

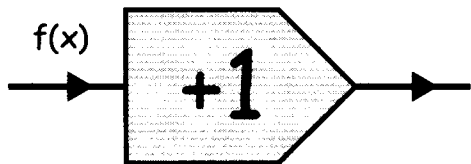
## FUNCTIONS

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Find the missing values for each function

Functions

$$f(x) = x + 1$$

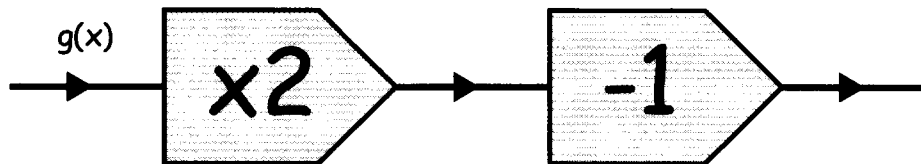


$$f(2) = 2 + 1 = 3$$

$$f(5) = 5 + 1 = 6$$

$$f(10) = 10 + 1 = 11$$

$$g(x) = 2x - 1$$

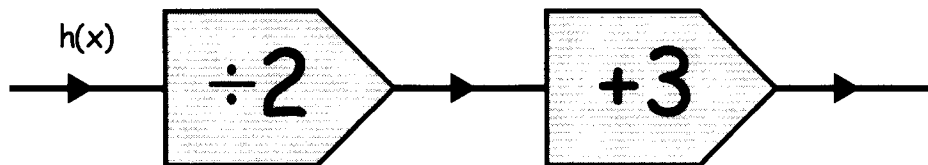


$$g(2) = 2 \times 2 - 1 = 3$$

$$g(5) = 2 \times 5 - 1 = 9$$

$$g(10) = 2 \times 10 - 1 = 19$$

$$h(x) = \frac{x}{2} + 3$$

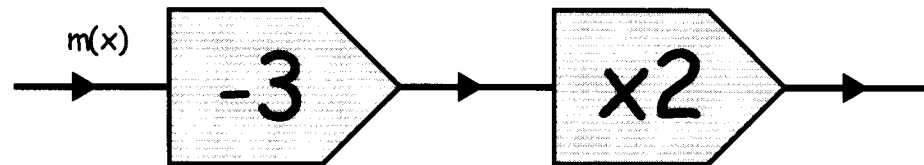


$$h(2) = \frac{2}{2} + 3 = 4$$

$$h(5) = \frac{5}{2} + 3 = 2.5 + 3 = 5.5$$

$$h(10) = \frac{10}{2} + 3 = 5 + 3 = 8$$

$$m(x) = 2(x - 3)$$



$$m(2) = 2(2 - 3) = -2$$

$$m(5) = 2(5 - 3) = 2 \times 2 = 4$$

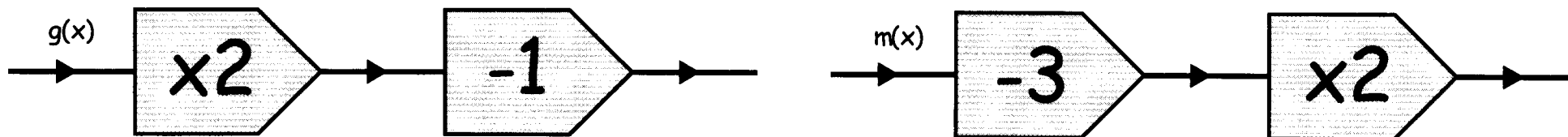
$$m(10) = 2(10 - 3) = 2 \times 7 = 14$$

①

$$g(x) = 2x - 1$$

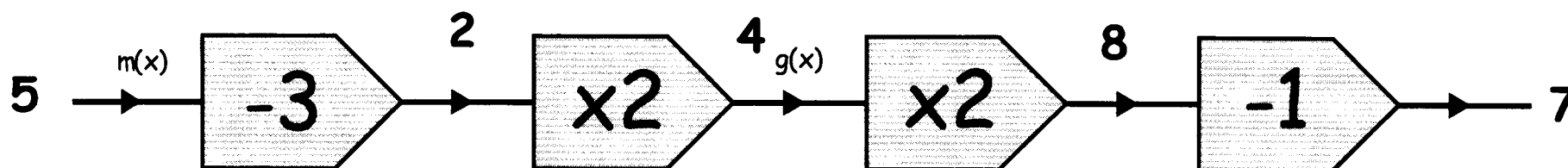
Composite Functions

$$m(x) = 2(x - 3)$$



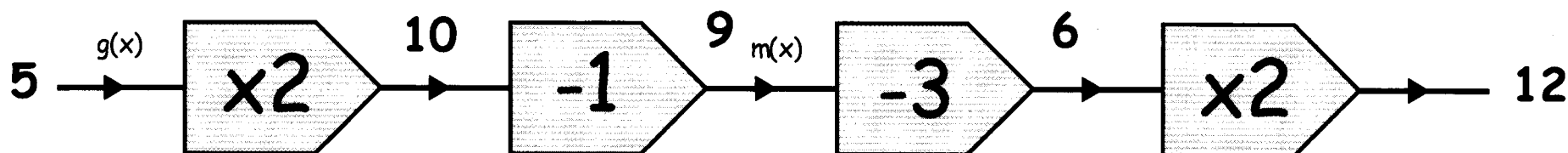
$gm(x)$  put  $x$  into  $m$ , put the output of  $m$  into  $g$

$$gm(5) = 7$$



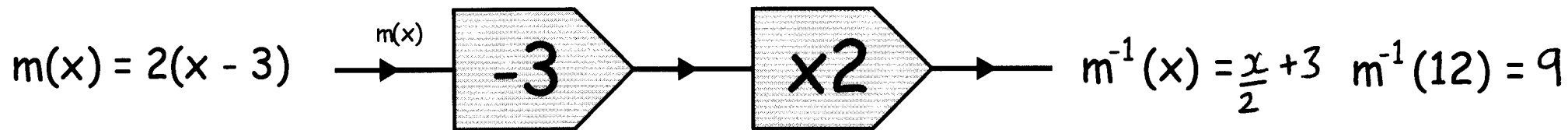
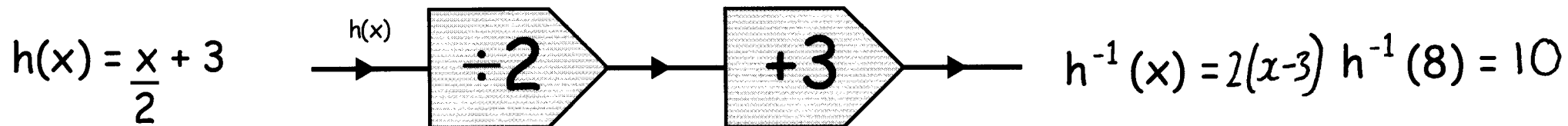
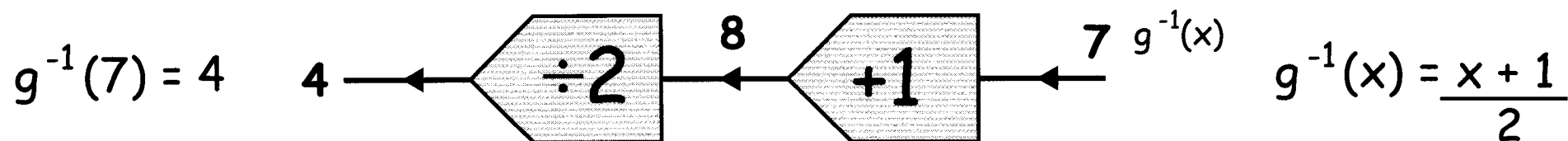
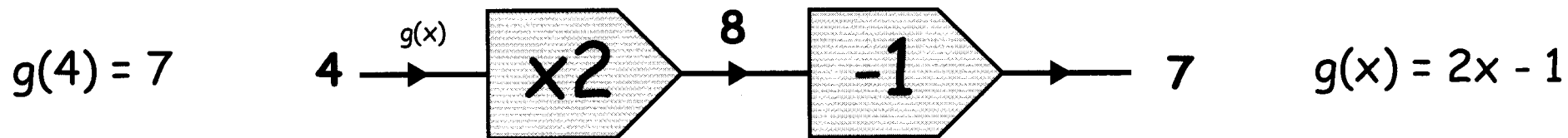
Find 1)  $gm(10) = 27$  2)  $gm(7) = 15$  3)  $gm(4) = 3$

$mg(x)$  put  $x$  into  $g$ , put the output of  $g$  into  $m$ .  $mg(5) = 12$



Find 4)  $mg(10) = 32$  5)  $mg(7) = 20$  6)  $mg(4) = 8$

# The inverse function reverses the original function



## FUNCTIONS

1)  $f(x) = x + 1$

a)  $f(2) = 3$       b)  $f(6) = 7$       c)  $f(?) = 12$  ~~13~~      d)  $f(-3) = -2$

2)  $g(x) = 2x - 1$

a)  $g(3) = 5$       b)  $g(5) = 9$       c)  $g(-1) = -3$       d)  $g(?) = 13$   
7

3)  $h(x) = \frac{x}{2} + 3$

a)  $h(4) = 5$       b)  $h(10) = 8$       c)  $h(7) = 6.5$       d)  $h(?) = 11$   
16

4)  $m(x) = 2(x - 3)$

a)  $m(1) = -4$       b)  $m(3) = 0$       c)  $m(-2) = -10$       d)  $m(?) = 10$   
8

## COMPOSITE FUNCTIONS – REMEMBER WORK FROM INSIDE OUTWARDS OR RIGHT TO LEFT

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

5)  $fg(2) = 4$       Hint: Put 2 into  $g(x)$  then put the output into  $f(x)$

6)  $gf(2) = 5$       Hint: Put 2 into  $f(x)$  then put the output into  $g(x)$

7)  $mh(4) = 4$       Hint: Put 4 into  $h(x)$  then put the output into  $m(x)$

8)  $hm(4) = 4$       Hint: Put 4 into  $m(x)$  then put the output into  $h(x)$

9)  $gh(6) = 11$       Hint: Put 6 into  $h(x)$  then put the output into  $g(x)$

10)  $fm(2) = -1$       Hint: Put 2 into  $m(x)$  then put the output into  $f(x)$

11)  $fh(6) = 7$       12)  $hg(5) = 8.5$       13)  $gm(10) = 27$       14)  $mf(9) = 14$

15)  $mgf(4) = 12$       16)  $ff(3) = 5$       17)  $mm(4) = -2$       18)  $hh(2) = 5$

## Functions

1)  $f(x) = 5x + 1$  and  $g(x) = 2(x-1)$ . Find

a)  $f(3) = 16$

b)  $g(4) = 6$

c)  $fg(3) = 21$

d)  $gf(1) = 10$

e)  $gg(3) = 6$

f)  $ff(2) = 56$

g)  $fg(x)$   
 $= 5 \times 2(x-1) + 1$   
 $= 10(x-1) + 1$   
 $= 10x - 10 + 1$   
 $= 10x - 9$

h)  $gf(x)$   
 $= 2(5x+1-1)$   
 $= 2 \times 5x$   
 $= 10x$

i)  $f^{-1}(x) = \frac{x-1}{5}$

j)  $g^{-1}(x) = \frac{x}{2} + 1$

k)  $f^{-1}(21) = 4$

l)  $g^{-1}(16) = 9$

2)  $m(x) = 3x - 2$  and  $n(x) = 4(x+1)$ . Find

a)  $m(3) = 7$

b)  $n(4) = 20$

c)  $mn(3) = 46$

d)  $nm(1) = 8$

e)  $nn(3) = 68$

f)  $mm(2) = 10$

g)  $mn(x)$   
 $= 3 \times 4(x+1) - 2$   
 $= 12(x+1) - 2$   
 $= 12x + 12 - 2$   
 $= 12x + 10$

h)  $nm(x)$   
 $= 4(3x-2+1)$   
 $= 4(3x-1)$   
 $= 12x - 4$

i)  $m^{-1}(x) = \frac{x+2}{3}$

j)  $n^{-1}(x) = \frac{x}{4} - 1$

k)  $m^{-1}(22) = 8$

l)  $n^{-1}(16) = 3$