COMPOSITE FUNCTIONS

Task 1

1) Given that
$f(x) = 2x + 3$ $g(x) = x^2$
Find $fg(2)$

2) Given that
$f(x) = x - 4$ $g(x) = 3x$
Find $fg(5)$

3) Given that
$f(x) = x^2 + 1$ $g(x) = x + 2$
Find $gf(1)$

4) Given that
$f(x) = 5x$ $g(x) = x^2 - 3$
Find $fg(2)$

5) Given that
$f(x) = x^2$ $g(x) = 2x + 1$
Find $gf(-3)$

6) Given that
$f(x) = \frac{x}{4} + 1$ $g(x) = x^2$
Find $fg(4)$

7) Given that
$f(x) = \frac{x+7}{2}$ $g(x) = x^2 - 2x$
Find $gf(-1)$

8) Given that
$f(x) = 2x^2$ $g(x) = x + 3$
Find $fg(2)$

9) Given that
$f(x) = x^2 + 8$ $g(x) = 4x$
Find $fg\left(\frac{1}{2}\right)$

10) Given that
$f(x) = \sqrt{x+1}$ $g(x) = x^2$
Find $fg(3)$

Task 2

11) Given that
$f(x) = 2x + 1$ $g(x) = x^2$
Find $fg(x)$

12) Given that
$f(x) = x - 3$ $g(x) = 4x$
Find $gf(x)$

13) Given that
$f(x) = x^2$ $g(x) = x + 5$
Find $fg(x)$

14) Given that
$f(x) = 3x$ $g(x) = x^2 - 1$
Find $gf(x)$

15) Given that
$f(x) = x + 2$ $g(x) = x^2$
Find $gf(x)$

16) Given that
$f(x) = 2x - 1$ $g(x) = x^2 + 3x$
Find $fg(x)$

17) Given that
$f(x) = x^2 + 1$ $g(x) = 2x - 3$
Find $gf(x)$

18) Given that
$f(x) = \frac{1}{x}$ $g(x) = x + 2$
Find $fg(x)$

19) Given that
$f(x) = \sqrt{x}$ $g(x) = x^2 + 4$
Find $fg(x)$

20) Given that
$f(x) = x^2 - 2x$ $g(x) = x - 1$
Find $fg(x)$

Task 3

21) Given that

$f(x) = 2x + 1 \qquad g(x) = x^2$

Solve $fg(x) = 9$

22) Given that

$f(x) = x - 3 \qquad g(x) = x^2$

Solve $fg(x) = 13$

23) Given that

$f(x) = \frac{2}{x} \qquad g(x) = x + 1$

Solve $gf(x) = 10$

24) Given that

$f(x) = 3x \qquad g(x) = x^2 - 1$

Solve $gf(x) = 8$

25) Given that

$f(x) = 3x + 5 \qquad g(x) = \frac{4}{x+6}$

Solve $gf(x) = 1$

26) Given that

$f(x) = 2x + 4 \qquad g(x) = 3x + 5$

Solve $f(x) = fg(x)$

27) Given that

$f(x) = 2x - 1 \qquad g(x) = \frac{3x}{8} + 9$

Solve $fg(x) = g(x)$

28) Given that

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

Solve $fg(x) = gf(x)$

29) Given that

$f(x) = \frac{1}{x} \qquad g(x) = x - 2$

Solve $fg(x) = gf(x)$

Challenge

30) $f(x) = 3x + 2$ **and** $g(x) = ax + 1$

Work out the value of a **such that**

$fg(x) = gf(x)$

31) $f(x) = \frac{1}{x+1}$ **and** $g(x) = \frac{1}{x-1}$

Show that $fg(x) = \frac{x-1}{x}$