

①  $f(x) = x^2 + 4$        $g(x) = \sqrt{x}$

What's in  
Common  
↓

A.  $(f+g)(x)$   
 $f(x) + g(x)$   
 $x^2 + 4 + \sqrt{x}$

~~$x^2 + 4$~~  Domain  $f(x) = (-\infty, \infty)$   
 Domain  $g(x) = [0, \infty)$

} Intersection  
of Both

Domain  $(f+g)(x) = [0, \infty)$

B.  $(f-g)(x)$   
 $f(x) - g(x)$   
 $x^2 + 4 - \sqrt{x}$

Same  
Domain

C.  $(f \cdot g)(x)$   
 $f(x) \cdot g(x)$   
 $(x^2 + 4)(\sqrt{x})$   
 $x^2\sqrt{x} + 4\sqrt{x}$

Same  
Domain

D.  $\left(\frac{f}{g}\right)(x)$

Same  
Domain

$$\frac{f(x)}{g(x)} = \frac{x^2 + 4}{\sqrt{x}} \cdot \frac{\sqrt{x}}{\sqrt{x}} = \frac{x^2\sqrt{x} + 4\sqrt{x}}{x}$$