When determining domain: $\frac{1}{0}$ or $\sqrt{-}$ look for these which are NOT Allowed.

Algebra II 6.3 Part 1 Extra Practice Name: Key

For #'s 1-6, let $f(x) = x^{\frac{1}{2}} + 2$, $g(x) = 3x^{\frac{1}{2}} - 1$, and $h(x) = -2x^{\frac{1}{2}} + 3$.

Perform the indicated operation and then state the domain.

1. $f(x) + g(x)$

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

$\boxed{4x^{\frac{1}{2}}+1}$ Domain: $x \geq 0$

2. $f(x) + h(x)$

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

$\boxed{-1x^{\frac{1}{2}}+5}$ Domain: $x \geq 0$

3. $h(x) + g(x)$

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

$\boxed{1x^{\frac{1}{2}}+2}$ Domain: $x \geq 0$

4. $f(x) - g(x)$

$(x^{\frac{1}{2}}+2) - (3x^{\frac{1}{2}}-1)$ Distribute negative.

$\boxed{-2x^{\frac{1}{2}}+3}$ Domain: $x \geq 0$

5. $h(x) - f(x)$

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

$\boxed{-3x^{\frac{1}{2}}+1}$ Domain: $x \geq 0$

6. $g(x) - h(x)$

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

$\boxed{5x^{\frac{1}{2}}-4}$ Domain: $x \geq 0$

For #'s 7-12, let $f(x) = 4x^{\frac{3}{2}}$, $g(x) = 2x^{\frac{1}{3}}$, and $h(x) = -6x^{\frac{1}{2}}$. Always look at the original problem when determining the domain. $x^{\frac{1}{2}} = \sqrt{x}$ $\neq \sqrt{-}$

Perform the indicated operation and then state the domain.

7. $f(x) * g(x)$

$(4x^{3/2})(2x^{1/3})$

$\boxed{8x^{11/6}}$ Domain: $x \geq 0$

8. $f(x) * h(x)$

$(4x^{3/2})(-6x^{\frac{1}{2}})$

$\boxed{-24x^{2}}$ Domain: $x \geq 0$

9. $h(x) * g(x)$

$(-6x^{\frac{1}{2}})(2x^{\frac{1}{3}})$

$\boxed{-12x^{5/6}}$ Domain: $x \geq 0$

10. $\frac{f(x)}{g(x)}$

$\frac{4x^{3/2}}{2x^{1/3}}$

$\boxed{2x^{7/6}}$ Domain: $x \geq 0$

11. $\frac{h(x)}{f(x)}$

$\frac{-6x^{\frac{1}{2}}}{4x^{3/2}}$

$\boxed{\frac{-3}{2x^{1/2}}}$ Domain: $x \geq 0$

12. $\frac{g(x)}{h(x)}$

$\frac{2x^{\frac{1}{3}}}{-6x^{1/2}}$

$\boxed{\frac{-1}{3x^{1/6}}}$ Domain: $x \geq 0$

For #'s 13-18, let $f(x) = 2x + 3$, $g(x) = x^2$, and $h(x) = \frac{3}{x-2}$.

Set denominator equal to zero to solve for domain restrictions

Perform the indicated operation and then state the domain.

13. $f(x) + g(x)$

$(2x+3) + (x^2)$

$\boxed{x^2+2x+3}$ Domain: $\mathbb{R}$

14. $f(x) * h(x)$

$(2x+3)\left(\frac{3}{x-2}\right)$

$\left(\frac{2x+3}{1}\right)\left(\frac{3}{x-2}\right) = \frac{3(2x+3)}{x-2}$

$\boxed{\frac{6x+9}{x-2}}$ Domain: $\mathbb{R};\ x \neq 2$

15. $h(x) - g(x)$

$\left(\frac{3}{x-2}\right) - (x^2)$

$\boxed{-x^2 + \frac{3}{x-2}}$ or $\boxed{\frac{-x^3+2x+3}{x-2}}$

Domain: $\mathbb{R};\ x \neq 2$

16. $f(x) * g(x)$

$(2x+3)(x^2)$

$\boxed{2x^3+3x^2}$ Domain: $\mathbb{R}$

17. $\frac{h(x)}{f(x)}$

flip and multiply

$\frac{\frac{3}{x-2}}{2x+3}$ $\quad \frac{3}{x-2} \cdot \frac{1}{2x+3}$

$\boxed{\frac{3}{(x-2)(2x+3)}}$ Domain: $\mathbb{R};\ x \neq 2, \frac{-3}{2}$

18. $\frac{g(x)}{h(x)}$

$\frac{\frac{x^2}{1}}{\frac{3}{x-2}} \rightarrow \frac{x^2}{1} \cdot \frac{x-2}{3}$

$\boxed{\frac{x^3-2x}{3}}$ Domain: $\mathbb{R};\ x \neq 2$

Domain:

$x-2=0$ $\quad 2x+3=0$

$x \neq 2$ $\quad\quad -3\ \ -3$

$\frac{2x}{2} = \frac{-3}{2}$

$x \neq \frac{-3}{2}$