HONORS ALGEBRA 2 SUMMER PACKET
2019-2020

Your name: _____

Honors Algebra 2 is a very fast paced and rigorous course. The topics in this packet are considered prerequisite skills. It is imperative that you are comfortable with all of these types of problems before the first day of class. We are assigning this packet to give everyone a refresher on the skills they need to be successful in a challenging course.

In general, you must know how to do all these problems WITHOUT a calculator. You should also know the difference between a rounded value and an exact value. **All answers in this packet and in the course should be answered exactly.** For example you should write π, not 3.14, 1/3 not .3333 and $\sqrt{5}$, not 2.236. **All fractions and radicals should be in simplest form and should be left as improper fractions, not mixed fractions**.

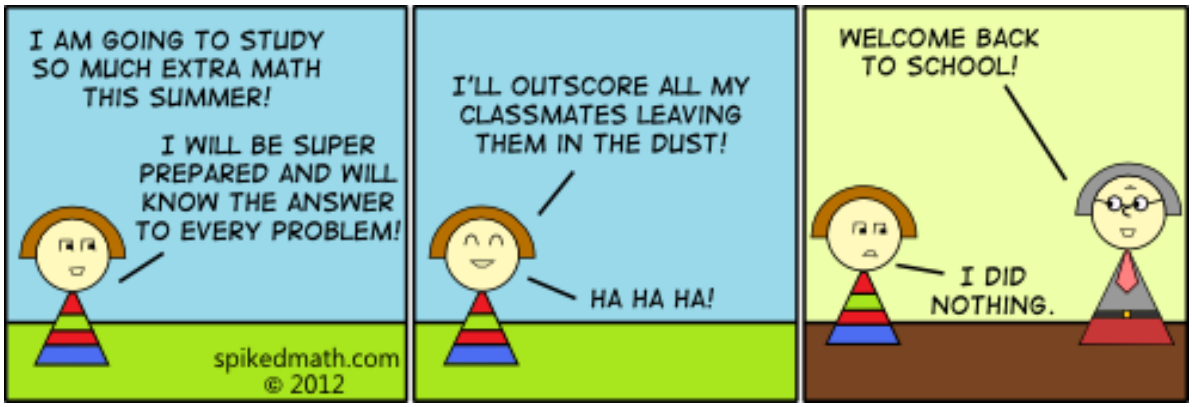
Rules for the packet: You may collaborate with others, look things up on google, consult old notes, textbooks, etc., but all of your work on this packet must be your own. You know the difference between working together and copying. Do your own work!

How will this packet be graded?

- You will have an assessment on the concepts included in these problems at the end of the first week of school. **This is considered a summative assessment of prerequisite skills and may NOT be retaken.**

- The packet is DUE on the FIRST DAY of school. It will be counted as a homework grade.

Don't be like this comic!



Slope Formula

$$\frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$$

Equations of Lines

Slope-Intercept Form:	$y = mx + b$
Point-Slope Form:	$y - y_1 = m(x - x_1)$
Standard Form:	$Ax + By = C$

Exponential Function $y = a \cdot b^x$

Forms of quadratic functions

Vertex Form:	$f(x) = a(x-h)^2 + k$
Standard Form:	$f(x) = ax^2 + bx + c$
Factored Form:	$f(x) = (x-d)(x-e)$

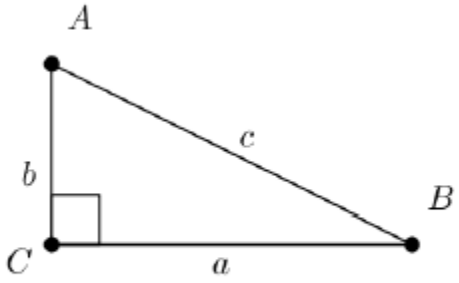
Quadratic Formula: If $ax^2 + bx + c = 0$, then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$.

Zero-product property: If $a \cdot b = 0$, then $a = 0$ or $b = 0$.

Pythagorean Theorem:

In a triangle with sides a, b, and longest side c, the equation $a^2 + b^2 = c^2$ holds if and only if the triangle is a right triangle.

Right triangles



$$\sin A = \frac{a}{c} = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos A = \frac{b}{c} = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan A = \frac{a}{b} = \frac{\text{opposite}}{\text{adjacent}}$$

$$c^2 = a^2 + b^2$$

Links for videos to review prerequisite concepts.

Order of Operations

https://www.youtube.com/watch?v=ipCPaIumKJc

Operations with Fractions

https://www.youtube.com/watch?v=xLHC23-6Fz4

Evaluating Expressions

https://www.youtube.com/watch?v=YA9qEHnsdvQ

Solving Multistep equations

https://www.youtube.com/watch?v=Rqac2XAk1oA

https://www.youtube.com/watch?v=XlbDvq5zcys

Solving Systems of Equations

https://www.youtube.com/watch?v=HvPbGgvTbQs

Graphing Linear Equations

https://www.youtube.com/watch?v=nojSLJ9KYvQ

Simplifying Expressions with Exponents

https://www.youtube.com/watch?v=LMDHi935XAQ

Factoring Polynomials

https://www.youtube.com/watch?v=SAwE_fszXhQ

https://www.youtube.com/watch?v=glc1steY5a8

https://www.youtube.com/watch?v=zgiXb7bgY6A

Solving Quadratics Zero Product Property

https://www.youtube.com/watch?v=dwCpQm9k2VI

Solving Quadratics Quadratic Formula

https://www.youtube.com/watch?v=S0XXBaECixo

Trigonometry and Pythagorean Theorem

https://www.youtube.com/watch?v=Jsiy4TxgIME

https://www.youtube.com/watch?v=AA6RfgP-AHU

Order of Operations

Simplify each expression.

a. $\frac{8}{5-1}(3-6)^2(4)$

b. $12 \div 2(4+3)$

c. $16 \div 2[8-3(4-2)]+1$

d. $\frac{2}{3}+\frac{1}{12}=$

e. $\frac{3}{7}-\frac{1}{2}=$

f. $\frac{2}{3}(\frac{27}{5})=$

g. $\frac{7}{9} \div \frac{1}{3}=$

h. $-\frac{3}{2}+\frac{5}{4}-\frac{5}{6}$

i. $\frac{4}{3}-\frac{6}{5}+\frac{9}{10}$

j. $\frac{1}{5}-\frac{2}{5} \cdot \frac{15}{8}$

k. $\frac{2}{3}+\frac{7}{12} \div \frac{21}{4}$

Evaluating Expressions

Evaluate each expression.

a) $2x^3+3x^2-5x$ when x $=-3$

b) $-d^2-16d-12$ when d $=2$

c) $h(n)=\frac{4}{3}n+\frac{8}{5}$; Find $h(-1)$

d) $f(x)=-1+\frac{1}{4}x$; Find $f\left(\frac{3}{4}\right)$

e) $f(2) \cdot f(-2) + f(3)$ for the function $f(x) = x^2 + 6x - 13$

Solving Equations

Solve each equation for x.

a) $-4(3 - x) = 2(x - 6)$

b) $2(4x + 6) + 8 = 6x$

c) $3x - 2(x + 1) = 0$

d) $6(x + 2) + 1 = 2(x + 4)$

e) $7x = 4x - 2$

f) $7x + 19 = 55 - 2x$

g) $2x + 7 + x = 4(x + 2) - 5$

h) $4(1 - x) + 3x = -2(x + 1)$

Systems of Equations

Solve each system using the indicated method. Check your solution.

a.) linear combination

$5x + 4y = 6$

$-2x - 3y = -1$

b.) substitution

$-2x + y = 8$

$y = -3x - 2$

c) any method

$3x - 2y = 5$

$-6x + 4y = 7$

d) any method

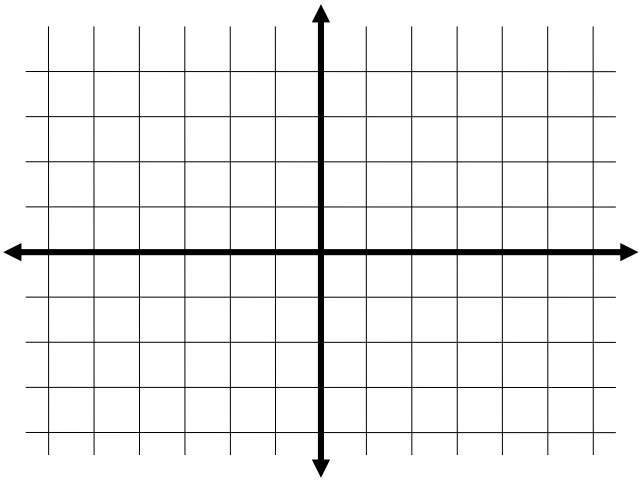
$-x + 2y = 11$

$3x - 2y = -13$

Linear Equations

Given $2x - 3y = -6$

a) Graph the equation.

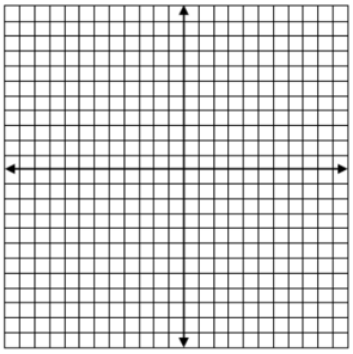


b) Determine the slope and *y*-intercept.

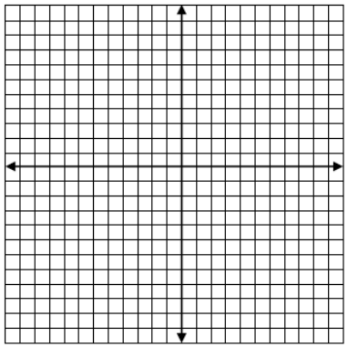
c) Select two points on the line and use them to confirm, algebraically, that the slope you calculated from part *(b)* is correct.

Graph each equation.

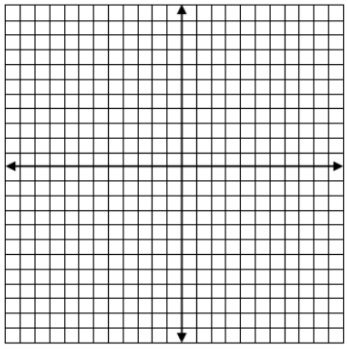
d) $y = 3x - 1$



e) $y = 2$



f) $x = -1$



Exponents Properties

Simplify each expression using only positive exponents.

Properties of exponents

$a^m \cdot a^n = a^{m+n}$ $\quad (a^m)^n = a^{mn}$ $\quad a^0 = 1$

$(ab)^m = a^m b^m$ $\quad a^{-n} = \frac{1}{a^n}$

$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ $\quad \frac{a^m}{a^n} = a^{m-n}$

a) $x^3 \cdot x^5$ **b)** $(x^4)^6$ **c)** $\frac{x^7}{x^2}$

d) $\left(\frac{3x}{y}\right)^2$ **e)** $x^{-2} \cdot x^{-4} \cdot x^6$ **f)** $\left(x^2 y z^3\right)^4$

g) $\frac{a^2 b^{-3}}{a^{-4} b^5}$ **h)** $\left(\frac{x^{-2}}{y^3}\right)^3$ **i)** $\left(5x^{-3} y^2\right)^{-2}$

Factoring

Factor each expression. Check your answer by multiplying the factored form back into standard form.

a) $x^2 - 3x + 10$

b) $3x^2 - 6x$

c) $x^2 - 81$

d) $2x^2 - 7x - 4$

e) $x^2 - x - 72$

f) $7x^3 - 12x^2 - 4x$

g) $2a^2 - 11a + 15$

h) $4r^2 - 81$

i) $3d^2 - 16d - 12$

Solving Quadratics

Solve each equation by factoring. Check your solution.

a) $x^2 - 2x - 3 = 0$

b) $x^2 - 16 = 0$

c) $x^2 + 4x = 0$

d) $x^2 - 6x + 9 = 0$

e) $x^2 + 3x - 10 = 0$

f) $5x^2 + 5x - 10 = 0$

g) $3a^2 - 2a - 5 = 0$ **h)** $2n^2 + 3n - 9 = 0$ **i)** $3x^2 - 8x = -4$

Solve each equation using the Quadratic Formula.

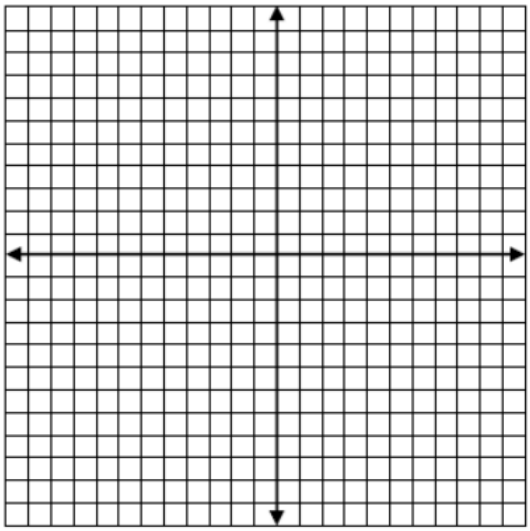
a) $x^2 + 5x - 1 = 0$ **b)** $x^2 + 10x = 9$ **c)** $x^2 - x - 1 = 0$

d) $2x^2 + 3x = -8$ **e)** $-2x^2 + 3x + 2 = 0$ **f)** $x^2 - 5 = 3x - 1$

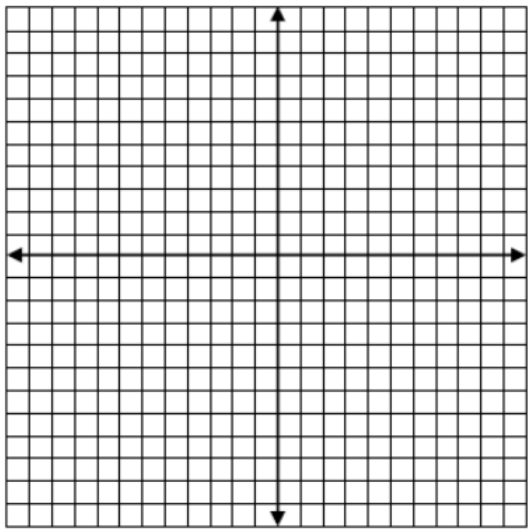
Graphing Quadratics

Graph each equation accurately using at least 3 points.

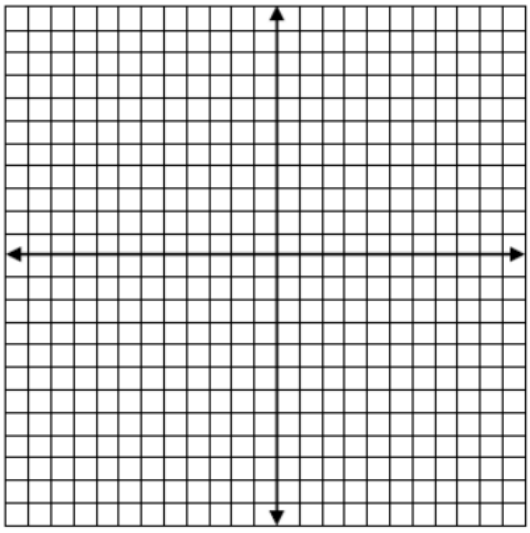
a) $f(x) = x^2 - 4x + 7$



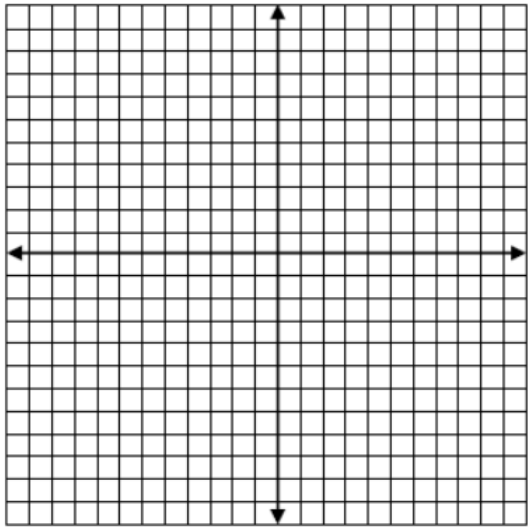
b) $y = -x^2 - 6x - 10$



c) $f(x) = (x+2)^2 - 1$



d) $f(x) = -2(x+5)^2 - 3$



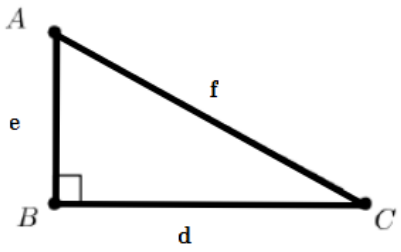
Trigonometry

Find the following...

Leg opposite $\angle A$

Leg opposite $\angle C$

Sine Ratio of $\angle A$



Cosine of ratio $\angle A$

Tangent ratio of $\angle A$

Sine ratio of $\angle C$

What is the...

The angle whose Tangent ratio is $\frac{d}{e}$

The angle whose Sine ratio is $\frac{e}{f}$

Find the missing side length (if possible).