Homework: Combinations of Functions; Composite Functions - Key

In Problems 1-12, find the domain of each function

1. $(-\infty,\infty)$	2. $x \neq \frac{2}{3}$
3. $(-\infty,\infty)$	4. $x \neq -7,7$
5. $x \neq -3,\frac{1}{2}$	6. $x \neq 3,5$
7. $x \neq 0,\frac{1}{3}$	8. $x \neq -3,\frac{-5}{2}$
9. $x \geq -8$ $[-8,\infty)$	10. $x \geq \frac{2}{7}$ $\left[\frac{2}{7},\infty\right)$
11. $x \geq 4$ $[4,\infty)$	12. $x \neq -5,-3,5$

In Problems 13-16, find f + g, f – g, fg, and f/g

13. $f+g=10x+1$ $f-g=-4x+3$ $fg=21x^2+11x-2$ $\frac{f}{g}=\frac{3x+2}{7x-1}$	14. $f+g=x^2-9x+14$ $f-g=x^2-11x+18$ $fg=x^3-12x^2+36x-32$ $\frac{f}{g}=x-8$

15.	16.
$f+g=\frac{3x+4}{x}$ $f-g=3$ $fg=\frac{6x+4}{x^2}$ $\frac{f}{g}=\frac{3x+2}{2}$	$f+g=\sqrt{x-7}+\sqrt{x+1}$ $f-g=\sqrt{x-7}-\sqrt{x+1}$ $fg=\sqrt{x^2-6x-7}$ $\frac{f}{g}=\frac{\sqrt{x-7}}{\sqrt{x+1}}$

In Problems 17-24, find *a.* $f\circ g$ *b.* $g\circ f$ *c.* $(f\circ g)(3)$

17.	18.
$f\circ g=27x+17$ $g\circ f=27x-1$ $(f\circ g)(3)=98$	$f\circ g=2x+2$ $g\circ f=2x+5$ $(f\circ g)(3)=8$
19.	20.
$f\circ g=12x^2-9x-2$ $g\circ f=36x^2-57x+22$ $(f\circ g)(3)=79$	$f\circ g=x^4-14x^2+52$ $g\circ f=x^4+6x^2+2$ $(f\circ g)(3)=7$
21.	22.
$f\circ g=x^2+3x$ $g\circ f=x^2+7x+8$ $(f\circ g)(3)=18$	$f\circ g=\sqrt{x-2}$ $g\circ f=\sqrt{x+5}-7$ $(f\circ g)(3)=1$

23.	24.
$f \circ g = \frac{5x+35}{2}$ $g \circ f = \frac{5x+7}{2}$ $(f \circ g)(3) = 25$	$f \circ g = x$ $g \circ f = x$ $(f \circ g)(3) = 3$

In Problems 25-28, find $f \circ g$

25. $f \circ g = \frac{6}{5x+2}$	26. $f \circ g = \frac{21-x}{3+2x}$
27. $f \circ g = \sqrt{3x-1}$	28. $f \circ g = x+5$