $g(x) = \frac{10}{x+1}$, $x \neq -1$ $h(x) = 2^x$

(a) Find

(i) $hf\left(\frac{8}{3}\right)$ [2] (ii) gh(-2), [2] (iii) $g^{-1}(x)$ [3] (iv) $f^{-1}f(5)$ [1]

(b) Write $f(x) + g(x)$ as a single fraction in its simplest form. [3]

0580/42/M/J/18 Q8

Fundoo Tutor
Focused On You.



5. (a) $f(x) = 2x - 3$ $g(x) = x^2 + 1$
(i) Find gg(2) [2] (ii) Find $g(x+ 2)$, giving your answer in its simplest form. [2]
(iii) Find x when $f(x) = 7$ [2] (iv) Find $f^{-1}(x)$ [2]
(b) $h(x) = x^x$
(i) Calculate h(3) [2]
(ii) Find x when $h(x) = 256$. [1]
0580/43/M/J/18 Q10)

6. $f(x) = 3x - 2$ $g(x) = x^2$ $h(x) = 3^x$
(a) Find f(-3) [1] **(b)** Find the value of x when $f(x) = 19$. [2]
(c) Find fh(2). [2] **(d)** Find $gf(x) + f(x) + x$.
Give your answer in its simplest form [3]
(e) Find $f^{-1}(x)$ [2]
0580/42/M/J/17 Q10)

Fundoo Tutor Focused On You.



7. $f(x) = 3 - 2x$ $\quad g(x) = \frac{4}{x}$, $x \neq 0$ $\quad h(x) = 4^x$

(a) Find f(5). [1] **(b)** Find gh(3). [2] **(c)** Find $f^{-1}(x)$. [2]

(d) Show that $hf(x) = \frac{64}{16^x}$ [3] **(e)** Find the value of x when $h(x) = g(0.5)$. [2]

0580/41/O/N/17 Q7)

8. $f(x) = 1 - 2x$ $\quad g(x) = x + 4$ $\quad h(x) = x^2 + 1$

(a) Find f(-1) [1] **(b)** Solve the equation $2f(x) = g(x)$ [2]

(c) Find $fg(x)$. Give your answer in its simplest form. [2]

(d) Find hh(2). [2] **(e)** Find $f^{-1}(x)$ [2]

(f) $hgf(x) = 4x^2 + px + q$

Find the value of p and the value of q.[4]

0580/42/O/N/17 Q9)

Fundoo Tutor
Focused. On You.



9. $f(x) = 2 - 3x$ $g(x) = 7x + 3$

(a) Find **(i)** f(-3) [1] **(ii)** $g(2x)$ [1]

(b) Find $gf(x)$ in its simplest form.[2]

(c) Find x when $3f(x) = 7$ [3]

(d) Solve the equation. $f(x + 4) - g(x) = 0$ [3]

0580/42/F/M/16 Q11)

10. $f(x) = 2x - 1$ $g(x) = 3x + 2$ $h(x) = \frac{1}{x}, x \neq 0$ $j(x) = x^2$

(a) Find $j(-1)$. [1]

(b) Find x when $f(x) + g(x) = 0$.[2]

(c) Find $gg(x)$, giving your answer in its simplest form. [2]

(d) Find $hf(x) + gh(x)$, giving your answer as a single fraction in its simplest form.[4]

(e)When $pp(x) = x$, $p(x)$ is a function such that $p^{-1}(x) = p(x)$.

Draw a ring around the function that has this property. [1]

$f(x) = 2x - 1$ $g(x) = 3x + 2$ $h(x) = \frac{1}{x}, x \neq 0$ $j(x) = x^2$

0580/42/F/M/23 Q11)

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



11. $f(x) = 2x+1$ $g(x) = 3x - 2$ $h(x) = 3^x$

(a) Find $hf(1) - fh(1)$. [3]

(b) Find $gf(x)$, giving your answer in its simplest form.[2]

(c) Solve the inequality $f(x) > g(x)$. [2]

(d) Solve the equation $h(x) = 1/9$ [1]

(e) Find $g^{-1}(x)$. [2]

(f) Find $\frac{5}{f(x)} + g(x)$ [3]

(g) Solve the equation $f^{-1}(x) = 4$. [1]

0580/41/O/N/16 Q9)

12. $f(x) = 2x + 5$ $g(x) = 2^x$ $h(x) = 7 - 3x$

(a) Find **(i)** f(3) [1] **(ii)** gg(2) [2]

(b) Find $f^{-1}(x)$. [2]

(c) Find $fh(x)$, giving your answer in its simplest form. [2]

(d) Find the integer values of x which satisfy this inequality. $1 < f(x) \leq 9$ [3]

0580/42/O/N/15 Q9)

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



13. $f(x) = 2^{x-3}$ $\quad g(x) = 2x - 1$ $\quad h(x) = \frac{5}{x-4}$

(a) Find ff(6). (b) Find $g^{-1}g(x + 21)$ (c) Find x when $f(x) = h(84)$.

0580/22/O/N/21 Q20)

14. f(x) = 3x+ 4 g(x) = 2x- 1 h(x) = 3^x

(a) Find g($\frac{1}{2}$) [1] (b) Find fh(-1) [2] (c)Find $g^{-1}(x)$ [2]

(d) Find ff(x) in its simplest form. [2] (e) Find (f(x))^2 in the form $ax^2 + bx + c$. [2]

(f) Find x when $h^{-1}(x)$ = g(2) [2]

0580/43/O/N/18 Q9)

Fundoo Tutor
Focused on You.



15. $f(x) = 2x + 1$ $g(x) = x^2 + 4$ $h(x) = 2^x$

(a) Solve the equation $f(x) = g(1)$. [2]

(b) Find the value of fh(3) [2]

(c) Find $f^{-1}(x)$. [2]

(d) Find $gf(x)$ in its simplest form. [3]

(e) Solve the equation $h^{-1}(x) = 0.5$. [1]

(f) $\frac{1}{h(x)} = 2^{kx}$ · Write down the value of k. [1]

0580/41/M/J/16 Q8)

16. $f(x) = 2x - 1$ $g(x) = 1/x$, $x \neq 0$ $h(x) = 2^x$

(a) Find h(3) [1] (b) Find fg(0.5).[2] (c) Find $f^{-1}(x)$. [2]

(d) Find $ff(x)$, giving your answer in its simplest form. [2]

(e)Find $(f(x))^2 + 6$, giving your answer in its simplest form.[2]

(f) Simplify $hh^{-1}(x)$. [1]

(g) Which of the following statements is true? [1]

$f^{-1}(x) = f(x)$

$g^{-1}(x) = g(x)$

$h^{-1}(x) = h(x)$

(h) Use two of the functions $f(x)$, $g(x)$ and $h(x)$

to find the composite function which is equal to $2^{x+1} - 1$. [1]

0580/43/O/N/15 Q9

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/



17. f(x) = $x^2 + 1$, g(x) = $1 - 2x$, h(x) = $\frac{1}{x}$, $x \neq 0$ j(x) = 5^x

(a) Find the value of (i)f(3) (ii)gf(3) [1]

(b) Find $g^{-1}(x)$ [2]

(c) Find x when $h(x) = 2$ [1]

(d)Find $g(x)g(x) - gg(x)$, giving your answer in the form $ax^2 + bx + c$[4]

(e) Find $hh(x)$,giving your answer in its simplest form. [1]

(f) Find $j(3)$ [1]

(g) Find x when $j^{-1}(x) = 2$ [1]

(h) $j(x) = hg(-12)$, find the value of x [2]

0580/42/O/N/20 Q10

18. f$(x) = 10 - x$ g$(x) = \frac{2}{x}, x \neq 0$ h$(x) = 2^x$ j$(x) = 5 - 2x$

(a) (i) Find g$\left(\frac{1}{2}\right)$. [1]

(ii) Find hg$\left(\frac{1}{2}\right)$. [1]

(b) Find x when f$(x) = 7$. [1]

(c) Find x when g$(x) =$ h(3). [2]

(d) Find j$^{-1}(x)$. [2]

(e) Write f(x) + g$(x) + 1$ as a single fraction in its simplest form. [3]

(f) $(\text{f}(x))^2 - \text{ff}(x) = ax^2 + bx + c$ [4]

(g) Find x when h$^{-1}(x) = 5$ [2]

0580/41/O/N/22 Q7

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/

---

19. $f(x) = \frac{3}{x+2}$, $x \neq -2$ $\quad$ $g(x) = 8x - 5$ $\quad$ $h(x) = x^2 + 6$



[Q19 – Q25]

(a) Workout $g(\frac{1}{4})$ [1] (b) Workout ff(2) [2]

(c) Find gg(x), giving your answer in its simplest form. [2] (d) Find $g^{-1}(x)$ [2]

(e)Write g(x) – f(x) as a single fraction in its simplest form. [3]

(f) (i) Show that hg(x) = 19 simplifies to $16x^2 - 20x + 3 = 0$ [3]

(ii) Solve $16x^2 - 20x + 3 = 0$.

Show all your working and give your answers correct to 2 decimal places [4]

0580/42/F/M/19 Q8)

20. f(x) = $5x + 7$ $g(x) = \frac{4}{x-3}$, $x \neq 3$

(a) Find **(i)** fg(1), [2] **(ii)** gf(x), [2] **(iii)** $g^{-1}(x)$ [3] **(iv)** $f^{-1}f(2)$. [1]

(b) f(x) = g(x)

(i) Show that $5x^2 - 8x - 25 = 0$. [3]

(ii) Solve $5x^2 - 8x - 25 = 0$.

Show all your working and give your answers correct to 2 decimal places [4]

0580/42/M/J/16 Q8

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/

21. $f(x) = 2x - 3$ $g(x) = \frac{1}{x+1} + 2$ $h(x) = 3^x$

(i) Work out f(4). (ii) Work out fh(–1) (iii) Find $f^{-1}(x)$, the inverse of $f(x)$ [2]

(iv) Find ff(x) in its simplest form.) [2]

(v) Show that the equation $f(x) = g(x)$ simplifies to $2x^2 - 3x - 6 = 0$.[3]

(vi) Solve the equation $2x^2 - 3x - 6 = 0$.

Give your answers correct to 2 decimal places. Show all your working. [4]

0580/41/M/J/14 Q10

22. $f(x) = 1/x$, $x \neq 0$ $g(x) = 1 - x$ $h(x) = x^2 + 1$

(a) Find fg(1/2) (b) Find $g^{-1}(x)$, the inverse of $g(x)$.

(c) Find hg(x), giving your answer in its simplest form. [3]

(d) Find the value of x when $g(x) = 7$. [1]

(e) Solve the equation $h(x) = 3x$.

Show your working and give your answers correct to 2 decimal places. [4]

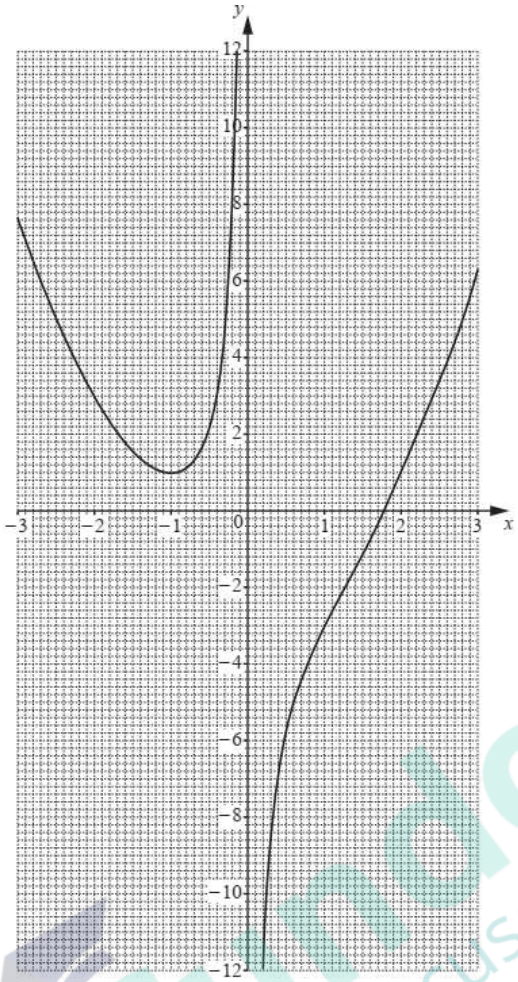
(f) A function k(x) is its own inverse when $k^{-1}(x) = k(x)$.

For which of the functions $f(x)$, $g(x)$ and $h(x)$ is this true? [1]

0580/42/M/J/14 Q10)

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/

23. The diagram shows the graph of $y = f(x)$



(a) Use the graph to find

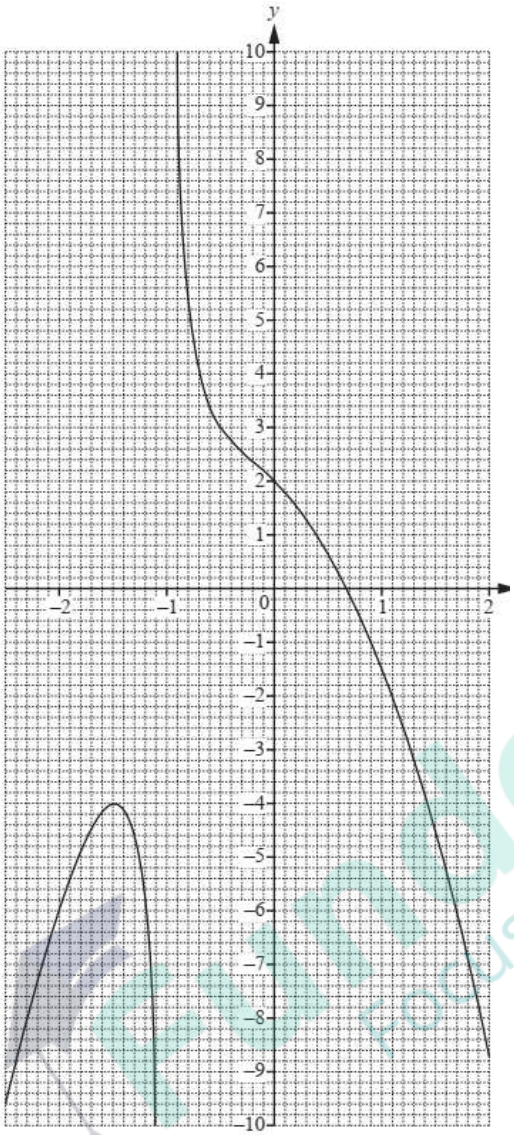
(i) f(1) , [1] **(ii)** ff(-2) [2]

0580/43/M/J/19 Q5)

Fundoo Tutor
Focused. On You.

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/

24. The diagram shows the graph of $y = f(x)$ for $-2.5 \leq x \leq 2$

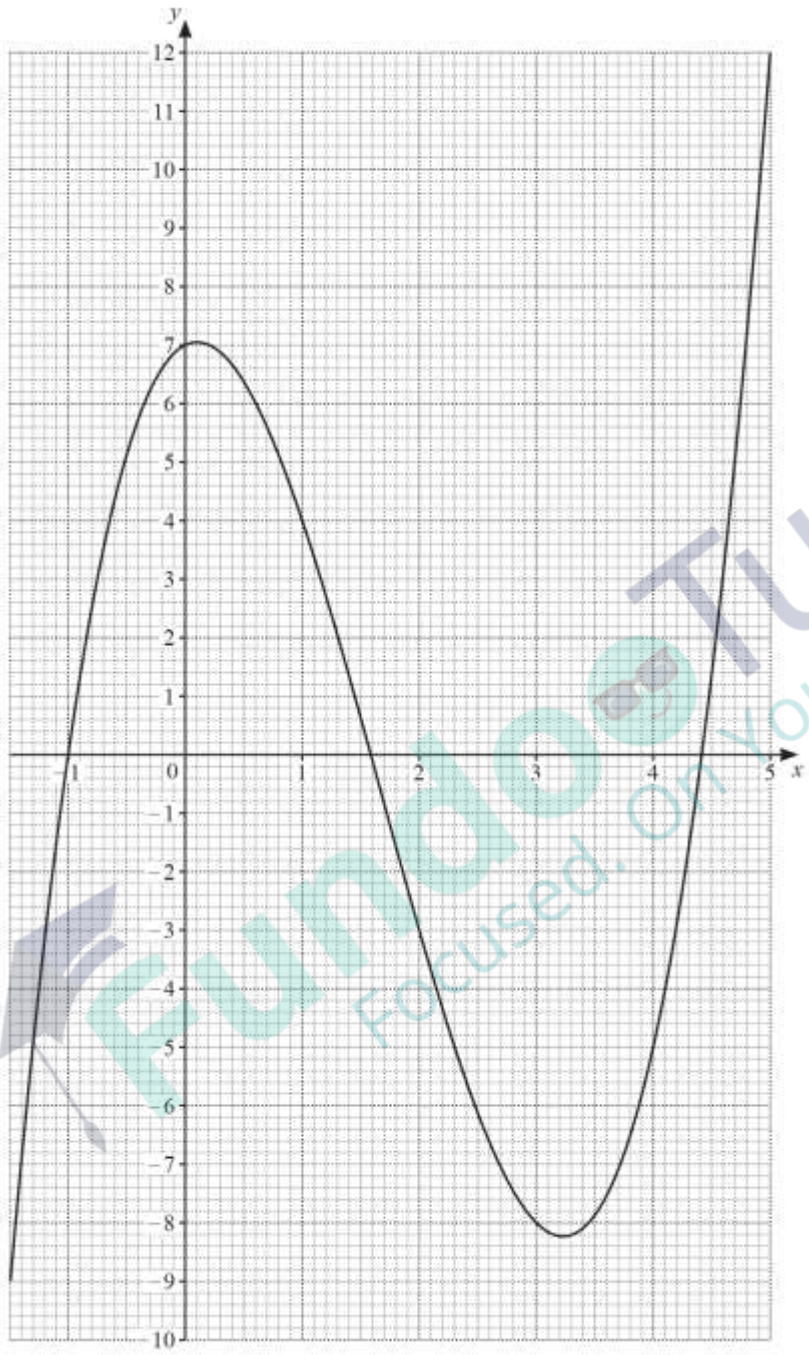


a) Find f(1) [1] **(b)** Solve $f(x) = 3$. [1]

0580/41/M/J/17 Q4)

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/

25. The diagram shows the graph of $y = f(x)$ for $-1.5 \leqslant x \leqslant 5$.



(i) Find $f(2)$. [1]

(ii) Solve the equation $f(x) = 0$ for $-1.5 \leqslant x \leqslant 5$. [3]

(iii) $f(x) = k$ has three solutions for $-1.5 \leqslant x \leqslant 5$ where k is an integer. Find the smallest possible value of k. [1]

(iv) On the grid, draw a line $y = mx$ so that $f(x) = mx$ has exactly one solution for $-1.5 \leqslant x \leqslant 5$. [2]

0580/41/M/J/22 Q6

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/

Answers

1) (a)(i)169 (ii)$1 + 4x^2$ (iii)x (b)3.5	14) (a)0 (b)5 (c)(x +1)/2 (d) $9x$ + 16 (e) $9x^2$ + 24x + 16 (f)27
2) (a)4(b)52(c) $7x^2 - 4$ (d) $\frac{7x^2-21x+12}{2x-6}$ (e)-3 (f)0,1	15) (a)2 (b)17 (c)(x - 1)/2 (d) $4x^2$ + 4x + 5 (e)$\sqrt{2}$ (f)-1
3) (a) 82 (b)(x+2)/7 (c) 1 ,2 ,2 (d)6/7	16)) (a) 8 (b) 3 (c)(x+1)/2 (d) $4x - 3$ (e) $4x^2 - 4x + 7$ (f) x (g) $g^{-1}(x) = g(x)$ (h) fh(x)
4) (a)(i)1 (ii)8 (iii)(10 – x)/x (iv)5 (b)$\frac{-3x^2+5x+18}{x+1}$	17))(a)(i)10 (ii)-19 (b)(1-x)/2 (c)1/2 (d)$4x^2 - 8x + 2$ e)x (f)125 (g)25 (h)-2
5) (a)(i)26 (ii) x^2 + 4x + 5 (iii)5 (iv)(x+3)/2 (b)(i)27 (ii)4	18) (a)(i)4 (ii)16 (b)3 (c) 1/4 (d) $\frac{5-x}{2}$ (e) $\frac{11x-x^2+2}{x}$ (f)a=1 , b=-21, c=100 (g) 32
6) (a)-11 (b)7 (c)25 (d) $9x^2$ – 8x + 2 (e)(x + 2) / 3	19) (a)-3 (b)12/11 (c) 64x - 45 (d) (x + 5)/8 (e) $\frac{8x^2+11x-13}{x+2}$ f(ii) 0.17 and 1.08
7) (a)-7 (b)4/64 (c)(3 – x)/2 (e) 1.5	20) (a)(i)-3 (ii)4/(5x + 4) (iii)(4 + 3x)/x (iv)2 b (ii) -1.57 and 3.17
8) (a)3 (b)-2/5 (c)-2x – 7 (d)26 (e) (1-x)/2 (f)-20 , 26	21) (a) (i) 5 (ii) $-2\frac{1}{3}$ (iii)(x + 3)/2 or x/2 + 1.5 (iv) 4 x – 9 (v) (2x – 3)(x + 1) = 1 + 2(x + 1) (vi) 2.64 and – 1.14
9) (a)(i)11 (ii)14x + 3 (b) 17- 21x (c)-1/9 (d)-1.3	22) (a) 2 (b) $1 - x$ (c) $x^2 - 2x$ + 2 (d) – 6 (e) 0.38, 2.62 (f) f(x) and g(x)
10) (a)1 (b)-0.2 oe (c)$9x + 8$ (d) $\frac{4x^2+5x-3}{x(2x-1)}$ (e) $h(x)$	23) (a)(i)-3 (ii) 6.2 to 6.4
11) (a)20 (b)6x + 1 (c)x < 3 (d)-2 (e)(x + 2)/3 (f) $\frac{6x^2-x+3}{2x+1}$ (g)9	24) (a) –1.6 to –1.4 (b) –0.5
12) (a)(i)11 (ii)16 (b)(x – 5)/2 (c)19 – 6x (d)-1,0,1,2	25) (a) (i)-3 (ii)-1, 1.55 to 1.5, 4.4 to 4.45 (iii)-8 (iv) straight line through origin intersecting curve at one point only
13) (a)32 (b)$x + 21$ (c) -1	

Fundoo Tutor offers personalized coaching for IGCSE, IB, and SAT students. Need a tutor? http://fundootutor.com/book-a-call/