

Homework 4.1: Combining Functions

Name Key!

Math 3

Directions: Find the equation of the line $f(x)$ and $g(x)$ in the form $y=mx+b$ by determining the slope and the y-intercept. Then, combine the functions in the following ways.

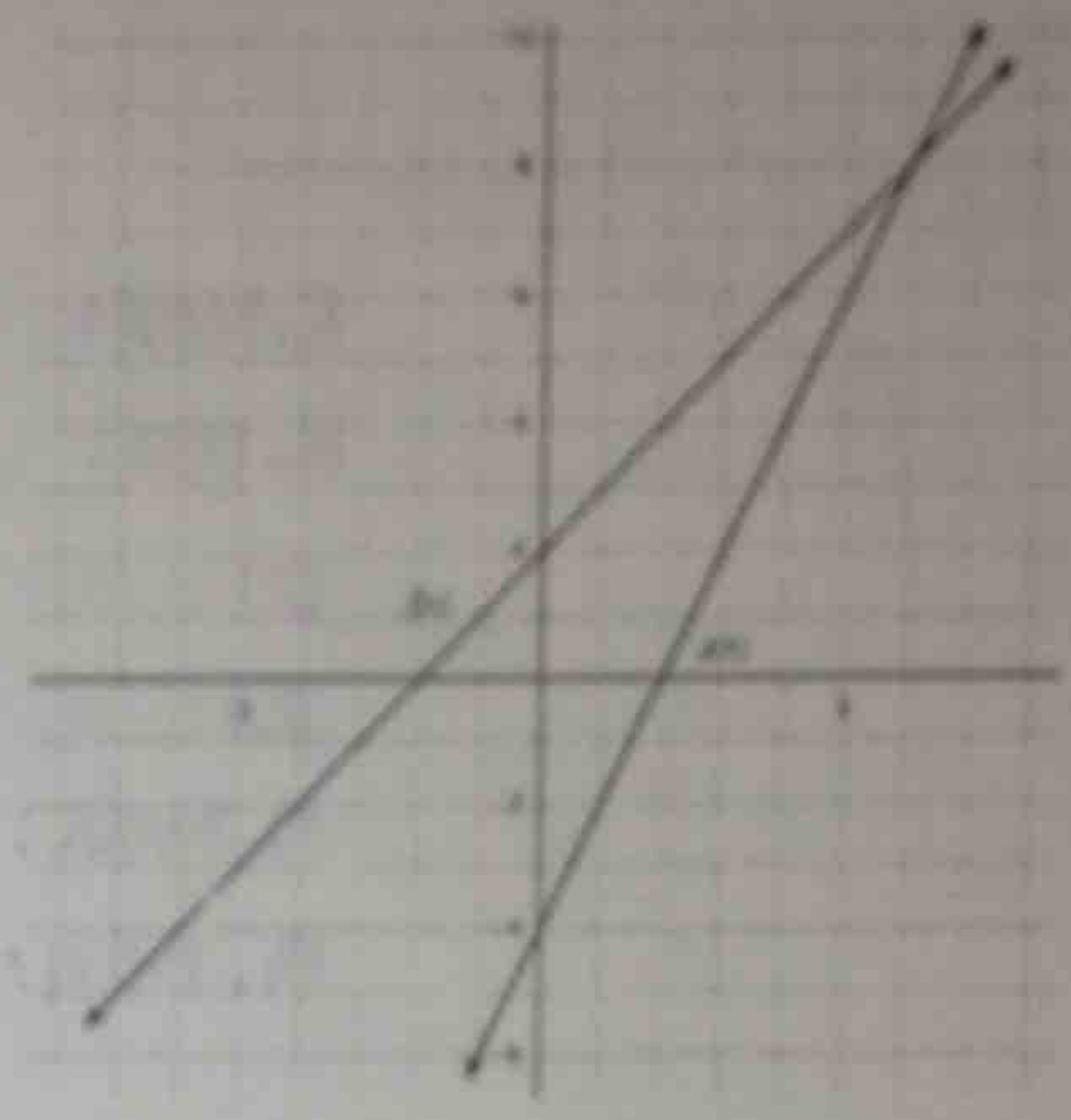
1. Equation of $f(x) =$
 $1x + 2$

2. Equation of $g(x) =$
 $2x - 4$

3. $f(x) + g(x) =$
 $(x+2) + (2x-4)$
 $= 3x - 2$

4. $f(x) - g(x) =$
 $(x+2) - (2x-4)$
 $x+2-2x+4$
 $= -1x + 6$

5. $f(x) \cdot g(x) =$
 $(x+2)(2x-4)$
 $2x^2 - 4x + 4x - 8$
 $2x^2 - 8$



Directions: Use the given functions to solve questions 6-12.

$f(x) = x - 3$

$g(x) = x + 2$

$h(x) = -x + 1$

$m(x) = x^2 + 3x + 2$

$n(x) = 2x^3 - x^2 + 2x + 1$

$p(x) = 2x + 1$

6. $f(x) + g(x)$
 $(x-3) + (x+2)$
 $2x - 1$

7. $f(x) - h(x)$
 $(x-3) - (-x+1)$
 $x-3+x-1$
 $2x - 4$

8. $f(x) + p(x)$
 $(x-3) + (2x+1)$
 $3x - 2$

9. $g(x) + h(x)$
 $(x+2) + (-x+1)$
 3

10. $m(x) - g(x)$
 $(x^2 + 3x + 2) - (x + 2)$
 $x^2 + 3x + 2 - x - 2$
 $x^2 + 2x$

11. $n(x) + m(x)$
 $(2x^3 - x^2 + 2x + 1) + (x^2 + 3x + 2)$
 $2x^3 + 5x + 3$

Directions: Determine if the statement is **SOMETIMES**, **ALWAYS**, or **NEVER** true.

- 12. The sum of two linear functions is another linear function. 12 ALWAYS
- 13. The sum of a linear and a quadratic is a cubic function. 13 NEVER
- 14. The sum of the cubic and a quadratic function is a cubic function. 14 ALWAYS

Homework 4.2: Dividing Polynomials

Name: _____

Math 3

Directions: Divide each of the polynomials using either long or synthetic division.

1. $(4x^2 - 9) \div (2x + 3)$

$$\begin{array}{r} 2x - 3 \\ 2x + 3 \overline{) 4x^2 + 0x - 9} \\ \underline{-4x^2 - 6x} \\ -6x - 9 \\ \underline{+6x + 9} \\ 0 \end{array}$$

$$2x - 3$$

2. $(x^2 - 4) \div (x + 4)$

$$\begin{array}{r} -4 \\ 1 -4 \\ \downarrow -4 \\ 1 -4 \end{array}$$

$$x - 4 + \frac{12}{x + 4}$$

3. $(2x^2 + 5x - 3) \div (x + 3)$

$$\begin{array}{r} -3 \\ 2 -3 \\ \downarrow -6 \\ 2 -1 \end{array}$$

$$2x - 1$$

4. $(2x^2 + 5x - 3) \div (x - 3)$

$$\begin{array}{r} 3 \\ 2 -3 \\ \downarrow 6 \\ 2 30 \end{array}$$

$$2x - 11 + \frac{30}{x - 3}$$

7. $(11x + 20x^2 + 12x^3 + 2) \div (3x + 2)$

$$\begin{array}{r} 4x^2 + 4x + 1 \\ 3x + 2 \overline{) 12x^3 + 20x^2 + 11x + 2} \\ \underline{-12x^3 - 8x^2} \\ 12x^2 + 11x \\ \underline{-12x^2 - 8x} \\ 3x + 2 \\ \underline{-3x - 2} \\ 0 \end{array}$$

$$4x^2 + 4x + 1$$

8. $(12x^3 + 2 + 11x + 20x^2) \div (2x + 1)$

$$\begin{array}{r} 6x^2 + 7x + 2 \\ 2x + 1 \overline{) 12x^3 + 20x^2 + 11x + 2} \\ \underline{-12x^3 - 6x^2} \\ 14x^2 + 11x \\ \underline{-14x^2 - 7x} \\ 4x + 2 \\ \underline{-4x - 2} \\ 0 \end{array}$$

$$6x^2 + 7x + 2$$

9. $\frac{3x^3 + 4x + 11}{x^2 - 3x + 2}$

$$\begin{array}{r} 3x + 9 \\ x^2 - 3x + 2 \overline{) 3x^3 + 0x^2 + 4x + 11} \\ \underline{-3x^3 + 9x^2 + 6x} \\ 9x^2 - 2x + 11 \\ \underline{-9x^2 + 27x - 18} \\ 25x - 7 \end{array}$$

$$x^2 - 3x + 2 + \frac{25x - 7}{x^2 - 3x + 2}$$

10. $\frac{2x^3 + 4x^2 - 5}{x + 3}$

$$\begin{array}{r} -3 \\ 2 -5 \\ \downarrow -6 -18 \\ 2 -2 -23 \end{array}$$

$$2x^2 - 2x + 6 + \frac{-23}{x + 3}$$

11. $\frac{12x^3 - 11x^2 + 9x + 18}{4x + 3}$

$$\begin{array}{r} 3x^2 - 5x + 6 \\ 4x + 3 \overline{) 12x^3 - 11x^2 + 9x + 18} \\ \underline{-12x^3 - 9x^2} \\ -20x^2 + 9x \\ \underline{+20x^2 + 15x} \\ 24x + 18 \\ \underline{-24x - 18} \\ 0 \end{array}$$

$$3x^2 - 5x + 6$$

12. $\frac{4x^3 - 2x^2 - 3}{2x^2 - 1}$

$$\begin{array}{r} 2x - 1 \\ 2x^2 + 0x - 1 \overline{) 4x^3 - 2x^2 + 0x - 3} \\ \underline{-4x^3 - 0x^2 + 2x} \\ -2x^2 + 2x - 3 \\ \underline{+2x^2 + 0x - 1} \\ 2x - 4 \end{array}$$

$$2x - 1 + \frac{2x - 4}{2x^2 - 1}$$