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

(a) $f(x) = -7x + 3$, $g(x) = 3x - 3$

(b) $f(x) = 2x + 8$, $g(x) = 3x$

(c) $f(x) = \dfrac{-9x^2}{-4x - 5}$, $g(x) = 3x$

(d) $f(x) = \dfrac{-5x + 1}{2x + 3}$, $g(x) = -x + 6$

(e) $f(x) = 4x + 5$, $g(x) = \sqrt{x - 3}$

(f) $f(x) = \sqrt{5\,x - 3}$, $g(x) = 2x - 6$

(g) $f(x) = \dfrac{\sqrt{3\,x - 2}}{\sqrt{-x + 1}}$, $g(x) = x - 8$

(h) $f(x) = \dfrac{x}{-x + 3}$, $g(x) = \dfrac{x + 2}{-3x + 2}$

(i) $f(x) = \dfrac{x - 1}{-2x + 1}$, $g(x) = \dfrac{-x + 3}{-3x + 2}$

(j) $f(x) = \dfrac{6\,x + 1}{\sqrt{x + 2}}$, $g(x) = x^2 - 2$

(k) $f(x) = 9x - 1$, $g(x) = x^2 + 3x + 3$

(l) $f(x) = 7x^2 - x - 3$, $g(x) = 8x - 10$

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.)

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

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

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

Answers

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

   (b) $6x + 8$

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

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

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

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

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

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

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

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

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

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

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

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

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