To all students entering 10th grade Standard Math.

In order to keep our current math skills sharp, please complete this summer review packet. Use your previous class notes and work, websites such as Khan Academy and IXL and other math reference books for guides. Please complete before the first day of school in August 2020. You will be tested on this material when you return to school. If there are topics you are struggling with, please use the extra resources provided to practice!

Show all work, graphs and solutions clearly on a **separate** sheet of paper. Your work should be numbered and organized so it is easy to read. Solutions are not provided with this packet.

Have a good summer!

CDS Mathematics Department

Name:_____

10th grade Standard Summer Packet 2020

DUE on the FIRST day of SCHOOL

Formulas:

Pythagorean Theorem	$a^2 + b^2 = c^2$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Trig Functions	$\sin = \frac{opp}{hyp}; \cos = \frac{adj}{hyp}; \tan = \frac{opp}{adj}$
Cosine Rule	$a^2 = b^2 + c^2 - 2bc\cos A$ $\quad \cos A = \frac{b^2+c^2-a^2}{2bc}$ $b^2 = a^2 + c^2 - 2ac\cos B$ $\quad \cos B = \frac{a^2+c^2-b^2}{2ac}$ $c^2 = a^2 + b^2 - 2ab\cos C$ $\quad \cos C = \frac{a^2+b^2-c^2}{2ab}$
Sine Rule	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ or $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
Area of a triangle	$A = \frac{1}{2}ab\sin C$ or $A = \frac{1}{2}bh$
Arithmetic Series	$a_n = a_1 + (n-1)d$
Geometric Series	$a_n = a_1 r^{n-1}$
Probability of an event A	$P(A) = \frac{n(A)}{n(U)}$
Independent events (or with replacement)	$P(A \cap B) = P(A)P(B)$
Midpoint, Distance, Slope	$M = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ $\quad d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$ $\quad m = \frac{y_2-y_1}{x_2-x_1}$

Simplifying Expressions

Topic	Extra Help	Extra Practice (IXL)
Factoring	https://www.khanacademy.org/math/algebra/polynomial-factorization/factoring-quadratics-strategy/v/strategy-in-factoring-quadratics-1	Algebra 2 Tab I.3, I.4, I.5
Foiling	https://www.khanacademy.org/math/algebra/introduction-to-polynomial-expressions/multiplying-binomials-2/v/multiplying-binomials https://www.khanacademy.org/math/algebra/introduction-to-polynomial-expressions/multiplying-polynomials-by-binomials/v/more-multiplying-polynomials	Algebra 2 Tab K.3
Index Laws	https://www.khanacademy.org/math/algebra2/exponential-growth-and-decay-alg-2/equivalent-forms-of-exponential-expressions/v/simplifying-an-exponential-expression	Algebra 1 Tab V.3, V.4, V.5, V.6, V.7, V.8
Radical Operations	https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/adding-and-simplifying-radicals https://www.khanacademy.org/math/algebra-home/alg-exp-and-log/miscellaneous-radicals/v/multiply-and-simplify-a-radical-expression-2	Algebra 2 Tab L.4, L.7, L.8, L.9, L.10, L.11
Complex Fractions	https://www.khanacademy.org/math/algebra2/rational-expressions-equations-and-functions/simplify-rational-expressions/v/simplifying-rational-expressions-introduction	Algebra 2 Tab N.4, N.5 N.6

Factoring

1. $x^2 - 4x - 12$
2. $3x^2 - 75$
3. $2x^2 - 3x - 20$
4. $30x^4 + 21x^2 - 36x^3$
5. $5x^3 + 15x^2 + 2x + 6$

Foiling

1. $(x-4)(x+5)$
2. $(5x-1)(2x+3)$
3. $(3x+2)(2x^2-x-5)$
4. $(3x-5)(x+7)(2x+1)$

Index Laws

1. $(b^3)^5$
2. $a^4b^3c^5(a^2b^3c)$
3. $\frac{x^5y^{-2}}{x^{-6}y^{-9}}$
4. $\left(\frac{x^8}{xy^5}\right)^{-2}$

Operations with Radicals

1. $\frac{\sqrt{60}}{\sqrt{6}}$
2. $\sqrt{12a^6b^3}$
3. $5\sqrt{3} + 7\sqrt{5} - 12\sqrt{3}$
4. $-5\sqrt{20x^9y^{12}}$
5. $\sqrt{15}(\sqrt{6})$
6. $2\sqrt{27} - 8\sqrt{12}$
7. $\sqrt{5}(2\sqrt{10} - 3)$
8. $(\sqrt{5} - 2\sqrt{3})(\sqrt{10} + 3\sqrt{5})$

Solving Equations:

Topic	Extra Help	Extra Practice IXL
Solving Quadratics	https://www.khanacademy.org/math/algebra/quadratics	Algebra 2 Tab J.4, J.5. J.6, J.8, J.9
Solving Radical Equations	https://www.khanacademy.org/math/algebra2/radical-equations-and-functions	Algebra 2 Tab L.13
Solving Exponential Equations	1.https://www.khanacademy.org/math/algebra2/exponential-and-logarithmic-functions/solving-exponential-equations-with-logarithms/v/solve-exponentials 2.https://www.khanacademy.org/math/algebra2/exponential-growth-and-decay-alg-2/solving-exponential-equations-using-properties-of-exponents/v/solving-exponential-equations-with-exponent-properties	Algebra 2 Tab S.4, S.5, R.1
Solving Rational Equations	https://www.khanacademy.org/math/algebra2/rational-expressions-equations-and-functions/solving-rational-equations/v/equations-with-two-rational-expressions	Algebra 2 Tab N.7 Precalc Tab E.2

Solving

1. $2\sqrt{5x-7}+12=18$

2. $5^{3x-7}=25^{2x+1}$

3. $x^2+8x-20=0$

4. $\frac{3x-7}{2x}=\frac{5x+6}{3x}$

5. $8x-7=19$

6. $-2x+8\leq 24$

7. $9^{2x-1}>27^{4x+1}$

8. $3x^2+8x=-4$

9. $\sqrt[3]{4x-9}-8=1$

10. $\frac{3x-2}{x+1}=\frac{4x+5}{x-1}$

13. A number squared is equal to 12 times the number minus 36. Find the number.

14. The area of a rectangle is $108cm^2$. The length is $3cm$ greater than the width. Find the length and the width of the rectangle.

15. A ball is thrown into the air vertically with a velocity of 112 feet per second. The ball was released 6 feet above the ground. The height above the ground t seconds after release is modeled by $h(t)=-16t^2+112t+6$

a. When will the ball reach 130 feet?

b. In how many seconds after its release will the ball hit the ground?

Solving Systems of Equations

Topic	Extra Help	Extra Practice IXL
Systems of Equations	https://www.khanacademy.org/math/algebra/systems-of-linear-equations	Algebra 2 Tab E.1, E.2, E.6, E.7, E.8 and E.9
Systems of Inequalities	https://www.khanacademy.org/math/algebra/two-variable-linear-inequalities	Algebra 2 Tab F.1 and F.2

Systems of Equations

1. Solve the following systems of equations:

a. $y = x - 10$
$5y + 10x = 10$

b. $2x - 3y = 12$
$4x + 10y = 16$

2. Solve the following system graphically: $x + y = -2$
$2x - y = -7$

3. George bought a total of 8 lbs of peanuts and cashews. Peanuts, p, cost $2 per pound and cashews, c, cost $5 per pound. The total amount George spent on peanuts and cashews was $25. Create a system of equations to model this information and determine how many pounds of peanuts and cashews that George bought.

Systems of Inequalities

4. Which of the following is a solution to the given system of inequalities? $3x + y < 12$
$x + y > 4$

a. (3, 1)

b. (4, 3)

c. (2, 6)

d. (6, 0)

5. At an ice cream parlor, ice cream cones cost x dollars each and sundaes cost y dollars each. The total cost of 4 cones and 3 sundaes is more than $20. The total cost of 5 cones and 1 sundae is less than $16. Which system of inequalities models this situation?

a. $4x + 3y < 20$
$5x + y > 16$

b. $4x + 3y > 20$
$5x + y < 16$

c. $4x + 3y \geq 20$
$5x + y \leq 16$

Geometry

Topic	Extra Help	Extra Practice IXL
Distance and Midpoint	https://www.khanacademy.org/math/geometry/hs-geo-analytic-geometry/hs-geo-distance-and-midpoints/v/distance-formula	Geometry Tab B.7, B.8, B.9
Slope and Linear Equations	1.https://www.khanacademy.org/math/algebra-basics/alg-basics-graphing-lines-and-slope/alg-basics-writing-slope-intercept/v/equation-of-a-line-1 2.https://www.khanacademy.org/math/geometry/hs-geo-analytic-geometry/hs-geo-parallel-perpendicular-eq/v/parallel-lines	Geometry Tab E.2, E.5, E.6
Pythagorean Theorem	https://www.khanacademy.org/math/basic-geo/basic-geometry-pythagorean-theorem	Geometry Tab Q.1, Q.2 Algebra 2 Tab Y.1
Parallel lines w/Transversals	https://www.khanacademy.org/math/geometry/hs-geo-foundations/hs-geo-angles/v/angles-formed-by-parallel-lines-and-transversals	Geometry Tab D.3, D.4

Distance, Slope and Midpoint

1. Find the midpoint given the following points:
   a. $(-2,\ 5)$ *and* $(3,\ 6)$ **b.** $(5,\ 9)$ *and* $(-7,-1)$ **c.** $(-4,-6)$ *and* $(-12,-19)$

2. Given the midpoint (M) and one endpoint (A), find the other endpoint (B):
   a. $M(-4,\ 6)$ *and* $A(5,\ 9)$ **b.** $M(3,\ -7)$ *and* $A(14,\ 12)$

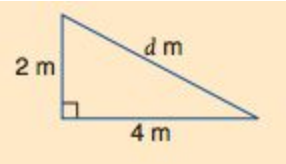
3. Find the length and slope of the line between each given sets of points:
   a. $(3,\ 9)$ *and* $(7,\ 19)$ **b.** $(-4,\ -8)$ *and* $(4,\ 7)$ **c.** $(-3,\ 5)$ *and* $(6,\ -1)$
4. The distance between A and B is $\sqrt{34}$. Given $A(3,\ 6)$ *and* $B(x,\ 12)$, find the value of x.
5. A triangle has the vertices (-4, 1), (2, 5) and (-6, -4). Determine whether the triangle is equilateral, isosceles or scalene.

Linear Equations

1. Write the equation of the line that goes through the point $(8,-2)$ with slope $-\frac{1}{2}$.
2. Write the equation of the line that goes through the point $(9,\ 12)$ and is parallel to the line $y = 3x - 4$.
3. Write the equation of the line that goes through the point $(-4,\ 5)$ and is perpendicular to the line $y = -\frac{1}{2}x - 9$.

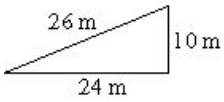
Pythagorean Theorem

1. Find the unknown side length:



2. Determine if a triangle with the given side lengths is a right triangle:

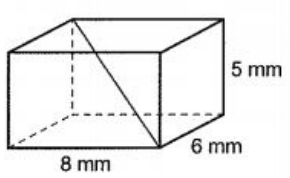
a.



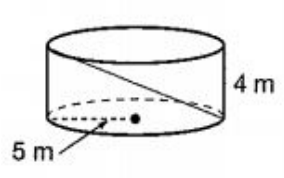
b.

3. Find the length of the indicated diagonal in each 3-D shape:

a.



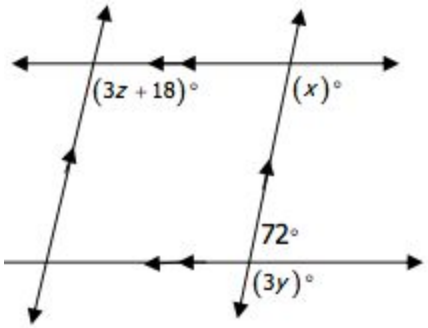
b.



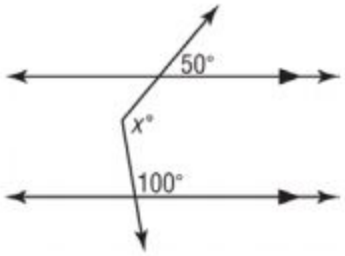
Parallel Lines w/Transversals

1. Find all unknown angles:

a.



b.



Venn Diagrams and Probability

Venn Diagrams	1.https://www.khanacademy.org/math/statistics-probability/analyzing-categorical-data/two-way-tables-for-categorical-data/v/two-way-frequency-tables-and-venn-diagrams 2.https://www.ck12.org/book/CBSE_Maths_Book_Class_11/section/1.5/
Tree Diagrams	https://www.ck12.org/c/probability/tree-diagrams/lesson/Tree-Diagrams-BSC-PST/?collectionHandle=probability&conceptCollectionHandle=probability-%3A%3A-tree-diagrams&collectionCreatorID=3
Sample Space Diagrams	https://www.youtube.com/watch?v=8PDUtGQjkNY

Venn Diagram

1. In a group of 105 students, 70 passed Math, 60 passed History and 45 passed Geography. 30 students passed Math and History, 35 passed History and Geography, 25 passed Math and Geography and 15 passed all three subjects. Draw a Venn diagram to illustrate this information and find the number of students who:
   - **a.** passed at least one subject
   - **b.** passed Geography and failed math
   - **c.** passed exactly two subjects
   - **d.** passed all 3 subject

Probability from Sample Space Diagrams

2. Two dice are rolled simultaneously
   - **a.** Illustrate the sample space on a 2- dimensional sample space grid.
   - **b.** Find the P(a double 5)
   - **c.** Find the P(at least one 4)
   - **d.** Find the P(a sum greater than 9)

Probability from Tree Diagrams

3. There are only red marbles and green marbles in a bag. There are 5 red marbles and 3 green marbles. Dwayne takes at random a marble from the bag. He replaces the marble and takes at random a second marble from the bag. Draw a tree diagram to represent this situation.
   - **a.** What is the probability that 2 different color marbles are drawn?
   - **b.** What is the probability that at least one green marble is drawn?
   - **c.** Dwayne accidentally drops the first marble and can not replace it in the bag. Draw a tree diagram to model this situation.
   - **d.** Answer questions (a) and (b) for this new situation (without replacement).