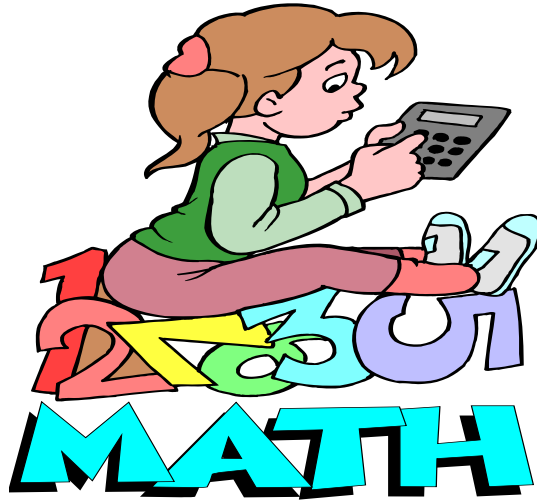


Rising 9th Graders' Summer MIST Packet

(Mathematics Independent Skills Training)



The Summer MIST Packet is divided into two sections:

Section 1 - *Basic Skills and Process Problems (#1-16)*

Throughout this section, you may find it useful to use tools such as a protractor, straight edge, calculator, etc. (scientific calculators are recommended and used in class). In addition, the corresponding standard and online references are provided for extra practice to expand your knowledge or to strengthen any particular skill, if necessary.

Section 2 - *Characteristics of Functions (#17- 35)*

The first unit in 9th Grade Math 1 (MM1) or Accelerated Math 1 (MA1) will build on your previous knowledge of functions introduced in the 8th-grade curriculum (GPS Unit 4). Characteristics of Functions set the foundation to explore the nature of independent and dependent relationships. This section contains practice questions from 8th and 9th grade curriculum to review and complete.

This packet is due during the first week of school. You should show your work and/or explain your answers for all problems; some problems specifically instruct you to do so; no credit will be given for those problems if work is not shown. Please follow directions.

9th Grade Geometry Standards for Math 1 and Accelerated Math 1 include extensive investigation of triangles, quadrilaterals, and other polygons as well as study of mathematical reasoning.

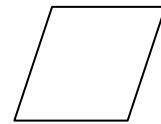
1) Name each type of quadrilateral shown below. (2nd & 4th Grade GPS)



Two pairs of parallel sides



One pair of parallel sides



All sides congruent

If you need help or more practice, try:

<http://www.interactivestuff.org/match/maker.phtml?featured=1&id=24>

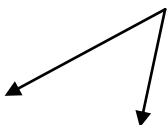
[http://www.gazinotes.com/KS3-GCSE/AT4-Names%20of%20Quadrilaterals%20\(more\).htm](http://www.gazinotes.com/KS3-GCSE/AT4-Names%20of%20Quadrilaterals%20(more).htm)

www.lbschools.net/Main_Offices/Curriculum/Areas/Mathematics/Drills/ppt/ClassifyQuadsBeatComp.ppt

2) Use a protractor to:

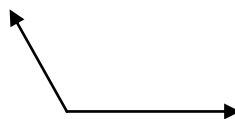
a. measure each angle.

b. Classify each angle as straight, obtuse, right, or acute. (4th Grade GPS)



a. _____

b. _____



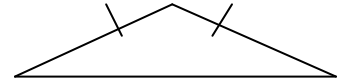
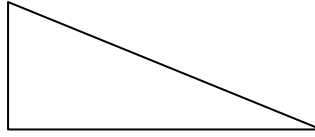
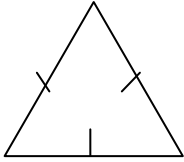


If you need help or more practice, try:

<http://www.mathsisfun.com/geometry/protractor-using.html>

<http://www.mathsisfun.com/angles.html>

- 3) Classify each triangle according to its sides as scalene, isosceles, or equilateral. Classify each triangle according to its angles as acute, right, or obtuse. (3rd and 4th Grade GPS)



(Side) _____

(Angle) _____

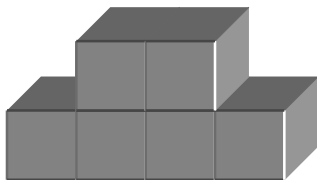
If you need help or more practice, try:
<http://www.studyzone.org/mtestprep/math8/f/triangle5l.cfm>

- 4) Use reasoning to answer the questions below (3rd Grade GPS):

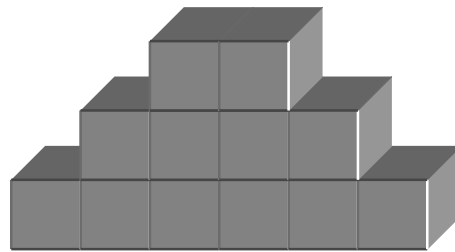
- a. If the pattern shown below continues, what would be the total number of blocks in the 5th stage of the pattern? (Hint. Find Stage 4 first)



Stage 1 .



Stage 2 .



Stage 3 .

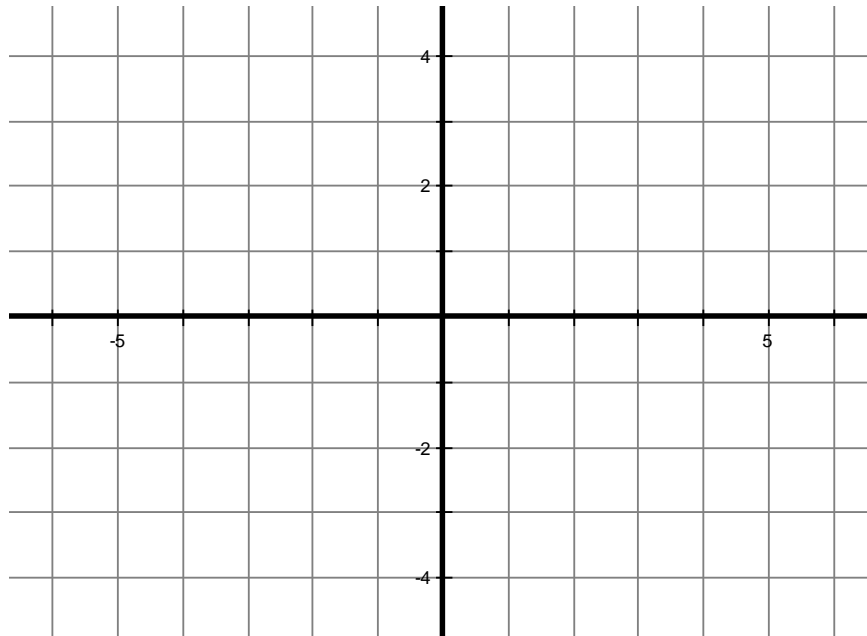
Stage 5

- b. Find the next two numbers in the pattern: 3, 7, 11, 15, 19, _____, _____.

If you need help or more practice, try:
<http://standards.nctm.org/document/eexamples/chap4/4.1/index.htm>
<http://www.doe.state.la.us/lde/uploads/2300.pdf>
<http://www.auburn.edu/~backsni/puzzles/sequences.html>

5) On the grid below (4th & 7th Grade GPS):

- a. Graph the points (1, 3), (-5, 3), (-2, -1), and (4, -1).
- b. Connect the points to form a quadrilateral.
- c. Name the type of quadrilateral that is formed: _____
- d. Mark the pairs of angles that are congruent. Use a different color for each pair.
- e. Mark the pairs of sides that are congruent. Use a different color for each pair.



If you need help or more practice, try:
<http://www.funbrain.com/co/index.html>
http://www.softschools.com/math/geometry/graphing_ordered_pairs/
<http://www.oswego.org/ocsd-web/games/billybug2/bug2.html>

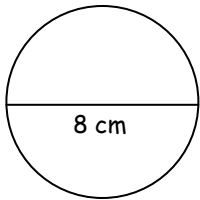
9th Grade Geometry Standards for Accelerated Math 1 students also include study of properties related to circles and measurements related to spheres. Students entering Accelerated Math 1 (incl. ALANHS students) are expected to be able to complete problems #6 and #7.

Formulas for Circles:

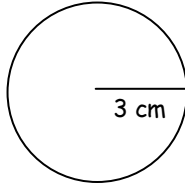
Area = pi times the radius squared: $A = \pi r^2$

Circumference = 2 times pi times the radius: $C = 2\pi r$
 Or Circumference = pi times the diameter: $C = \pi d$
Remember $d = 2r$.

6) Find the area and circumference of each circle below. Use 3.14 for pi.
 In the white space below the problems, write the formula, show substitutions and calculations.
 Include units in answer (5th Grade GPS).



Diameter = 8 cm
Figure 1



Radius = 3 cm
Figure 2

Figure 1 : A = _____
 Figure 1 : C = _____
 Figure 2: A = _____
 Figure 2: C = _____

If you need help or more practice, try:
<http://www.mathgoodies.com/lessons/vol2/circumference.html>

Some Volume and Surface Area Formulas

Rectangular Prism:

Surface Area = Perimeter of the base (P) times height plus 2 times the area of the base (B):

$$SA = Ph + 2B \quad \text{or} \quad SA = (2l + 2w)h + 2lw$$

Volume = length times width times height: $V = lwh$ or $V = Ah$

Remember that for a rectangle: $P = 2l + 2w$ and $A = lw$

Cylinder:

Surface Area = 2 times the area of the circular bases (B) plus the circumference times the height:

$$SA = 2B + Ch \quad \text{or} \quad SA = 2\pi r^2 + 2\pi rh$$

Volume = Area of the base times the height: $V = Bh$ or $V = \pi r^2 h$

Remember that for a circle: $A = \pi r^2$ and $C = 2\pi r$

7) Find the surface area and volume of each figure below. Use 3.14 for pi.
 In the white space below the problems, write the formula, show substitutions and calculations.
 Include units in answer (4th & 6th Grade GPS).

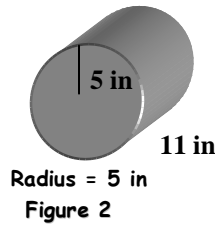
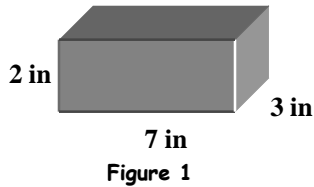


Figure 1: SA = _____

Figure 1: V = _____

Figure 2: SA = _____

Figure 2: V = _____

If you need help or more practice, try:

<http://www.regentsprep.org/Regents/Math/math-topic.cfm?TopicCode=fsolid>

[http://questgarden.com/04/10/3/051008144204/files/Geometry_\(prisms\).ppt#256.1,Surface Area and Volume of Prisms](http://questgarden.com/04/10/3/051008144204/files/Geometry_(prisms).ppt#256.1,Surface Area and Volume of Prisms)

<http://www.emaths.co.uk/powerpoint/shapespace/ABSurface%20Area%20of%20a%20cylinder.ppt#256.1,Surface Area of a cylinder>

9th Grade Data Analysis Standards for Math 1 and Accelerated Math 1 include study of counting strategies such as permutation and combination formulas, basic laws of probability, relationships between sample and population statistics, and variability of data using the mean absolute deviation of the data.

8) A bag contains 3 green marbles, 5 blue marbles, and 2 yellow marbles. One marble is drawn from the bag. Find the probability that the marble is blue. Show work. (6th & 8th Grade GPS) _____

9) Mr. A's homeroom class has 5 girls and 7 boys. Ms. Z's homeroom class has 8 girls and 7 boys. One student is to be selected at random from each class to go to the office to pick up copies of the school newsletter. Find the probability that Mr. A and Ms. Z each pick a boy. Show work. (8th Grade GPS) _____

If you need help or more practice, try:
http://www.mathgoodies.com/lessons/vol6/intro_probability.html
http://www.mathgoodies.com/lessons/vol6/independent_events.html

- 10) A particular school required standard dress. Students are expected to wear a certain type of shirt but may choose from blue, red, or white. Students may wear black or khaki slacks. How many different shirt-slack color combinations may be made? Show work. (8th Grade GPS) _____

If you need help or more practice, try:

<http://www.aaastudy.com/sta-basic-cntg.htm#section2>

<http://images.schoolinsites.com/SiSFiles/Schools/AL/ScottsboroCity/ScottsboroHigh/Uploads/Forms/Sept%202%20Notes%20Counting%20Principle.pdf>

- 11) For a summer reading log, a student records the number of hours spent reading each week of the summer: 5, 3, 7, 8, 10, 9, 8

Find the mean (show work). _____

Find the median (show work). _____

Find the mode. _____

Find the range (show work). _____

Find the lower (1st) quartile. _____

Find the upper (3rd) quartile. _____

Find the inter-quartile range. _____

(7th Grade GPS)

If you need help or more practice, try:

<http://www.hcbe.net/itc/powerpoints/files/46F12153FCB549D798D5DB266644E03D.ppt#256,1,Mean, Median, Mode & Range>

http://www.wtamu.edu/academic/anns/mps/math/mathlab/beg_algebra/beg_alg_tut34_cent.htm

<http://www.coventry.ac.uk/ec/~styrrell/learningobjects/spread/interquartilerange.ppt#256,1,The interquartile range.>

9th Grade Algebra Standards for Math 1 and Accelerated Math 1 include study of functions, radical expressions, polynomial expressions, rational expressions and equations, and quadratic equations.

12) Evaluate and simplify each expression. (4th-8th Grade GPS)

$$-2(-3 + 8) \quad \underline{\hspace{2cm}}$$

$$(4 - 7)(5 - -1) \quad \underline{\hspace{2cm}}$$

$$\frac{-3 + -9}{-2 + 8} \quad \underline{\hspace{2cm}}$$

$$\frac{3}{5} + \frac{2}{3} \quad \underline{\hspace{2cm}}$$

$$3.2 - 4.51 + 5 \quad \underline{\hspace{2cm}}$$

$$\frac{9}{10} \div \frac{4}{5} \quad \underline{\hspace{2cm}}$$

$$\frac{2}{\frac{1}{3}} \quad \underline{\hspace{2cm}}$$

$$9 - 6 \cdot 2 + 5 \quad \underline{\hspace{2cm}}$$

$$\sqrt{64} \quad \underline{\hspace{2cm}}$$

$$\sqrt{25} + \sqrt{9} \quad \underline{\hspace{2cm}}$$

$$(2 + \sqrt{3})^2 \quad \underline{\hspace{2cm}}$$

$$\frac{2}{\sqrt{2}} \quad \underline{\hspace{2cm}}$$

$$\frac{2}{3\sqrt{2}} \quad \underline{\hspace{2cm}}$$

$$\frac{2}{3 - \sqrt{2}} \quad \underline{\hspace{2cm}}$$

If you need help or more practice, try:
<http://www.regentsprep.org/Regents/math/math-topic.cfm?TopicCode=signed>
<http://www.regentsprep.org/rEGENTS/math/math-topic.cfm?TopicCode=orderop>
<http://www.mathsisfun.com/square-root.html>
<http://www.regentsprep.org/regents/math/math-topic.cfm?TopicCode=radicals>

13) Solve each equation or inequality. Show work. (7th & 8th Grade Standards)

$4n - 24 = 8$ _____

$2a + 3 = -7$ _____

$\frac{x}{6.5} = \frac{8}{13}$ _____

$4x - 3 = 2x + 5$ _____

$m - 3 \geq 8$ _____

$-3k < 18$ _____

If you need help or more practice, try:

<http://teachers.henrico.k12.va.us/math/HCPAlgebra1/Documents/3-3/NOTESEqnsMultiStep.ppt#262,7>, The answers:
http://step.nn.k12.va.us/math/middlemath/ppt/Solve_one_step_Inequalities.ppt#256,1, Solving One-Step Inequalities

14) Simplify each expression (show work as necessary). (7th Grade GPS)

$2(x + 6)$ _____

$5x - 8x$ _____

$7a + 4b - 5a$ _____

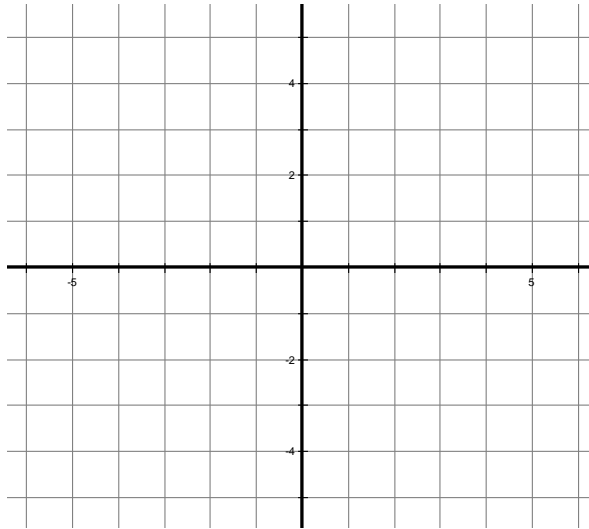
$4(m - 2) + 6m$ _____

If you need help or more practice, try:

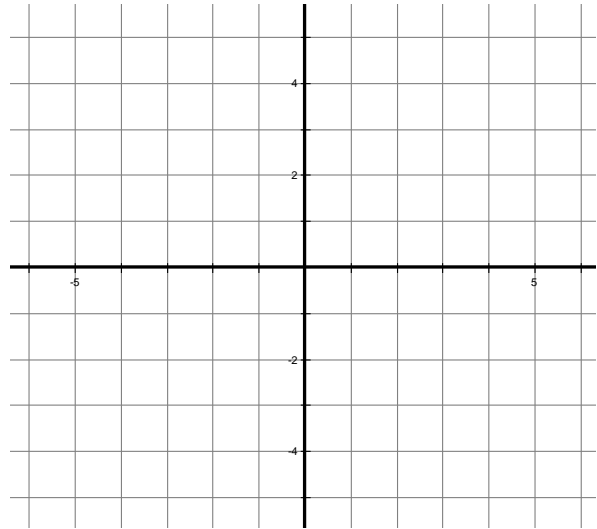
http://www.wtamu.edu/academic/anns/mps/math/mathlab/beg_algebra/beg_alg_tut11_simp.htm
www.edu.gov.on.ca/eng/studentsuccess/lms/files/tips4rm/TIPS4RMalgebraicequations.ppt

- 15) Graph the line that corresponds to each equation below. (8th Grade GPS)
 (Hint: $y = mx + b$; use a table of values to determine coordinates)

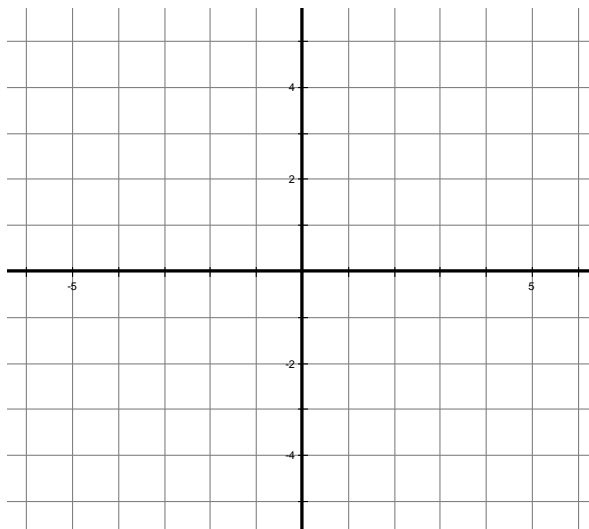
$$y = \frac{1}{2}x + 3$$



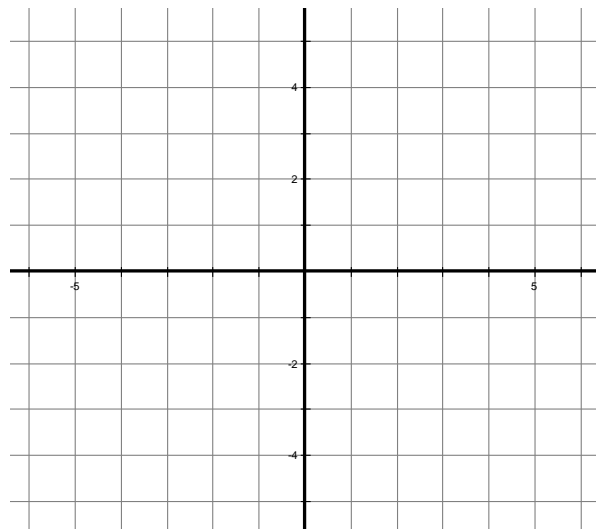
$$y = -3x + 1$$



$$2x + 3y = 6$$



$$4x - 5y = 20$$



If you need help or more practice, try:

http://www.wtamu.edu/academic/anns/mps/math/mathlab/int_algebra/int_alg_tut16_eqline.htm

<http://www.ltcconline.net/greenl/java/BasicAlgebra/LineGraph/LineGraph.htm>

<http://www.curriculum.org/tcf/teachers/projects/algebra/GraphingIntercepts.adp>

<http://cs.selu.edu/~rbyrd/math/intercept/>

9th Grade Process and Reading Standards for Math 1 and Accelerated Math 1 include problem solving, mathematical reasoning, mathematical communication, connections to other disciplines, representations of mathematical ideas, and reading and vocabulary.

16) Explain or Solve. (Kindergarten through 8th Grade GPS)

The maximum teacher-student ratio for a particular grade level is 1 to 25. What does this ratio mean?

A high school is planning to paint classrooms over the summer. The paint and labor cost approximately \$50 per room. If the school has \$5200 to spend on the paint and labor, can they afford to paint 108 classrooms? Explain.

The Iron Age in the United Kingdom lasted from approximately 797 B.C. to the beginning of the Roman Era at approximately 38 A.D. Based on these numbers, how many years did the U.K. Iron Age last (show work)?

The End of Basic Skills and Processes

We hope you're having a wonderful summer,
and we look forward to meeting you at the
beginning of the school year!

- 17) Using set notation, identify the domain and range of the relation:
 $(8,2), (6,4), (4,2), (2,4)$. (M8D1)

- 18) Determine if each relation is a function or not a function. Explain. (M8A3)

$$x + y = 5$$

$$2x - y = 3$$

$$x = 4$$

$$f(x) = -1$$

For #19 and #20 below, what type of relation does the data indicate: Linear or Nonlinear? Explain. (M8A3)

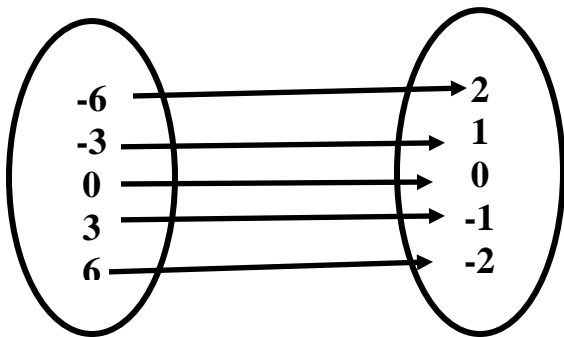
19)

x	-1	0	1	2	3
y	-8	-2	4	10	16

20)

Input

Output



- 21) Let $f(x) = -7x - 10$. Find $f(-4)$. (M8A3)

For questions #22 – 26, match each parent function with its corresponding graph.

(Connected to skills from M6A3, M7A3, M8A3, M7N1, M8P4, M8P5)

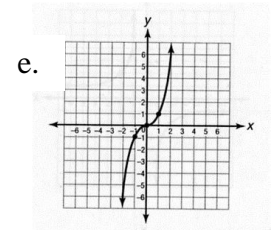
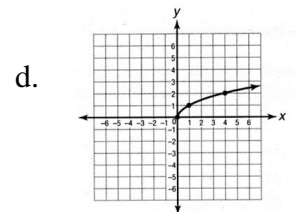
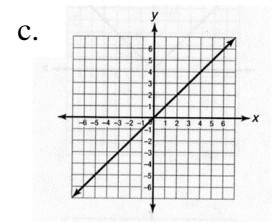
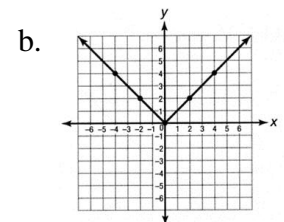
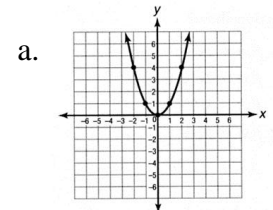
22) $f(x) = x^3$

23) $f(x) = x^2$

24) $f(x) = \frac{1}{x}$

25) $f(x) = x$

26) $f(x) = |x|$



Hint: Create a (x,y) chart and plot the points to see which matches the graph. Remember $y = f(x)$.

- 27) Complete the table of values that represents the function rule: (M8A3)
 $y = 4x + 7$

Input X		2	3		5
Output Y	-1			23	

- 28) Circle the function rule that relates n and A in the arithmetic sequence 15, 11, 7, ...? Explain. (M8D1)

- A. $A = -n + 7$
- B. $A = -4n + 19$
- C. $A = -6n + 21$
- D. $A = 4n + 19$

Sara, Rez, and Jonah want to let their friends know about a party after school. Each of them call two people in 3 minutes, all who then contact two different people 3 minutes later, and so on.

- 29) What are the 1st 4 terms of the pattern of number of people called every 3 minutes? (M8A3)

$T_1 =$ _____

$T_2 =$ _____

$T_3 =$ _____

$T_4 =$ _____

Describe that function rule for the number of people called every 3 minutes as a recursive sequence (for $n > 1$) in terms of n ?

$T_n =$ _____

Company XYZ has started providing month-to-month internet service to its customers without having to sign a contract. They will charge clients two dollars per megabyte, M , received or sent with an access fee of \$10.00 per month. (M8A3, M8P)

- 30) This monthly bill, B , can be modeled by the equation:

Complete a table of values for the equation.

Jon and Nick took 5 tests in their math class this semester. They recorded their scores for each test in the chart below.

Test	Jon	Nick
1	92	84
2	85	89
3	90	96
4	78	84
5	95	92

- 31) For his score, who had the greater:

mean (show work)?

range (show work)?

median?

32) Given the two functions:
 $f(x) = (5x^2 + 3x - 8)$ and
 $g(x) = (-2x^2 - 9x + 1)$
(M8N1, M8A3; extension into MM1A1)

What is the sum of the two functions?

$H(x)$ is defined by $f(x) - g(x)$. What is $H(x)$?

33) Solve given the two functions:
 $f(x) = x^2 + 4x + 3$ and $g(x) = x + 1$
(M8N1, M8A3; extension into MM1A1)

Find the product of the two functions?

Divide $f(x)$ by $g(x)$.

34) Complete the area model for multiplying polynomials.
(M8N1, M8A3; extension into MM1A2)

	$2x$	1
x		
2		

Combine like terms above to show that

$$(x + 2)(2x + 1) =$$

Enrichment Problem

35) Apply The Binomial Theorem to expand $(x+3)^4$. *(MM1A2)*

Hint: $(x + 3)^4 = (x + 3)^2(x + 3)^2$