IB Summer Homework
IB Math Applications and Interpretation Year 2

Name _____

Dear Future IB Math Applications and Interpretation Year 2 Student,

I hope you are excited for your upcoming year in IB Math Applications and Interpretation Year 2 class! The purpose behind this summer homework packet is to reacquaint you with the necessary skills to be successful in this year's math course.

At first glance this packet may seem overwhelming. However, there are approximately 9 weeks of summer. Pace yourself. There are 10 Parts of this packet – complete one/two parts each week and you will easily be able to complete the assignment before your return to school in the fall. Please be prepared to submit this assignment during your **second IB Math Apps and Int. SL class**. It will be graded for accuracy as well as completion. Work needs to be shown in a neat and organized manner, and it is perfectly acceptable to complete the packet on separate sheets of paper. Just be sure to staple any extra papers to the packet. **Please utilize a calculator!**

Show ALL work for each problem and take your time. Remember, this will be your first impression to your new math teacher, and you want to make sure that it is a positive one! See below for directions and helpful links. We hope you have a wonderful summer!

Best,
Wareham High School Math Department

Need help with your Summer math packet???

Feel free to email Mrs. Medina at mmedina@wareham.k12.ma.us with any questions you might have. To ensure the fastest response, please include your name, summer assignment name, and (if possible) a picture of the problem and your accompanying work.

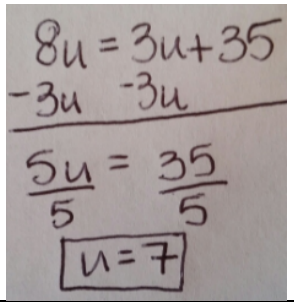
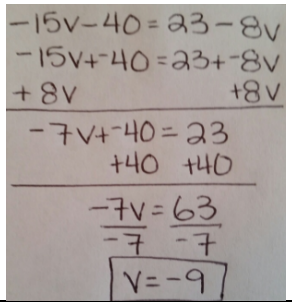
Directions:

- Before answering any questions, read through the given notes and examples for each topic.
- This packet is to be submitted during your **second IB Math Apps and Int. SL class** period.
- All work must be shown in the packet or on a separate sheet of paper stapled to the packet.
- **To avoid a penalty on your grade, final answers MUST BE BOXED or CIRCLED.**

Part 1 – Solving Equations with Variables on Both Sides

General Equations: https://www.khanacademy.org/math/algebra/one-variable-linear-equations/alg1-variables-on-both-sides/v/equations-3

Equations with Fractions: https://www.khanacademy.org/math/algebra/one-variable-linear-equations/alg1-variables-on-both-sides/v/solving-equations-with-the-distributive-property-2

Example 1:	*Example 2:*
	

Solve the following equations using the examples above as guidance.

1. $-30n = -27n - 63$	2. $\frac{3}{2}(x + 4) - 3 = 10 - 2x$	3. $0.1n - 2n = 0.2(n - 3)$
4. $\frac{1}{3}x - 2 = 6x + \frac{7}{3}$	5. $\frac{4}{5}(x - 2) = \frac{1}{5}x + 2$	6. $\frac{4}{5}(x - 2) = \frac{1}{3}(x + 4)$

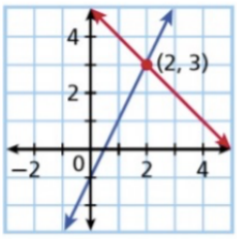
Part 2 – Graphing and Solving Systems of Equations

https://www.khanacademy.org/math/algebra-basics/core-algebra-systems/corealgebra-systems-tutorial/e/graphing_systems_of_equations

How do you solve a system of equations by graphing?

Step 1:
Set-up each equation to be graphed in slope-intercept form (solve for y).

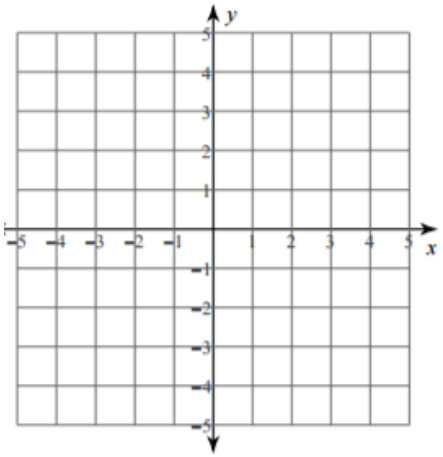
Step 2:
Graph each equation and look for the intersection point; write the ordered pair as your answer.



Step 3:
Check your answer by substituting the point in both equations.

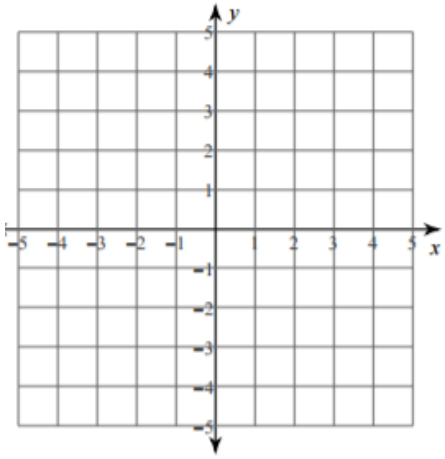
7. $y = -\frac{1}{2}x - 1$

$y = \frac{1}{4}x - 4$



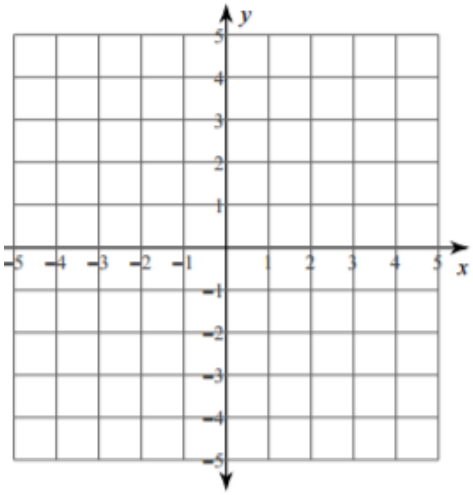
8. $y = -\frac{5}{3}x + 3$

$y = \frac{1}{3}x - 3$



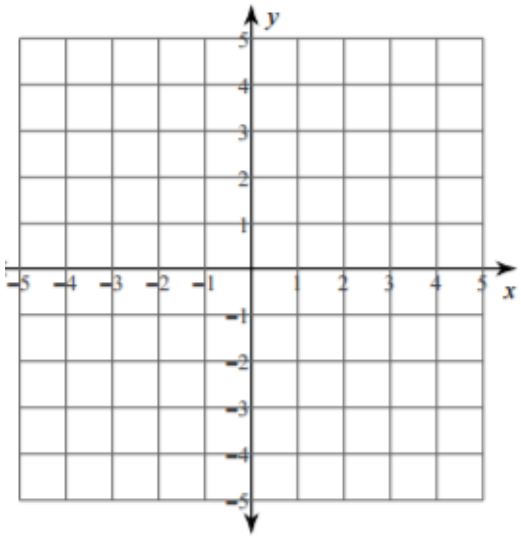
9. $y = -1$

$y = -\frac{5}{2}x + 4$



10. $y = 4x + 3$

$y = -x - 2$

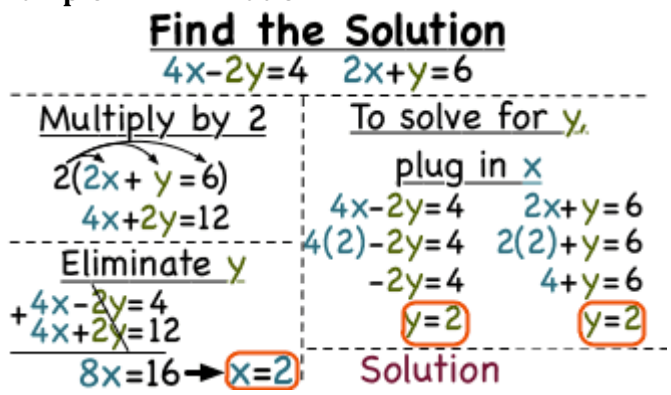


Part 3: Solving Systems of Equations Algebraically (Substitution and Elimination)

Elimination: https://www.khanacademy.org/math/algebra-home/alg-system-of-equations/alg-equivalent-systems-of-equations/v/solving-systems-of-equations-by-elimination

Substitution: https://www.khanacademy.org/math/algebra-home/alg-system-of-equations/alg-solving-systems-of-equations-with-substitution/v/solving-linear-systems-by-substitution

Example 1 – Elimination:



Example 2 – Substitution:

$y = x + 1 \quad 2y = 3x$

$2y = 3x$

$2(x + 1) = 3x$

$2x + 2 = 3x$

$-2x \quad -2x$

$2 = x$

$y = x + 1$

$y = 2 + 1 = 3$

Solution: (1, 3)

Solve the following systems using substitution or elimination.

11. $-3x - 3y = 3$
$y = -5x - 17$

12. $2x - 3y = -1$
$y = x - 1$

13. $-6x + 5y = 1$
$6x + 4y = -10$

14. $7x + 2y = 24$
$8x + 2y = 30$

Part 4 – Adding and Subtracting Polynomials

https://www.khanacademy.org/math/algebra-basics/quadratics-polynomialstopic/polynomial-basics-core-algebra/v/adding-and-subtracting-polynomials-2

Example 1:

$(6x^2 - 7x + 8) + (-4x^2 + 9x - 5)$

Align like terms vertically and add.

$$\begin{array}{r} 6x^2 - 7x + 8 \\ (+)\ -4x^2 + 9x - 5 \\ \hline 2x^2 + 2x + 3 \end{array}$$

Example 2

$(4x^2 - 5x + 6) - (2x^2 + 3x - 1)$

Remove parentheses, and group like terms together.

$(4x^2 - 5x + 6) - (2x^2 + 3x - 1)$

$= 4x^2 - 5x + 6 - 2x^2 - 3x + 1$ Distribute the −1.

$= (4x^2 - 2x^2) + (-5x - 3x) + (6 + 1)$ Group like terms.

$= 2x^2 - 8x + 7$ Combine like terms.

Simplify the following expressions:

15. $(3a+4b)+(6a-6b)$

16. $(a+4)+(a-6)$

17. $(n-9)-(n+7)$

18. $(2c^2-cd+3d^2)+(c^2-2d^2)$

19. $(3x^2-6)+(-x+1)$

20. $(5-a+a^2)-(a^2+7-2a)$

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

22. $(x^2-5x+2)-(3x^2+x-1)$

Part 5 – Multiplying Polynomials

https://www.khanacademy.org/math/in-eighth-grade-math/algebraic-expressionsidentities/monomial-by-polynomial/v/multiplying-monomials-by-polynomials

Example 1:

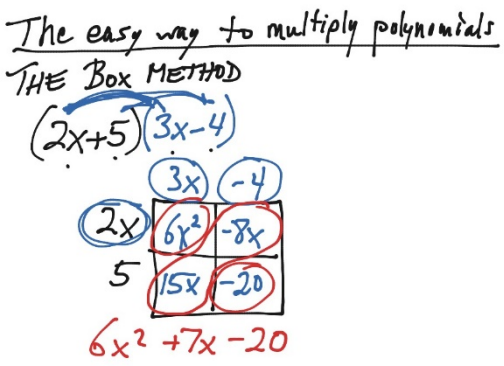
$3x^2(2x^2 - 4x + 1)$ — **Original Problem**

$3x^2(2x^2) + 3x^2(-4x) + 3x^2(1)$ — Distribute $3x^2$ throughout the parenthesis.

$6x^4 - 12x^3 + 3x^2$ — Multiply the coefficient and add th exponents.

Solution:
$6x^4 - 12x^3 + 3x^2$

Example 2:



Find the product.

23. $-3(a-5)$

24. $-9(2x-9)$

25. $-12(2b^2+bc+3c^2)$

26. $(a+7)(a+5)$

27. $(2x+3)(5x-4)$

28. $(2x^2-3x)(x-2)$

Part 6 – Factoring Quadratics when a = 1

https://www.youtube.com/watch?v=_Wb_CT-1VN8

Example 1:

Factor using the x-box method.

1. $x^2 + 4x - 12$

a)

b)

	x	+6
x	x^2	6x
-2	-2x	-12

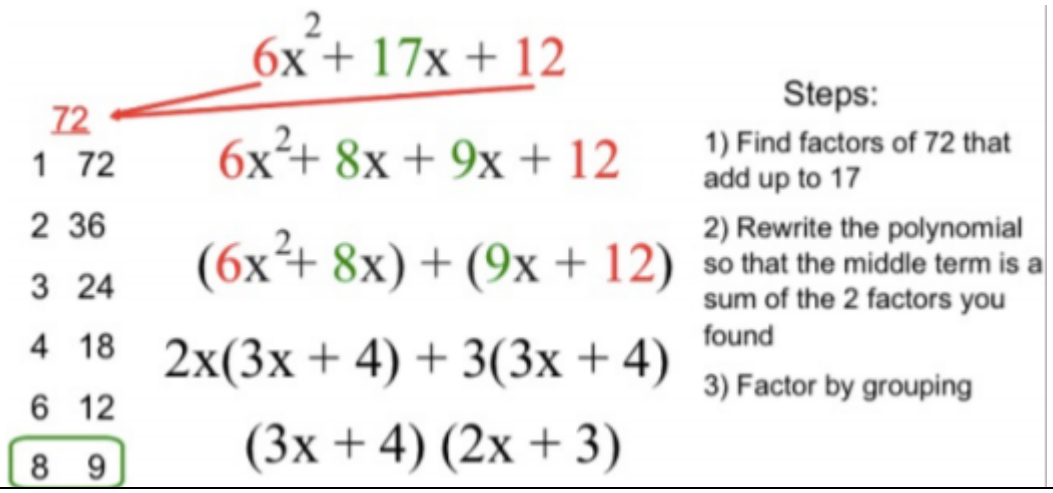
Solution: $x^2 + 4x - 12 = (x + 6)(x - 2)$

Factor the following. Note: If a quadratic function is not factorable, we call it 'prime'.

29. $x^2 + 6x + 5$	30. $x^2 - 6x + 10$
31. $r^2 + 15r + 56$	32. $p^2 + 2p + 4$
33. $x^2 + 9x + 36$	34. $m^2 + 8m - 65$
35. $c^2 + 9c - 18$	36. $x^2 - 7x - 18$

Part 7 – Factoring Quadratics when a does not equal 1.
https://www.youtube.com/watch?v=giwO987jvtU

Example 1:



See above video for factoring with the box method.

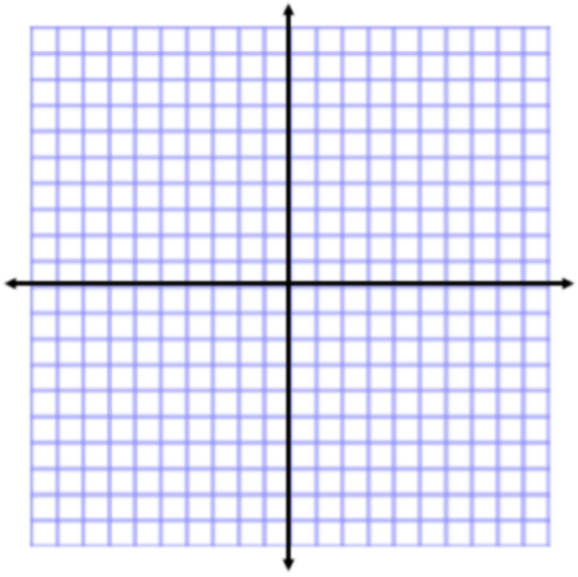
Factor. If not factorable, write 'prime'.

37. $2x^2+5x+3$	38. $3n^2+7n+4$
39. $4r^2+5r+1$	40. $6p^2+5p+1$
41. $11z^2+2z-9$	42. $4y^2-5y-4$

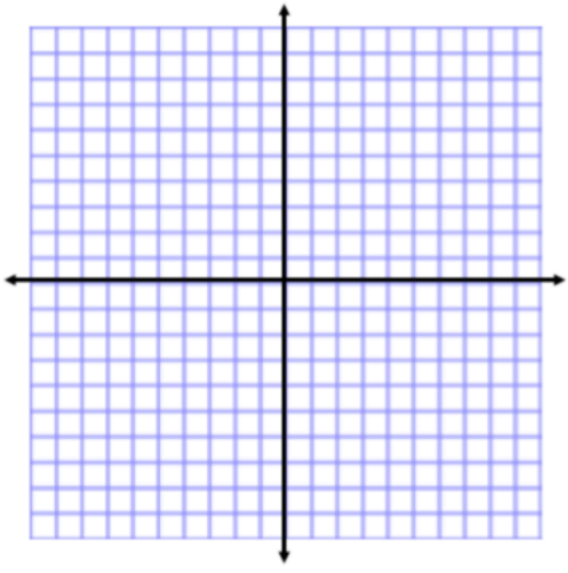
Part 8 – Graphing Quadratics from a Table of Values
https://www.youtube.com/watch?v=nh3_IGxHA5A

Graph the following quadratic functions

43. $y = x^2$



44. $y = 2x^2 - 4x - 5$



Part 9 – Writing Linear Equations from a Point and a Slope

https://www.khanacademy.org/math/algebra/two-var-linear-equations/point-slope/v/point-slope-and-slope-intercept-form-from-two-points

Example 1:

Find the equation of the line passing through the point (3,-1) with a slope of 2.

$y - y_1 = m(x - x_1)$ ← Point-Slope Form for the equation of a line

$y - (-1) = 2(x - 3)$

$y + 1 = 2x - 6$ Substitute the coordinates of the point and the slope in the appropriate places

$y = 2x - 6 - 1$

$y = 2x - 7$ Solve for y

17) Find the equation of the line passing through the point (2, 4) with a slope of 5.

18) Find the equation of the line passing through the point (4, -1) with a slope of -3.

19) Find the equation of the line passing through the point (-4, -5) with a slope of $-\frac{5}{6}$.

Part 10 – Writing Linear Equations from Two Points

Example 1:

- Find slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$
- Plug into point-slope form:

$$y - y_1 = m(x - x_1)$$

- Rewrite the equation in slope-intercept form:

$$y = mx + b$$

- Example: Find the slope-intercept form of the equation of the line passing through (2, 3) and (-4, 9).

$$m = \frac{9-3}{-4-2} = \frac{6}{-6} = -1$$

$$y - 3 = -1(x - 2)$$

$$y - 3 = -x + 2$$

$$y = -x + 5$$

20) Determine the equation of the line passing through the points (0, 0) and (2, -6).

21) Determine the equation of the line passing through the points (2, 3) and (5, 9).

22) Determine the equation of the line passing through the points (-6, 10) and (-2, -1).