



Kinnelon High School

Mathematics Department

Summer Guide in Preparation of the 2019-2020 School Year

Dear students and families,

Please use the summer months to review and/or complete this Summer Guide regarding upcoming math courses for the 2019-2020 school year. All textbooks will be provided to students through the school in September. Mandatory course materials must be purchased. Suggested course materials are optional.

Sincerely,

The KHS Math Department

Course Name	Algebra 2/ Trigonometry CP
Textbook(s)	Algebra & Trigonometry, Sullivan (Pearson Prentice Hall)
Mandatory Course Materials	Binder with loose leaf paper (suggested) or Folder and a notebook Calculator
Suggested Course Materials	If you are considering purchasing a graphing calculator, the TI-84 is the recommended calculator Graph Paper
Guide Summary	See attached summer assignment

Summer Review Packet for Students Preparing for Algebra 2/Trigonometry for 2019-2020

In preparation for this course, these are the topics taught in Algebra I, which you are expected to feel comfortable with. Please complete this packet over the summer. The week of September 9th, we will have a quiz on these topics. Please see your teacher for help in September, should you have any difficulty with this. The answers to this assignment can be found in the back of the packet. Enjoy your summer.....looking forward to a great year ahead!

Be able to solve multiple step equations.

1. $3x - 4 = -7$	2. $2x + 15 = x - 7$
3. $5x - 10 = 7x - 15$	4. $2(3x - 4) = 16$
5. $3(-x + 14) = 2x - 1$	6. $7x + 4 = 8(x - 4)$
7. $\frac{2}{3}x + 4 = 16$	8. $\frac{2}{7}x - 15 = -2x + 3$

Rules of Exponents

$x^a \cdot x^b = x^{a+b}$	$\frac{x^a}{x^b} = x^{a-b}$	$(x^a)^b = x^{ab}$	$x^0 = 1$
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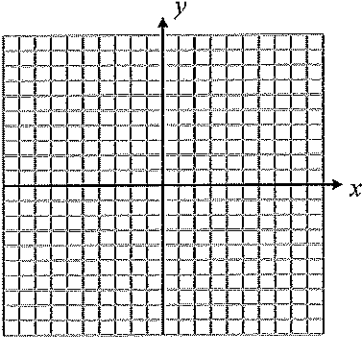
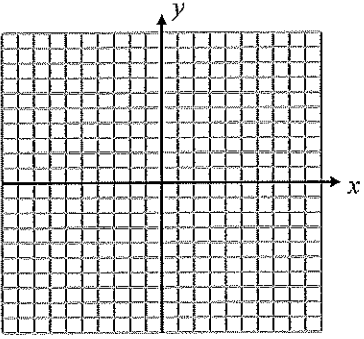
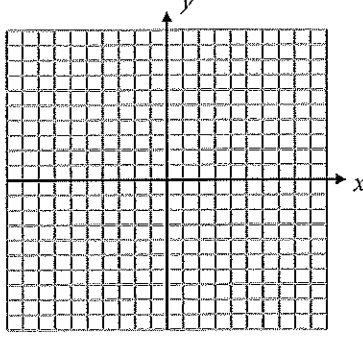
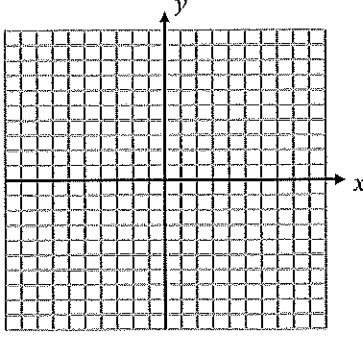
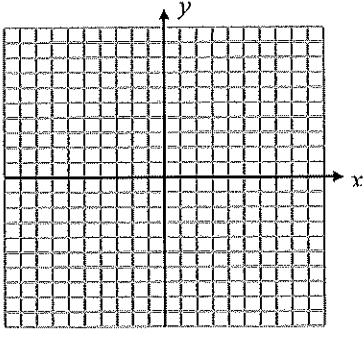
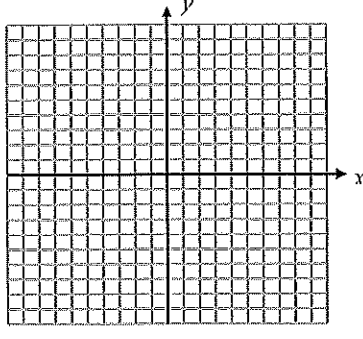
Be able to apply rules of exponents....Simplify the following

9. $x^4 \cdot x^{10}$	10. $3x^2 \cdot 2x^4$
11. $\frac{x^8}{x}$	12. $\frac{10x^8}{5x^2}$
13. $(x^4)^3$	14. $\frac{4x^4y^6z^{10}}{-2xy^7z^4}$
15. $\frac{75a^4b}{15a^7b^2}$	16. b^0
17. $\left(\frac{2x^4y^3}{p^8}\right)^3$	18. $\left(\frac{30x^5y^4}{9x^2y^6}\right)^2$

Linear Equations

$y = mx + b$	Slope Intercept Form	Slope "m" y intercept "b" x intercept: Set $y = 0$ and solve.
$Ax + By = C$	Standard Form	Slope: $-\frac{A}{B}$
Horizontal Lines	$y = \#$	Slope = 0
Vertical Lines	$x = \#$	Slope: Undefined

Be able to graph the following, find the slope, x and y intercepts.

<p>19. $y = 2x + 5$</p>  <p>Slope: _____ x-intercept: _____ y-intercept: _____</p>	<p>20. $y = 4x - 1$</p>  <p>Slope: _____ x-intercept: _____ y-intercept: _____</p>	<p>21. $x = 4$</p>  <p>Slope: _____ x-intercept: _____ y-intercept: _____</p>
<p>22. $y = -3$</p>  <p>Slope: _____ x-intercept: _____ y-intercept: _____</p>	<p>23. $2x - y = 4$</p>  <p>Slope: _____ x-intercept: _____ y-intercept: _____</p>	<p>24. $x + 4y = -4$</p>  <p>Slope: _____ x-intercept: _____ y-intercept: _____</p>

Linear equations: Be able to solve a system of equations.

25. $x + y = 1$ and $x - y = 3$	26. $2x + y = 17$ and $x - 2y = 1$
27. $3x + 2y = 5$ and $x + y = 3$	28. $2x + 4y = 8$ and $3x - 5y = 45$
29. $5x - 3y = -9$ and $2x + 7y = -20$	30. $8x - 2y = -3$ and $12x - 3y = 8$

31. $y = 3x + 11$ and $3y = 9x + 33$	32. $y = 4x - 39$ and $3x + y = 24$
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Quadratic Equations

Difference of Squares	$a^2 - b^2 = (a - b)(a + b)$
Perfect Square Trinomials	$a^2 + 2ab + b^2 = (a + b)(a + b)$ or $(a + b)^2$ $a^2 - 2ab + b^2 = (a - b)(a - b)$ or $(a - b)^2$

Be able to factor and solve.

33. $x^2 + 6x = 0$	34. $x^2 - 9 = 0$
35. $4x^2 - 25 = 0$	36. $x^2 + 13x + 42 = 0$
37. $x^2 - 6x - 40 = 0$	38. $x^2 + 14x - 51 = 0$

39. $x^2 - 20x = -64$

40. $25x^2 + 20x + 4 = 0$

41. $36x^2 - 84x + 49 = 0$

42. $12x^2 - 4x - 5 = 0$

43. $3x^2 + x - 4 = 0$

44. $3x^2 = 19x + 14$

Solve Inequalities

Change direction of inequality sign under two conditions.

When you divide by a negative number Ex. If $-4x < 12$ then $x > -3$	The variable should appear on the left hand side of the equation. Example: If $17 > x$ then $x < 17$
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Be able to solve and graph.

45. $7x + 3 > 3x - 8$	46. $\frac{6-4x}{3} \leq -2$
47. $6 \geq \frac{2}{3}x + 1$	48. $\frac{7}{2} - 4x < \frac{8}{3}$

Simplifying Radical Equations

Perfect Squares: 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289

<p>To simplify, split up radical into a product of two numbers where one factor is the LARGEST possible perfect square</p> <p>Example: $\sqrt{48} = \sqrt{16} \cdot \sqrt{3}$</p> <p>Answer: $4\sqrt{3}$</p>	<p>Multiplying</p> $\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$ <p>Example $\sqrt{2} \cdot \sqrt{10} = \sqrt{20}$ which becomes $\sqrt{4} \cdot \sqrt{5}$</p> <p>Answer: $2\sqrt{5}$</p>
<p>Adding or Subtract Must be "like terms"</p> $11\sqrt{5} - 2\sqrt{5} = 9\sqrt{5}$ $12\sqrt{3} + 15\sqrt{3} = 27\sqrt{3}$ <p>Terms must be simplified before they get added</p> <p>Example</p> $\frac{\sqrt{175} - \sqrt{112}}{\sqrt{25}\sqrt{7} - \sqrt{16}\sqrt{7}}$ $5\sqrt{7} - 4\sqrt{7}$ <p>Answer: $\sqrt{7}$</p>	<p>Dividing When taking the square root of a fraction, take the square root of the numerator and the denominator.</p> <p>Example 1</p> $\sqrt{\frac{3}{8}} = \frac{\sqrt{3}}{\sqrt{8}}$ $\frac{\sqrt{3}}{\sqrt{8}} = \frac{\sqrt{3}}{\sqrt{4}\sqrt{2}} \text{ becomes } \frac{\sqrt{3}}{2\sqrt{2}}$ <p>Any radical on the denominator must be rationalized.</p> <p>Multiply the numerator and the denominator by $\sqrt{2}$ to eliminate the radical on the denominator</p> $\frac{\sqrt{3}}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{6}}{2 \cdot 2} \text{ becomes } \frac{\sqrt{6}}{4}$ <p>Example 2</p> <p>Any binomial that contains a radical must be eliminated by multiplying by its conjugate</p> $\frac{5}{3 - \sqrt{2}} \cdot \frac{3 + \sqrt{2}}{3 + \sqrt{2}} = \frac{5(3 + \sqrt{2})}{9 - 2}$ $\text{becomes } \frac{15 + 5\sqrt{2}}{7}$

Simplify

49. $\sqrt{60}$	50. $2\sqrt{75}$	51. $\sqrt{80}$
52. $3\sqrt{24}$	53. $(2\sqrt{7})^2$	54. $3\sqrt{2} \cdot 4\sqrt{10}$
55. $\frac{1}{\sqrt{5}}$	56. $\sqrt{\frac{3}{7}}$	57. $\sqrt{\frac{3}{20}}$
58. $\frac{3}{\sqrt{5}-1}$	59. $\frac{\sqrt{7}+3}{\sqrt{3}+6}$	60. $\frac{4\sqrt{2}}{5\sqrt{3}+\sqrt{6}}$

Below is the answer key. A detailed answer key will be given at the start of the school year.

- 1) $x = -1$
- 2) $x = -22$
- 3) $x = \frac{5}{2}$
- 4) $x = 4$
- 5) $x = \frac{43}{5}$
- 6) $x = 36$
- 7) $x = 18$
- 8) $x = \frac{63}{8}$
- 9) x^{14}
- 10) $6x^6$
- 11) x^7
- 12) $2x^6$
- 13) x^{12}
- 14) $\frac{-2x^3z^6}{y}$
- 15) $\frac{5}{a^3b}$
- 16) 1
- 17) $\frac{8x^{12}y^9}{p^{24}}$
- 18) $\frac{100x^6}{9y^4}$
- 19) $m = 2, x - \text{int}: \left(-\frac{5}{2}, 0\right), y - \text{int}: (0, 5)$
- 20) $m = 4, x - \text{int}: \left(\frac{1}{4}, 0\right), y - \text{int}: (0, -1)$
- 21) $m = \text{undefined}, x - \text{int}: (4, 0), y - \text{int}: \text{none}$
- 22) $m = 0, x - \text{int}: \text{none}, y - \text{int}: (0, -3)$
- 23) $m = 2, x - \text{int}: (2, 0), y - \text{int}: (0, -4)$
- 24) $m = -\frac{1}{4}, x - \text{int}: (-4, 0), y - \text{int}: (0, -1)$
- 25) $(2, -1)$
- 26) $(7, 3)$
- 27) $(-1, 4)$
- 28) $(-2, 3)$
- 29) $(-3, -2)$
- 30) No solution (the lines are parallel)
- 31) All real numbers (the lines are the same)
- 32) $(9, -3)$
- 33) $x = 0$ and -6
- 34) $x = -3$ and 3
- 35) $x = \frac{5}{2}$ and $-\frac{5}{2}$
- 36) $x = -6$ and -7

37) $x = 10$ and -4

38) $x = -17$ and 3

39) $x = 16$ and 4

40) $x = -\frac{2}{5}$

41) $x = \frac{7}{6}$

42) $x = -\frac{1}{2}$ and $\frac{5}{6}$

43) $x = 1$ and $-\frac{4}{3}$

44) $x = -\frac{2}{3}$ and 7

45) $x > -\frac{11}{4}$

46) $x \geq 3$

47) $x \leq -\frac{15}{2}$

48) $x > \frac{5}{24}$

49) $2\sqrt{15}$

50) $10\sqrt{3}$

51) $4\sqrt{5}$

52) $6\sqrt{6}$

53) 28

54) $16\sqrt{5}$

55) $\frac{\sqrt{5}}{5}$

56) $\frac{\sqrt{21}}{7}$

57) $\frac{\sqrt{15}}{10}$

58) $\frac{3\sqrt{5}+3}{4}$

59) $\frac{\sqrt{21}-6\sqrt{7}+3\sqrt{3}-18}{-33}$

60) $\frac{20\sqrt{6}-8\sqrt{3}}{69}$