

FUNCTION OPERATIONS

$$f(x) = x^2 + 3x + 2 \quad g(x) = 3x^2 - x + 7$$

$$f(-3) = (-3)^2 + 3(-3) + 2 \\ = 9 - 9 + 2 = 2$$

$$(f+g)(x) = x^2 + 3x + 2 + 3x^2 - x + 7 \\ = 4x^2 + 2x + 9$$

$$(f+g)(1) = 4(1)^2 + 2(1) + 9 \\ = 4 + 2 + 9 = 15$$

$$K(x) = 3x + 2 \quad m(x) = x^2 - 2x + 4 \quad p(x) = \frac{1}{x-2}$$

$$(Km)(x) = (3x+2)(x^2-2x+4)$$

$$= \underline{3x^3} - \underline{6x^2} + \underline{12x} + \underline{2x^2} - \underline{4x} + 8$$

$$= 3x^3 - 4x^2 + 8x + 8$$

$$\left(\frac{K}{p}\right)(x) = \frac{3x+2}{\frac{1}{x-2}} = (3x+2) \cdot \frac{(x-2)}{1} \\ = 3x^2 - 6x + 2x - 4 \\ = 3x^2 - 4x - 4$$

Journals - Omit
4, 9, 10, 11, 12 b

Func Ops
Handout
Omit 13-18

Review
15a, 16, 17

COMPOSITION OF FUNCTIONS - Function in a function

$$f(x) = 3x + 2 \quad g(x) = x^2 - 2x + 4 \quad h(x) = \frac{3x^2 + 2}{x^2 - 1} \quad K(x) = \sqrt{2x + 1}$$

$$\begin{aligned} f[g(x)] &= 3(x^2 - 2x + 4) + 2 \\ (f \circ g)(x) &= 3x^2 - 6x + 12 + 2 \\ &= 3x^2 - 6x + 14 \end{aligned}$$

$$\begin{aligned} f[g(2)] &= g(2) = 2^2 - 2(2) + 4 \\ &= 4 - 4 + 4 \\ &= 4 \\ f(4) &= 3(4) + 2 \\ &= 14 \end{aligned}$$

$$f(x) = 3x+2 \quad g(x) = x^2 - 2x + 4 \quad h(x) = \frac{3x^2+2}{x^2-1} \quad K(x) = \sqrt{2x+1}$$

$$(g \circ f)(x)$$

$$= (3x+2)^2 - 2(3x+2) + 4$$

$$= (3x+2)(3x+2) - 6x - 4 + 4$$

$$= 9x^2 + 6x + 4$$

$$f(x) = 3x+2 \quad g(x) = x^2 - 2x + 4 \quad h(x) = \frac{3x^2+2}{x^2-1} \quad K(x) = \sqrt{2x+1}$$

$$(h \circ K \circ f)(x)$$

$$(h \circ K \circ f)(-1)$$

$$K \circ f = \sqrt{2(3x+2)+1}$$

$$= \sqrt{6x+4+1}$$

$$= \sqrt{6x+5}$$

$$h(\sqrt{6x+5}) = \frac{3(\sqrt{6x+5})^2 + 2}{(\sqrt{6x+5})^2 - 1}$$

$$= \frac{3(6x+5) + 2}{6x+5-1}$$

$$= \frac{18x+15+2}{6x+4}$$

$$= \frac{18x+17}{6x+4}$$