

Richard Montgomery High School

Department of Mathematics

Summer Math Packet

for students entering

MYP Algebra II with Analysis or

Pre-IB Analysis and Applications of Functions

Name: _____

Date: _____

This packet must be completed and ready to turn in to your new math teacher on the **first day of school**. It will be graded and you will be tested on the material in this packet within the first few weeks of school.

Try to wait until late July or early August to begin working on this packet. We want to make sure the material is fresh in your mind.

You may work with a classmate or a peer. You may use textbooks or other sources to help you complete the packet, however, each student must submit their own packet, and each student is responsible for understanding the material contained in the packet. Calculators are allowed. Make sure to show an appropriate amount of work.

Please do your work directly on this packet. Additional work, completed on separate paper, may be attached to the back of the packet.

1. Give three examples of numbers that belong to each set of numbers.

i. Natural numbers _____

ii. Whole numbers _____

iii. Integers _____

iv. Rational numbers _____

v. Irrational numbers _____

vi. Real numbers _____

2. Write an example to illustrate the property.

i. Commutative property for addition _____

ii. Commutative property for multiplication _____

iii. Associative property for addition _____

iv. Associative property for multiplication _____

v. Distributive property of multiplication over addition _____

3. What is the opposite of -5? _____

4. What is the reciprocal of $-\frac{2}{5}$? _____

5. Solve for x in the equation.

a. $6(x + 2) - 4x = 48$

b. $\frac{1}{3}x + 6 = 11$

c. $7x + 19 = 55 - 2x$

d. $4(1 - x) + 3x = -2(x + 1)$

e. $20x - (3 + 5x) = 8x + 4$

f. $\frac{1}{4}x + 16 = 3(\frac{1}{4}x + \frac{4}{3})$

g. $|x - 4| = 12$

h. $\frac{5}{x+2} = \frac{x}{3}$

6. Solve for the variable indicated.

a. Solve for r : $A = P + Prt$

b. Solve for y : $2x - 3y + 12 = 0$

c. Solve for l : $R = \frac{kl}{d^2}$

d. Solve for v : $S = -\frac{1}{2}gt^2 + vt$

7. Decide whether the point $(-2, -2)$ lies on the line $2x + 3y = 10$. Write yes or no and show work to support your answer.

8. Find the slope of the line containing the points $(3, 5)$ and $(6, 9)$.

9. Find the x-intercept and the y-intercept of the line $3x + 4y = -24$.

10. Find an equation of the line with slope $\frac{3}{2}$ and y-intercept of -5.

11. Find an equation of a vertical line that passes through the point $(-2, -7)$.

12. Find an equation of the line that passes through the points $(1, 6)$ and $(3, -4)$.
13. Find an equation of the line with slope $\frac{1}{2}$ that passes through the point $(-2, 5)$.
14. Find an equation of the line with slope $-\frac{3}{4}$ and x-intercept of 8.
15. Find an equation of the line that passes through the origin and the point $(4, -8)$.
16. Find an equation of the line that passes through the point $(-2, -7)$ and has a slope of 0.
17. Find an equation of the line that passes through the point $(-1, 4)$ and is parallel to the line with equation $y = 2x - 3$.
18. Find an equation of the line that passes through the point $(2, 5)$ and is perpendicular to the line with equation $y = \frac{1}{3}x + 2$.
19. Sketch a reasonable graph for the following scenario: The distance you are from a reading lamp and the amount of light it shines on your book are related. Make sure to label the axes of the graph.

20. Given $f(x) = 3x - 5$, $g(x) = x^2 - 5$, and $h(x) = |x + 7|$, find each of the following.

a. $f(2)$

b. $g(-3)$

c. $h(-10)$

d. $g(0)$

e. The Domain and Range of $f(x)$.

f. The Domain and Range of $g(x)$.

21. Multiply and simplify.

a. $3x(4x^2 - 2x + 1)$

b. $-x^2(2x^3 - 14x^2 + x)$

c. $(x + 5)(x - 3)$

d. $(x - 4)(x + 4)$

e. $(3x + 5)(2x + 1)$

f. $(2x - 3)(x + 3)$

g. $(4x - 3)(2x - 5)$

h. $(3x - 1)^2$

i. $(5x + 4)(2x - 3)$

j. $(2x + 5)(2x + 5)$

k. $(4x + 3)(4x - 3)$

l. $(x + 1)(x^2 - 2x + 1)$

m. $(3x - 2)(2x^2 + 3x - 4)$

n. $(x + 2)(x - 2)(x + 3)$

22. Factor completely.

a. $x^2 + 7x + 12$

b. $2x^2 - x - 15$

c. $x^2 - 25$

d. $x^2 - 8x + 16$

e. $5x^2 + 15x$

f. $-6x^3 + 3x^2 + 3x$

g. $x^2 + 10x - 24$

h. $x^2 + 5x - 14$

i. $3x^2 + 10x + 3$

j. $4x^2 - 49$

k. $3x^2 - 11x + 6$

l. $81x^2 - 1$

m. $3x^2 + 8x + 5$

n. $3x^2 + 11x + 10$

o. $2x^2 - x - 6$

p. $3x^2 + 5x - 12$

q. $2x^2 - 6x$

r. $3x^2 + 7x + 2$

s. $x^2 - 12x + 36$

t. $4x^2 + 4x + 1$

u. $6x^2 + 13x + 5$

v. $10x^2 - 7x - 12$

23. Solve the quadratic equation by factoring or by the quadratic formula.

a. $x^2 - 9x + 18 = 0$

b. $x^2 + 7x - 8 = 0$

c. $x^2 - 6x + 7 = 0$

d. $3x^2 - 20x - 7 = 0$

e. $2x^2 + x - 15 = 0$

f. $5x^2 + x + 2 = 0$

g. $2x^2 - 4x - 9 = 0$

h. $2x^2 - 8x = 0$

i. $x^2 + 3x = 0$

24. Use properties of exponents to simplify the following.

a. $x^2 \cdot x^4$

b. $\frac{x^{15}}{x^8}$

c. $(x^3)^2$

d. $(3x)^2$

e. $\left(\frac{2y^3}{3x^2}\right)^3$

f. $(5x^{-2}y^4)(3x^4y^{-4})$

g. $\frac{12x^3y^2z^2}{24x^2y^5z^2}$

h. $(2x^2y^3)(x^2y)^3$

25. Perform the operation indicated. Simplify.

a. $\frac{12}{15} + \frac{7}{9}$

b. $\frac{12}{40} \cdot \frac{15}{45}$

c. $\frac{-10}{21} \div \frac{15}{28}$

d. $\frac{8x^2}{3} \div \frac{2x}{9}$

e. $\frac{22x^2}{15} \cdot \frac{-5}{11x^3}$

f. $\frac{x}{3} + \frac{5x}{6}$

g. $\frac{x-4}{5} - \frac{x-6}{5}$

h. $\frac{5}{2x} + \frac{3}{10x}$

i. $\frac{7}{x+2} - \frac{5}{x+2}$

j. $\frac{\frac{2}{3}}{\frac{5}{6}}$

k. $\frac{\frac{2x}{5}}{\frac{5x}{20}}$

26. Determine whether the following statement is true or false (write True or False). If the statement is false, correct it.

a. $|-3| = -3$

b. $(-5)^2 = -25$

c. $-5^2 = -25$

d. $3x^{-1} = \frac{1}{3x}$

e. $\sqrt{3^2 + 7^2} = 3 + 7$

f. $(x + 2)^2 = x^2 + 4$

g. $\frac{4 + 6\sqrt{5}}{2} = 2 + 6\sqrt{5}$

h. $\sqrt{(-7)^2} = -7$

i. $(2x)^3 = 8x^3$

j. $\frac{2x + 3}{y + 3} = \frac{2x}{y}$

k. if $x^2 = 25$, then $x = 5$