

2.2 Pg 74 (1, 4, 5, 19, 25, 31, 47)

(1-8)  $f(x) = x^3 + 5$  ;  $g(x) = x^2 - 2$  ;  $h(x) = 2x + 4$

1.  $f + g = x^3 + 5 + x^2 - 2 = x^3 + x^2 + 3$

4.  $gf = (x^2 - 2)(x^3 + 5) = x^5 - 2x^3 + 5x^2 - 10$

5.  $f/g = \frac{x^3 + 5}{x^2 - 2}$

(19-24) find  $f+g$ ,  $f-g$ ,  $fg$  and  $f/g$

19.  $f(x) = x^2 + 5$  ;  $g(x) = \sqrt{x} - 2$

$f + g = x^2 + 5 + \sqrt{x} - 2 = x^2 + \sqrt{x} + 3$

$f - g = x^2 + 5 - (\sqrt{x} - 2) = x^2 + 5 - \sqrt{x} + 2 = x^2 - \sqrt{x} + 7$

$fg = (x^2 + 5)(\sqrt{x} - 2) = x^2 \cdot \sqrt{x} + 5\sqrt{x} - 2x^2 - 10$

$\frac{f(x)}{g(x)} = \frac{x^2 + 5}{\sqrt{x} - 2}$

Textbook left

$= x^{2.5} + 5x^{1/2} - 2x^2 - 10$

$= x^{2.5} - 2x^2 + 5x^{1/2} - 10$

25.  $f(x) = x^2 + x + 1$  ;  $g(x) = x^2$

$f \circ g = f(g(x)) = (x^2)^2 + (x^2) + 1$

$f \circ g = x^4 + x^2 + 1$

$g \circ f = g(f(x)) = (x^2 + x + 1)^2$  Textbook just left

$= x^4 + x^3 + x^2 + x^3 + x^2 + x + x^2 + x + 1$

$= x^4 + 2x^3 + 3x^2 + 2x + 1$

(Cont.) 2.2 Pg 74 (31, 47)

31. Evaluate  $h(2)$ , where  $h = g \circ f$

$$f(x) = x^2 + x + 1 \quad g(x) = x^2$$

$$\begin{aligned} \text{From \#25 } h(x) = g \circ f &= x^4 + 2x^3 + 3x^2 + 2x + 1 \\ h(2) &= 2^4 + 2(2)^3 + 3(2)^2 + 2(2) + 1 \\ &= 16 + 16 + 12 + 4 + 1 \end{aligned}$$

$$h(2) = 49$$

47. 
$$\frac{f(a+h) - f(a)}{h} \quad (h \neq 0)$$

$$f(x) = x^2 + 1$$

$$\frac{[(a+h)^2 + 1] - (a^2 + 1)}{h} = \frac{a^2 + 2ah + h^2 + 1 - a^2 - 1}{h}$$

$$\frac{2ah + h^2}{h} = h + 2a$$