

1. Find  $(f \circ g)(x)$  and simplify.

$$\begin{aligned} \text{(a)} \quad f(x) &= -7x + 3 \\ g(x) &= 3x - 3 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad f(x) &= 2x + 8 \\ g(x) &= 3x \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad f(x) &= \frac{-9x^2}{-4x - 5} \\ g(x) &= 3x \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad f(x) &= \frac{-5x + 1}{2x + 3} \\ g(x) &= -x + 6 \end{aligned}$$

$$\begin{aligned} \text{(e)} \quad f(x) &= 4x + 5 \\ g(x) &= \sqrt{x - 3} \end{aligned}$$

$$\begin{aligned} \text{(f)} \quad f(x) &= \sqrt{5x - 3} \\ g(x) &= 2x - 6 \end{aligned}$$

$$\begin{aligned} \text{(g)} \quad f(x) &= \frac{\sqrt{3x - 2}}{\sqrt{-x + 1}} \\ g(x) &= x - 8 \end{aligned}$$

$$\begin{aligned} \text{(h)} \quad f(x) &= \frac{x}{-x + 3} \\ g(x) &= \frac{x + 2}{-3x + 2} \end{aligned}$$

$$\begin{aligned} \text{(i)} \quad f(x) &= \frac{x - 1}{-2x + 1} \\ g(x) &= \frac{-x + 3}{-3x + 2} \end{aligned}$$

$$\begin{aligned} \text{(j)} \quad f(x) &= \frac{6x + 1}{\sqrt{x + 2}} \\ g(x) &= x^2 - 2 \end{aligned}$$

$$\begin{aligned} \text{(k)} \quad f(x) &= 9x - 1 \\ g(x) &= x^2 + 3x + 3 \end{aligned}$$

$$\begin{aligned} \text{(l)} \quad f(x) &= 7x^2 - x - 3 \\ g(x) &= 8x - 10 \end{aligned}$$

2. Find  $(f \circ g)(x)$  for the values  $x = -3, -1, 0, 1, 3$ .

(Hint. You do not need to find a formula for the function  $(f \circ g)(x)$  to do this question.)

$$\text{(a)} \quad f(x) = \frac{-2x + 4}{x + 6}, \quad g(x) = -3x + 8$$

$$\text{(b)} \quad f(x) = \frac{x}{-x + 2}, \quad g(x) = \frac{2x - 7}{-3x + 2}$$

$$\text{(c)} \quad f(x) = \frac{x - 4}{-3x + 1}, \quad g(x) = 3$$

## Answers

1. (a)  $-21x + 24$

(b)  $6x + 8$

(c)  $\frac{-81x^2}{-12x - 5}$

(d)  $\frac{5x - 29}{-2x + 15}$

(e)  $4\sqrt{x - 3} + 5$

(f)  $\sqrt{10x - 33}$

(g)  $\frac{\sqrt{3x - 26}}{\sqrt{-x + 9}}$

(h)  $\frac{-x - 2}{10x - 4}$

(i)  $\frac{-2x - 1}{x + 4}$

(j)  $\frac{6x^2 - 11}{\sqrt{x^2}}$

(k)  $9x^2 + 27x + 26$

(l)  $448x^2 - 1128x + 707$

2. (a)  $-\frac{30}{23}, -\frac{18}{17}, -\frac{6}{7}, -\frac{6}{11}, \frac{6}{5}$

(b)  $-\frac{13}{35}, -\frac{9}{19}, -\frac{7}{11}, -\frac{5}{3}, \frac{1}{13}$

(c)  $\frac{1}{8}, \frac{1}{8}, \frac{1}{8}, \frac{1}{8}, \frac{1}{8}$