

Pg 145 - 146:

2. -3 30b.

8. 0 $(f+g)(x) = 2x^2 + \frac{2}{x-5} = \frac{2x^3 - 10x^2 + 2}{x-5}, x \neq 5$

$(f-g)(x) = 2x^2 - \frac{2}{x-5} = \frac{2x^3 - 10x^2 - 2}{x-5}, x \neq 5$

$(fg)(x) = \frac{4x^2}{x-5}, x \neq 5$

$(ff)(x) = 4x^4$

$(f/g)(x) = \frac{x^2(x-5)}{x^2(x-5)} = x^2 - 5x^2, x \neq 5$

$(g/f)(x) = \frac{1}{x^2(x-5)}, x \neq 0, 5$

31b.

$(f+g)(x) = \frac{1}{x} + x - 3 = \frac{x^2 - 3x + 1}{x}, x \neq 0$

$(f-g)(x) = \frac{1}{x} - x + 3 = \frac{-x^2 + 3x + 1}{x}, x \neq 0$

$(fg)(x) = 1 - \frac{3}{x} = \frac{x-3}{x}, x \neq 0$

$(ff)(x) = \frac{1}{x^2}, x \neq 0$

$(f/g)(x) = \frac{1}{x(x-3)}, x \neq 0, 3$

$(g/f)(x) = x(x-3) = x^2 - 3x, x \neq 0$

C1 Ditto 2:

5. $y = -3/2x + 1$

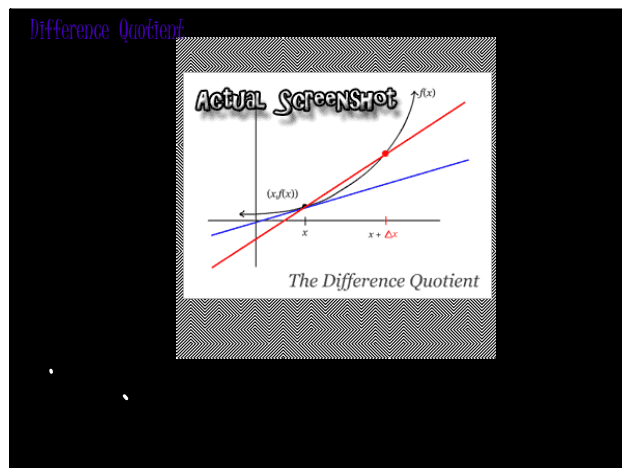
6. Perpendicular: $x = 3$
Parallel: $y = 7$
* Plot the line & point

63. $(f \circ g)(x) = \frac{4x}{x-5}, x \neq 0, 5$
 $(g \circ f)(x) = \frac{1-5x}{4}, x \neq \frac{1}{5}$

$f(x) = \frac{4}{1-5x}, g(x) = \frac{1}{x}$

$f(\frac{1}{1-5x}) = \frac{4}{1-5(\frac{1}{1-5x})} = \frac{4}{1-\frac{5}{1-5x}} = \frac{4}{\frac{1-5x-5}{1-5x}} = \frac{4(1-5x)}{1-5x-5} = \frac{4(1-5x)}{-4-5x} = \frac{4(1-5x)}{-(4+5x)} = -\frac{4(1-5x)}{4+5x}$

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$f(x) = \frac{x-2}{x}, g(x) = x+2$

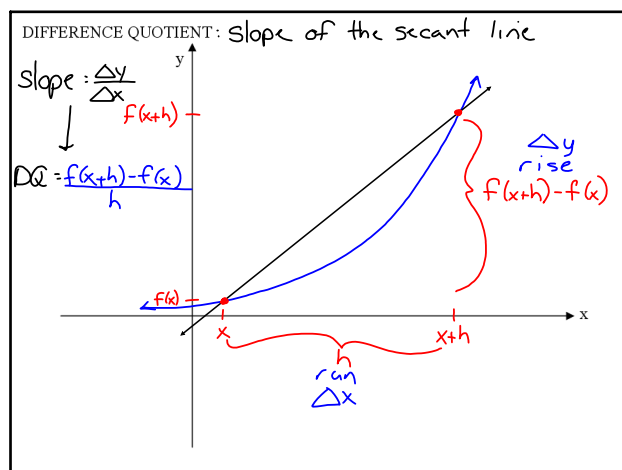
Find each of the following:

$(f+g)(x) = f(x) + g(x) = \frac{x-2}{x} + x+2 = \frac{x-2+x^2+2x}{x} = \frac{x^2+3x-2}{x}, x \neq 0$

$(f \circ g)(x) = f(g(x)) = f(x+2) = \frac{x+2-2}{x+2} = \frac{x}{x+2}, x \neq -2$

$(\frac{f}{g})(x) = \frac{f(x)}{g(x)} = \frac{\frac{x-2}{x}}{x+2} = \frac{x-2}{x(x+2)} = \frac{x-2}{x^2+2x}, x \neq 0, -2$

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DQ = $\frac{f(x+h)-f(x)}{h} = \frac{\Delta y}{\Delta x}$

Find DQ for:

$f(x) = 2x$

① Find $f(x+h)$
 $f(x+h) = 2(x+h) = 2x+2h$

② Substitute $f(x+h)$ and $f(x)$ into the DQ formula.
* $f(x)$ must always be able to be eliminated after the substitution.

DQ: $\frac{2x+2h-2x}{h} = \frac{2h}{h} = 2$

③ Eliminate h from the denominator.
DQ: 2

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Find DQ for:

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

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

② Substitute

DQ: $\frac{x^2 + 2hx + h^2 + 1 - (x^2 + 1)}{h} = \frac{2hx + h^2}{h} = 2x + h$

③ Eliminate h

DQ: $\frac{2hx + h^2}{h} = 2x + h$

DQ: $2x + h$

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Find DQ for:

$$f(x) = x - x^2$$

$$\textcircled{1} f(x+h) = (x+h) - (x+h)^2$$

$$= x+h - [(x+h)(x+h)]$$

$$= x+h - (x^2 + 2hx + h^2)$$

$$= x+h - x^2 - 2hx - h^2$$

$$\textcircled{2} \text{DQ} : \frac{x+h-x^2-2hx-h^2-(x-x^2)}{h}$$

$$\text{DQ} : \frac{\cancel{x}+h-\cancel{x}^2-2hx-h^2-\cancel{x}+\cancel{x}^2}{h}$$

$$\textcircled{3} \text{DQ} : \frac{h-2hx-h^2}{h}$$

$$\text{DQ} : 1-2x-h$$

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$$4. f(x) = x^3 + x$$

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