Accelerated Pre-Calculus Students:

Attached is the summer work packet. With the exception of the trig review, the other sections are based on Algebra I skills, so this should be easy for you. Please pay attention to the "without a calculator" instructions and make sure you are able to complete the pages within the given time limit. If you are a few minutes over, it's not a big deal, but if it takes you quite a bit longer, you should do some review and practice to be able to get up to speed. These are prerequisite skills for Pre-Calculus success.

The answers are posted on the website
http://lhs.haikulearning.com/erinh/acceleratedpre-calc/
Please check your answers as you complete the work.

We will be having a test (including both calculator and non-calculator parts) the 2nd class day back on this material, so make sure you are able to do these problems. If you are having trouble or need reminders of how to proceed, please email me. I'll check email at least once a week (usually more), but be patient in waiting for a reply.

Have a good summer – see you in August!

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Equations of Lines Review

You should be able to complete this section in less than 20 minutes.

Give the x and y intercepts of each line:

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

2. $4x - y = 8$ x-intercept = y-intercept =

3. $y = 2x + 10$ x-intercept = y-intercept =

Write an equation of a line with the given slope and y-intercept:

4. slope = $\frac{1}{4}$, y-intercept = 8

5. slope = -2, y-intercept = -3

6. slope = 6, y-intercept = $-\frac{2}{3}$

Give the slope and the y-intercept of each line:

7. $y = \frac{4}{3}x - 3$ slope = y-intercept =

8. $3x + 4y = 12$ slope = y-intercept =

9. $5x - 3y = 7$ slope = y-intercept =

Write the equation, in slope-intercept form (if possible), of the line described by each:

10. goes through $(1,6)$, slope = 2

11. goes through $(-6,0)$, slope = $-\frac{2}{3}$

12. goes through $(-2,-8)$, slope = $\frac{3}{5}$

13. goes through $(1,5)$ and $(3,9)$

14. slope zero, *y*-intercept 2

15. *x*-intercept 3, *y*-intercept -2

16. through $(-4,2)$
x-intercept 8

17. *x*-intercept -4, *y*-intercept 6

18. vertical, through (1, 4)

19. horizontal, through (8, 2)

20. goes through $(-2,1)$ and $(7,4)$

21. undefined slope, *x*-intercept 2

Factoring Review

You should be able to completely factor each of the following **<u>without using a calculator</u>**. This section should be able to be done in less than 20 minutes.

1. $5x - 20x^2$

2. $2a^2 + ab - 3b^2$

3. $169 - x^3$

4. $ab^2 + 4b^2$

5. $9c^2 - 16d^2$

6. $6m^2 + 7mn + 2n^2$

7. $3x^2 - 5x - 22$

8. $\frac{1}{9}m^2 - 4$

9. $2x^2 - 4x - 126$

10. $15a + 25b$

11. $2m^2 - 5m + 3$

12. $r^4m - 81m$

13. $m^2 - 4n^2$

14. $5x^2 + 9x - 2$

15. $27x^3 + 64y^3$

16. $15x^2 + 22x - 5$

17. $2x^2 - 2x - 144$

18. $x^3 - 64$

19. $c^2 - \frac{9}{25}$

20. $mx^2 - 7mx + 12m$

21. $7 + 28a - 35b$

22. $16x^2 - 4y^2$

23. $n^2x^2 - 7n^2xy + 10n^2y^2$

24. $2m^2 - 18m - 180$

25. $x^2 - x - 72$

26. $40 - 34x + 3x^2$

27. $5a^3 - 75a^2 + 180a$

28. $2x^4 - 6x^3 + 34x^2$

29. $4xy^3 - 4xy^2 - 80xy$

30. $y^3 + 27$

31. $2x^2 - 5x + 2$

32. $x^4 + 3x^3y^2 + 12x^2y^3$

33. $a^2b^2 - 16$

34. $\frac{1}{4}a^2 - \frac{1}{9}b^2$

35. $10x^2 - 17x + 6$

36. $mnx^2 + 6mnx - 27mn$

Monomials Review

Simplify each, writing final answers with only positive exponents. You should be able to complete this section in less than 20 minutes.

1. $\left(2x^4\right)^5$

2. $\left(7x^3\right)\left(5x^4\right)$

3. $-2a^2\left(-3a^5\right)$

4. $\dfrac{k^{-5}}{k^0}$

5. $\dfrac{c^0}{c^{-3}}$

6. x^5y^{-3}

7. $\left(-x^4y^7\right)^5$

8. $\dfrac{2x^{-5}y^{-3}}{6x^4y^{-8}}$

9. $\dfrac{57k^7d^3}{19k^{-3}d^5}$

10. $\left(3x^4y^2\right)\left(2x^7y\right)\left(5xy^4\right)$

11. $\left(2x\right)^3\left(5x^2\right)$

12. $\dfrac{a^{-7}c^{-5}}{-a^{-5}c^{-9}}$

13. $\dfrac{x^6}{x^{-4}}$

14. $\left(4x^2\right)^2\left(x^8\right)^3$

15. $\dfrac{y^{-7}}{y^{-7}}$

16. $\dfrac{x^{-8}}{x^{-11}}$

17. $\left(3c^2y\right)^2\left(2cy^2\right)^3$

18. $\dfrac{(-2x^{-3})^2}{(-4x^{-5})^2}$

19. $x^{-8}x^{2}$

20. $\left(-2x^{4}y^{2}\right)^{6}$

21. $\dfrac{m^{9}k^{-3}}{m^{7}k^{-5}}$

22. $\left(4x^{2}\right)\left(3x^{5}\right)^{3}$

23. $x^{-3}x^{-5}$

24. $\dfrac{(3x^{-4}y^{2})^{3}}{36x^{-8}y^{-2}}$

25. $\dfrac{h^{-5}y^{-3}m^{-7}}{h^{6}y^{-7}m^{-3}}$

26. $\left(5^{4}\right)^{6}$

27. $\dfrac{-2x^{4}}{6x^{9}}$

28. $\dfrac{18y^{-2}}{12y^{-8}}$

29. $\dfrac{-3x^{-4}}{6x^{-8}}$

30. $\left(7a^{n}\right)^{2}$

31. $\dfrac{(8x^{-3}y^{6})(6x^{4}y^{-10})}{(4x^{-3}y^{2})^{2}}$

32. $\left(2^{9}\right)\left(2^{5}\right)$

33. $\left(\dfrac{x^{4}y^{-3}}{x^{6}y^{5}}\right)^{-3}$

34. $\dfrac{(x^{-3}y^{-5}z^{3})^{-2}}{(x^{4}y^{-5}z^{-4})^{-1}}$

35. $-5x^{4}y^{3}w^{8}\left(-2x^{3}y^{5}w^{7}\right)\left(-3x^{2}y^{4}w^{3}\right)$

36. $\left(3^{4}\right)^{3}\left(3^{6}\right)$

37. $\left(-2x^{6}y\right)^{3}\left(-x^{4}y^{3}\right)^{4}$

38. $\left(7x^{5}y^{3}\right)\left(4x^{3}y^{4}\right)^{2}$

39. $\dfrac{-18x^{-3}y^{8}}{-24x^{5}y^{-6}}$

40. $\left(3x^{k}\right)\left(2x^{4}\right)$

41. $\left[\left(2x^{4}\right)^{3}\right]^{2}$

42. $\dfrac{r^{6}d^{0}}{r^{-4}d^{-3}}$

43. $\dfrac{(4x^{-7}y^{3})^{0}(2x^{-3}y^{4})^{3}}{(4x^{-4}y^{-2})^{2}}$

44. $\dfrac{(-x^{4}y^{-2}z^{-3})^{-4}}{(-x^{5}y^{-6}z^{3})^{-3}}$

45. $\dfrac{(3x^{-2}y^{4})^{-2}}{(6x^{-3}y^{3})^{-2}}$

Quadratic-Type Equations

Solve each of the following quadratic-type equations for *x*. You should be able to complete this section in less than 30 minutes.

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

2. $(3x-4)(2x+1)=0$

3. $5x(x+7)=0$

4. $(x+2)(x-3)(x+5)=0$

5. $x^2-5x+6=0$

6. $x^2-5x-6=0$

7. $x^2-4x-12=0$

8. $5x^2-15x=0$

9. $3x^2-7x=6$

10. $x^2-40=3x$

11. $2y^2=14y$

12. $a^2=25$

13. $6x^2 + x = 1$

14. $9r^2 + 12r - 32 = 0$

15. $2x^3 = 20x - 3x^2$

16. $5x^3 + 7x^2 + 2x = 0$

17. $8x^3 - 50x = 0$

18. $x^4 - 5x^2 + 4 = 0$

19. $4x^5 + 9x = 13x^3$

20. $75x^3 = 27x$

21. $(x-1)(x+6) = -12$

22. $(2x+1)(x+5) = 4(3x+2)$

Write an equation <u>in factored form</u> with the given solutions:

23. $x = 2,\ x = -3$

24. $x = 5,\ x = \frac{3}{2}$

25. $x = 0,\ x = -5,\ x = 1$

26. $x = \frac{3}{5},\ x = -\frac{4}{3}$

Write an equation <u>in polynomial form</u> ($ax^2 + bx + c = 0$, where *a*, *b*, and *c* are integers with no common factors) that has the given solutions:

27. $x = 0,\ x = -5$

28. $x = 3,\ x = \frac{1}{2}$

29. $x = \frac{2}{3},\ x = \frac{1}{4}$

30. $x = -\frac{5}{3},\ x = 3$

Radicals Review

Perform each indicated operation, simplifying all final answers. All variables represent positive real numbers. You should be able to complete this section in less than 30 minutes.

1. $\sqrt{18x^8y^4}$

2. $\sqrt{20}+2\sqrt{45}$

3. $8\sqrt{7}-\sqrt{7}$

4. $\left(2\sqrt{3}\right)\left(4\sqrt{6}\right)$

5. $\sqrt{18}-\sqrt{54}+2\sqrt{50}$

6. $\sqrt{48x^3y^7z^5}$

7. $\sqrt{112}$

8. $\sqrt{6}\left(2\sqrt{24}\right)$

9. $\sqrt{2}\left(\sqrt{6}+3\sqrt{2}\right)$

10. $\sqrt{98k^6}$

11. $\sqrt{\dfrac{288x^4}{49y^6}}$

12. $2\sqrt{50}-3\sqrt{72}$

13. $5\sqrt{3}+12\sqrt{3}-4\sqrt{2}$

14. $\sqrt{3}\left(\sqrt{18}+\sqrt{12}\right)$

15. $\left(2\sqrt{3}+4\right)\left(4\sqrt{3}+2\right)$

16. $\left(-8\sqrt{7}\right)\left(2\sqrt{21}\right)$

17. $\sqrt{125x^5y}\left(\sqrt{10x^7y^3}\right)$

18. $\sqrt{9}+3\sqrt{4}-2\sqrt{49}$

19. $\left(2\sqrt{5}\right)^3$

20. $\sqrt{20}+2\sqrt{45}$

21. $\left(-8\sqrt{7}\right)\left(2\sqrt{56}\right)$

22. $\left(3\sqrt{2}+7\right)\left(2\sqrt{2}-1\right)$

23. $3\sqrt{5}\left(6\sqrt{15}+4\right)$

24. $\left(5\sqrt{7}+3\sqrt{2}\right)\left(5\sqrt{7}-3\sqrt{2}\right)$

25. $\sqrt{75}+3\sqrt{27}-8\sqrt{12}$

26. $\left(4+\sqrt{13}\right)^2$

27. $\left(3\sqrt{2}+4\sqrt{3}\right)\left(4\sqrt{3}-3\sqrt{2}\right)$

28. $\left(3\sqrt{5}-4\sqrt{6}\right)\left(\sqrt{10}+3\sqrt{3}\right)$

29. $\left(\sqrt{10}-\sqrt{5}\right)^2$

30. $\left(3\sqrt{2}+6\sqrt{3}\right)\left(4\sqrt{3}-8\sqrt{2}\right)$

Simplify each, rationalizing the denominator for your final answer:

31. $\dfrac{12}{\sqrt{3}}$

32. $\dfrac{4}{3\sqrt{2}}$

33. $\dfrac{\sqrt{10}}{\sqrt{5}}$

34. $\dfrac{20}{\sqrt{6}-2}$

35. $\dfrac{\sqrt{2}}{\sqrt{6}+\sqrt{2}}$

36. $\dfrac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$

Trig Review

Evaluate each of the following, giving exact answers, **<u>without using a calculator or notes.</u>**
You should be able to complete this section (problems 1-53) in less than 15 minutes. (Try for 10 minutes)

1.	$\cos 150^{\circ}$	2.	$\cos (30)^{\circ}$	3.	$\sin 180^{\circ}$
4.	$\sin 225^{\circ}$	5.	$\sin (240)^{\circ}$	6.	$\cos 210^{\circ}$
7.	$\cos 90^{\circ}$	8.	$\sin 150^{\circ}$	9.	$\cos (270)^{\circ}$
10.	$\sin (120)^{\circ}$	11.	$\tan 210^{\circ}$	12.	$\tan 240^{\circ}$
13.	$\tan 300^{\circ}$	14.	$\tan (30)^{\circ}$	15.	$\cos (180)^{\circ}$
16.	$\tan 90^{\circ}$	17.	$\cos 135^{\circ}$	18.	$\sin (90)^{\circ}$
19.	$\cos 270^{\circ}$	20.	$\sin 330^{\circ}$	21.	$\tan (330)^{\circ}$

22. $\cos 45^{o}$

23. $\sin 135^{o}$

24. $\sin 210^{o}$

25. $\sin 60^{o}$

26. $\tan 225^{o}$

27. $\sin 315^{o}$

28. $\tan 180^{o}$

29. $\cos 120^{o}$

30. $\sin (300^{o})$

31. $\tan 120^{o}$

32. $\cos 300^{o}$

33. $\cos 60^{o}$

34. $\tan 150^{o}$

35. $\cos 330^{o}$

36. $\sin 240^{o}$

37. $\tan 315^{o}$

38. $\tan 60^{o}$

39. $\sin 45^{o}$

40. $\sin 30^{o}$

41. $\cos 315^{o}$

42. $\sin (225^{o})$

Give all possible values of θ, $0^{\circ} \le \theta < 360^{\circ}$, for which each of the following is true.

43. $\sin\theta = \frac{\sqrt{2}}{2}$

44. $\cos\theta = -\frac{\sqrt{3}}{2}$

45. $\sin\theta = 1$

46. $\sin\theta = -\frac{1}{2}$

47. $\cos\theta = 0$

48. $\cos\theta = \frac{\sqrt{2}}{2}$

48. $\tan\theta = \sqrt{3}$

49. $\tan\theta = -1$

50. $\sin\theta = 0$

51. $\cos\theta = \frac{\sqrt{3}}{2}$

52. $\sin\theta = \frac{1}{2}$

53. $\tan\theta = -\frac{\sqrt{3}}{3}$

Give the period and amplitude of each. Then sketch one period of the graph, including maximum and minimum values on the *y*-axis and "quarter points" on the *x*-axis. You should be able to complete these graphs in less than 15 minutes.

54. $y = 3\sin x$

55. $y = 2\sin\left(4x\right)$

56. $y = -3\cos\left(\frac{x}{3}\right)$

57. $y = 4\cos\left(2x\right) + 3$

58. $y = -2\csc\left(\frac{x}{2}\right)$

59. $y = 3\sec x - 4$

60. $y = 2\sin 4\left(x + \frac{\pi}{4}\right)$