M30-1 Function Operations & Polynomials Quiz
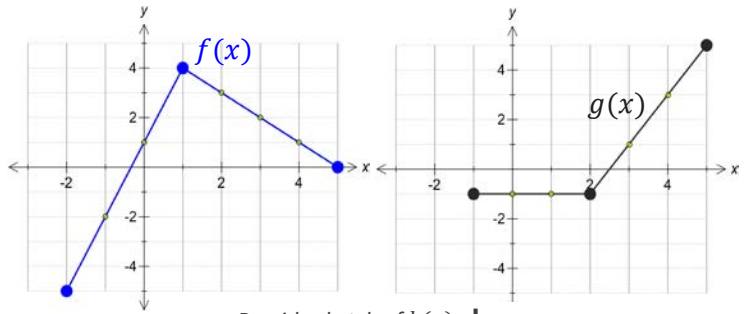
Name: _____

NO CALCULATORS are allowed for this quiz!

1. Given the graphs of $f(x)$ and $g(x)$ on the right...

   (a) State the domain of $h(x) = f(x) - g(x)$

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   1

   (b) State the indicated values in the blanks provided

   $\frac{3}{}$
   4

   i) $f(3)$ _____
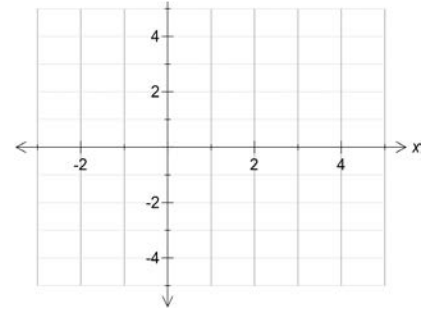
   ii) $f \circ g(0)$ _____

   iii) $f \circ f \circ g(0)$ _____

   (c) Provide a sketch of $h(x) = (f - g)(x)$ on the grid provided. →

   $\overline{}$
   1

Provide sketch of $h(x)$. ↓

2. Two functions are defined by $f(x) = x^2 - 1$ and $g(x) = 2x + 3$.

   (a) State the expression *(fully simplified)* for a function $(f + g)(x)$ and state the **domain**.

   $\overline{}$
   2

   _____   _____
   Simplified $(f + g)(x)$ DOMAIN of $(f + g)(x)$

   (b) State the expression *(do not simplify)* for a function $\left(\frac{f}{g}\right)(x)$ and state the **domain**.

   $\frac{5}{}$ $\frac{}{2}$

   _____   _____
   Non-simplified $\left(\frac{f}{g}\right)(x)$ DOMAIN of $\left(\frac{f}{g}\right)(x)$

   (c) State the expression *(simplified)* for a function $f \circ g(x)$.

   $\overline{}$
   1

   _____
   Simplified $f \circ g(x)$

5. Below is a list of functions. Indicate each polynomial functions but placing a "P" beside it. Then, indicate the degree of the polynomial function.

____ $f(x) = 3x^2 + 5x - 7$ $\qquad\qquad$ $y = 5x(x-2)(x+3)$ $\qquad\qquad$ $y = 3\sqrt{x-1} + 2$

2

$y = \sqrt{5}x - 7$ $\qquad\qquad\qquad$ $y = 3x^2 + 2x^{-1}$ $\qquad\qquad\qquad$ $y = 6x^2(x+5)^7$

5. For each provided equation on the left, math with the appropriate numbered graph.   ***Note:*** *There are more graphs than equations – some graphs are "extras"!*

a) $f(x) = 3x^2 + 5x - 7$ $\qquad$ _____

b) $2y = 5x + 8$ $\qquad$ _____

c) $y = x^3 - 4x^2 + x + 6$ $\qquad$ _____

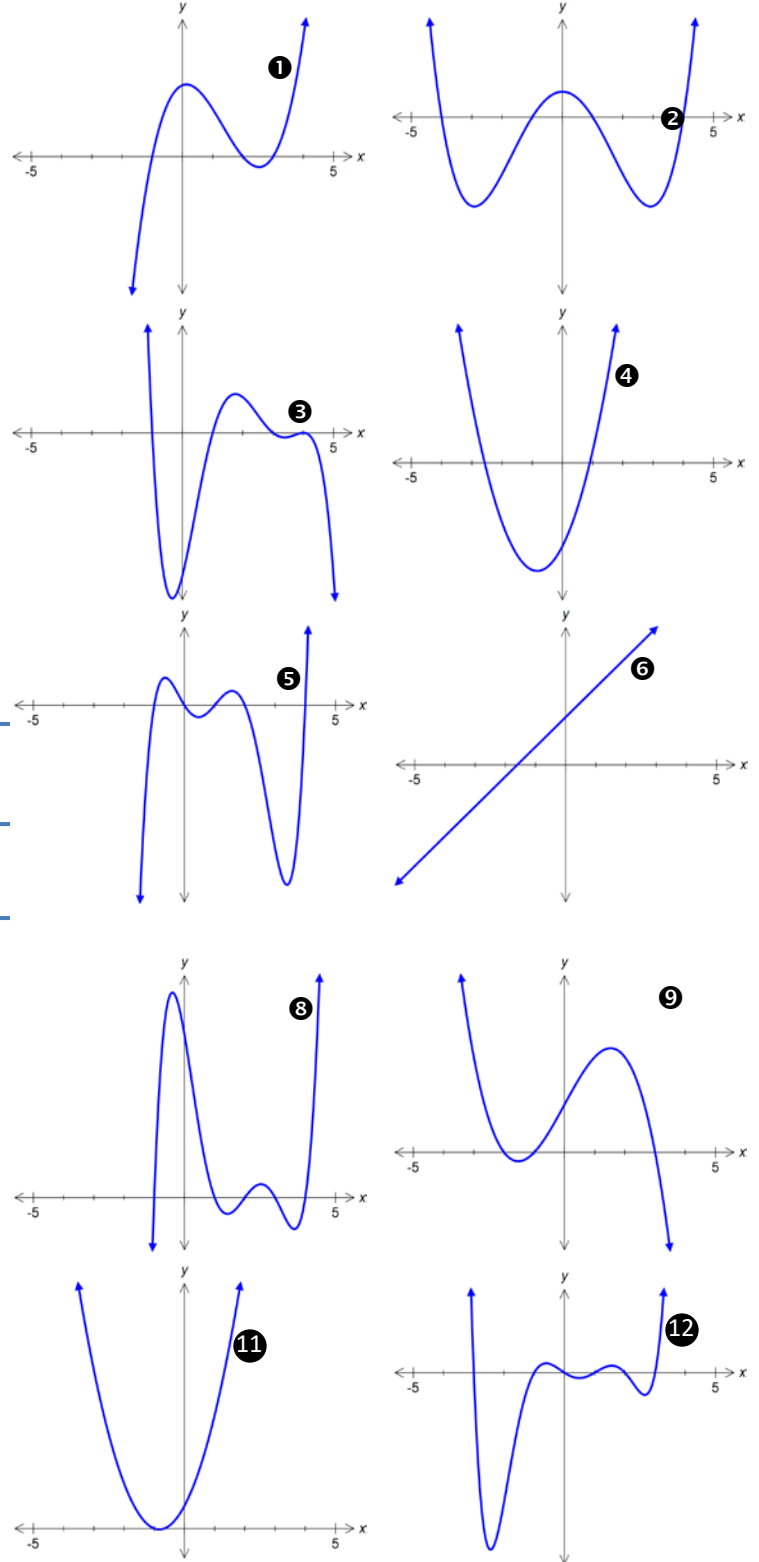**d)** $y = -(x+1)(x+2)(x-3)$ $\qquad$ _____

4

e) $f(x) = x^4 - 17x^2 + 16$ $\qquad$ _____

f) $f(x) = -2(x+1)(x-1)(x-3)(x-4)^2$ _____

g) $y = -x^6 + 5x^5 + 7x^4 - 53x^3 + 18x^2 + 72x$ _____

h) $y = 2x^5 - 12x^4 + 14x^3 + 12x^2 - 16x$ _____

6

1. Determine the value of k such that when $f(x) = x^4 + kx^3 - 3x - 5$ is divided by $x - 3$, the remainder is -14

2

2. Use the factor / remainder theorem to show that:

(a) $(x + 3)$ is a factor of $P(x) = x^3 - 7x + 6$ (b) $(x - 1)$ is NOT a factor of $f(x) = 2x^3 + 9x^2 + 7x - 6$

2

3. Use synthetic division to find the result when $P(x) = x^3 - 3x^2 - 4x + 12$ is divided by $x - 2$.

2

6

4. FULLY FACTOR $P(x) = x^3 - 4x^2 + x + 6$ using an algebraic method. Show all steps / reasoning.