Kerry Ojakian's MTH 30 Class
Class Assignment #4

1. Let $f(x) = x^3$ and $g(x) = x - 1$.

   (a) Find $(f + g)(-3)$

   (b) Find $(f - g)(-3)$

   (c) Find $(f * g)(-3)$

   (d) Find $\left(\frac{f}{g}\right)(-3)$

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2. Let $f(x) = x^3$ and $g(x) = x - 1$. For each of the following, find the simplified and expanded form.

   (a) $(f + g)$

   (b) $(f - g)$

   (c) $(f * g)$

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3. Let $f(x) = \frac{1}{x^3}$ and $g(x) = \sqrt{x + 1}$. Find the domain of each of the following.

   (a) $(f + g)$

   (b) $(f - g)$

   (c) $(f * g)$

   (d) $\left(\frac{f}{g}\right)$

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4. Find an example of function f and g so that $\left(\frac{f}{g}\right)$ is defined everywhere.

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5. If the order is reversed when composing two functions, can the result ever be the same as the answer in the original order of the composition? If yes, give an example. If no, explain why not.

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6. Let $f(x) = 2x$ and $g(x) = x + 10$.

   (a) Find $(f \circ g)(5)$

   (b) Find $g(f(5))$

   (c) Find $f(f(5))$

   (d) Find $(g \circ g)(5)$

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7. Let $f(x) = \dfrac{4}{x}$ and $h(x) = \dfrac{1}{x+1}$. Find $f(h(x))$ (simplify and expand).

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8. Let $g(u) = \sqrt{u}$ and $h(x) = x^4$. Find $h(g(u))$ (simplify and expand).

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9. Let $f(x) = \dfrac{1}{x-4}$ and $g(x) = \dfrac{2}{x} + 4$. Find $f(g(x))$ and $g(f(x))$.

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10. Let $f(x) = 5x^2 + 1$ and $g(x) = \sqrt{x+1}$.

    (a) Find $f(g(x))$ (simplify).

    (b) Find the domain of $f \circ g$.

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11. For $f(x) = \sqrt{x}$ and $g(x) = x^2$, write the domain of $f \circ g$ in interval notation. Also, find the domain of $g \circ f$.

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12. For $f(x) = \dfrac{1}{x}$ and $g(x) = \sqrt{x-1}$, write the domain of $f \circ g$ in interval notation.

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13. Let $H(x) = (2x+1)^5$. Find functions f and g so that $H = f \circ g$.

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14. Let $H(x) = \dfrac{1}{3x^2+1}$. Find functions f and g so that $H = f \circ g$.

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15. Let $H(x) = \dfrac{1}{(2x+1)^2}$. Find functions f and g so that $H = f \circ g$.
