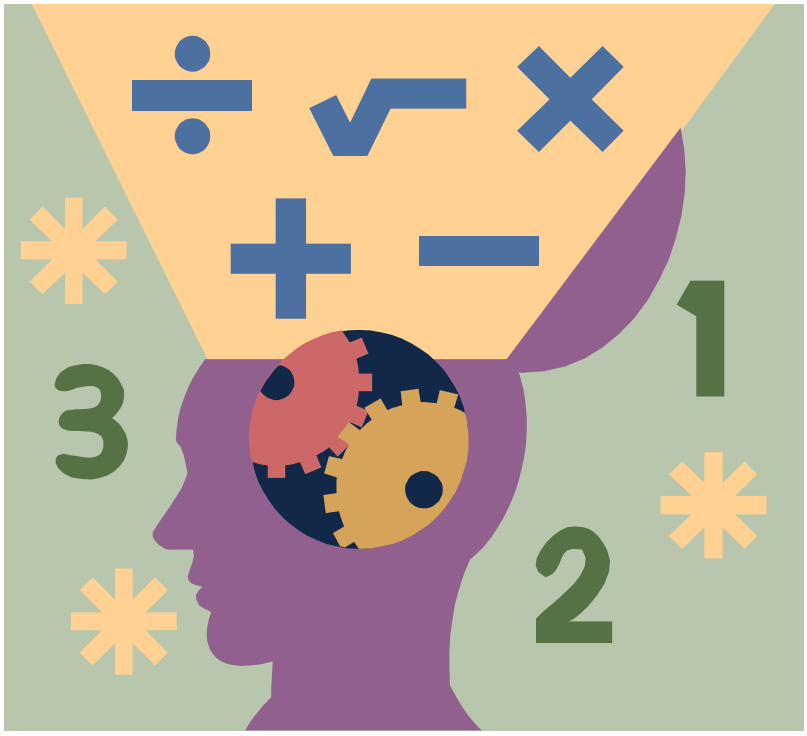
PORTFOLIO CALIBRATION
MATHEMATICS GRADE 7
2006-2007



Instructions

Solutions for the warm – up tasks and calibration sets for student One and student two are listed on the following page to ease the time required to complete this calibration session.

Directions:

Read, assess and record your scores for the two warm – ups. Make sure that you are using the *Vermont Elementary and Middle Level Mathematics Portfolio Scoring Guide* dated September 1997.

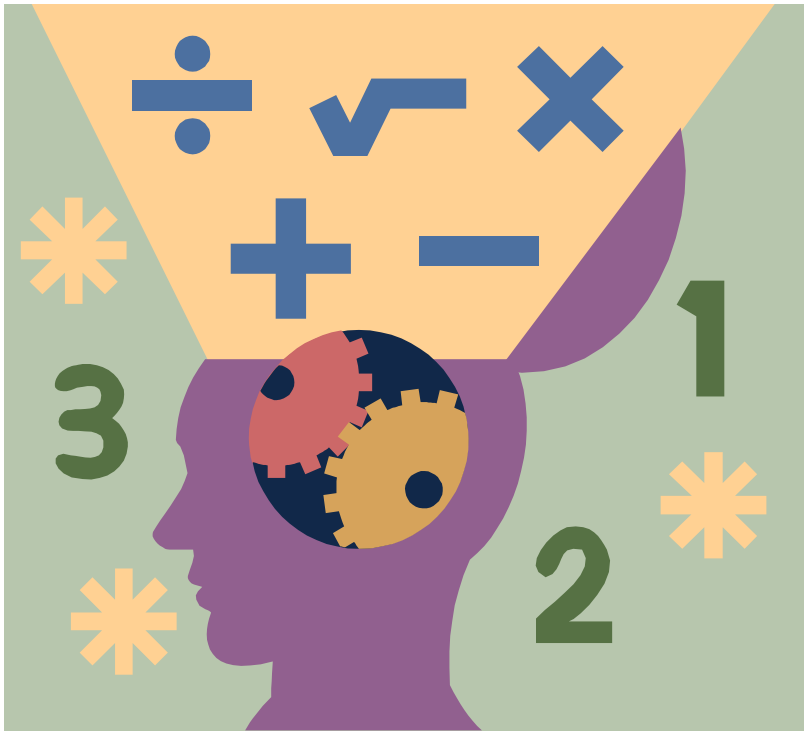
After assessing the warm – up tasks, read the rationales that follow the tasks. Check your scores against these to look for areas of understanding and misunderstanding. You are now ready to calibrate.

Read, assess and record your scores for the portfolio for Student One and for the portfolio for Student Two.

When reviewing the results of this calibration, it is important to recognize that your percentage of agreement should NOT be equated as a "pass/fail" paradigm. Rather, look for trends in your scores when scores regularly disagree with the scores given in the rationales. Read the rationales carefully to better understand how the scores were achieved.

Inexperienced scorers should not be discouraged by low levels of agreement. You should ask to receive some professional development to help you.

Solutions and Rationale Template



Warm – Up Solutions

Speeding Ticket #2

When the speed is 85 mph the fines are the same in both states. ($250)

When the speed is less than 85 mph the fine is less in Vermont

When the speed is greater than 85 mph the fine is less in Massachusetts

Making Squares

The sum of the areas of the two squares is 124.8125 square inches.

(The perimeter of the smaller square is 29 inches and the measure of its sides are 7.25 inches. The area of the smaller square is 52.5625 square inches. The perimeter of the larger square is 34 inches and the measure of its sides is 8.5 inches. The larger square has an area of 72.25 square inches)

Portfolio Student One Solutions

Growing Cubes

Figure	**12**	**20**	**N**
Number of cubes	**169**	**441**	**$(n + 1)^2$**
Surface area	**389**	**965**	**$2(n+1)^2+4(n+1)-1$**

Speeding Ticket #1

When the speed is 85 mph the fines are the same in both states. ($250)

When the speed is less than 85 mph the fine is less in Vermont

When the speed is greater than 85 mph the fine is less in Massachusetts

Bouncing Ball #1

The ball traveled a total of 103 feet when it hit the floor the fourth time.

The ball bounces to a height of 5 1/3 feet after the fourth bounce.

Ping-Pong Tournament

Six (6) people will require 15 games.

Fifteen (15) people will require 105 games taking 13.5 hours (13 hours and 30 minutes)

Mathematical Tug-of-War

Ivan and the 3 grandmas win the third match.

Portfolio Student Two Solutions

Increase in the Freshman Class

The freshman class increased by 41 2/3 %.

Mathematical Tug-of-War #2

Ivan and the 3 grandmas win the third match.

Penned In

The triangle has an area of 68 square units.

R U Nuts

The mixture contains 35 pounds of peanuts and 25 pounds of cashews.

Bouncing Ball #2

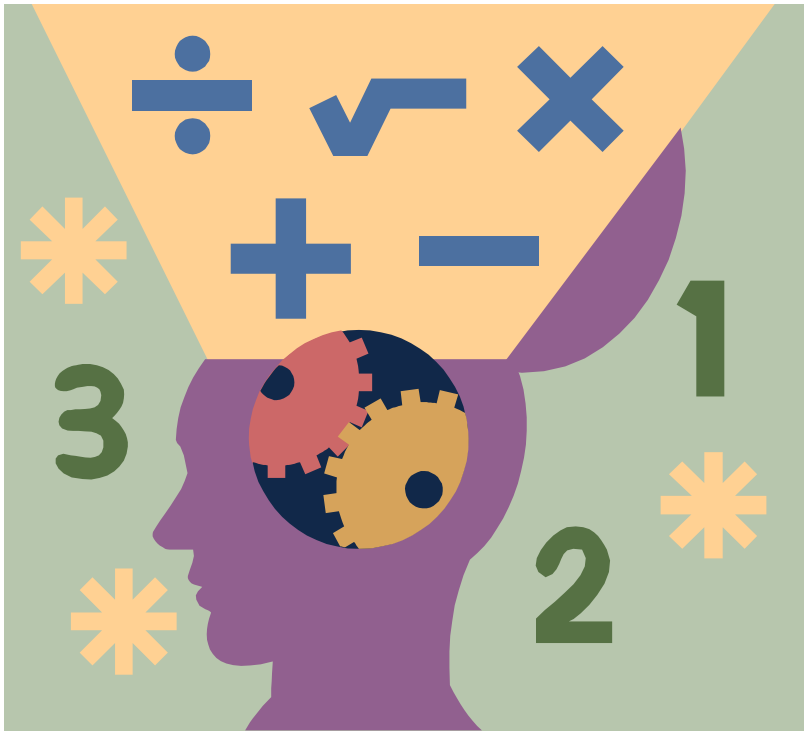
The ball traveled a total of 103 feet when it hit the floor the fourth time.

The ball bounces to a height of 5 1/3 feet after the fourth bounce.

Task:

Criteria	**Score Points**	**Rationale**
Approach & Reasoning		
Connections		
Solution		
Mathematical Language		
Mathematical Representation		
Documentation		

Warm – Ups and Rationales



Speeding Ticket #2

In Massachusetts the fine for speeding is a flat fee of $100.00 plus $5.00 for each mile per hour above the 55 mile speed limit. In Vermont the fine is a flat fee of $50.00and $10.00 for each mile per hour above the 65 mile speed limit.

Recently you were stopped for speeding right on the border between Massachusetts and Vermont. Unfortunately for you, you were stopped by BOTH a Vermont and Massachusetts trooper. They have decided to let YOU decide which state will have jurisdiction. Choose which state you would like to be fined by and give reasons.

Criteria	**A &R**	**Conn**	**Sol**	**Lang**	**Rep**	**Doc**
Scores						

Mass. state sets
$y = 5x + 100$

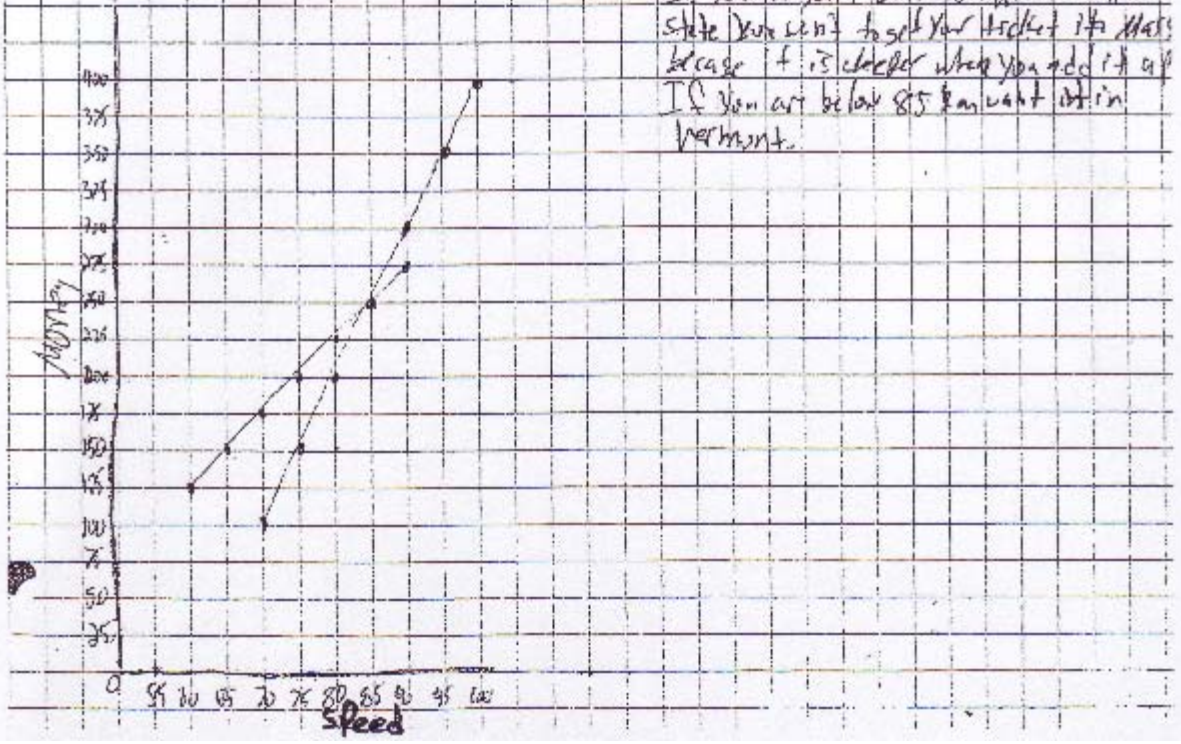
Speed	money
55	100
60	125
65	150
70	175
75	200
80	225
85	250
90	275

Vermont
$y = 10x + 50$

Speed	Money
65	50
70	100
75	150
80	200
85	250
90	300
95	350
100	400

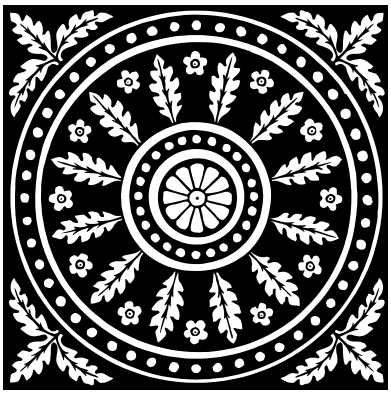
$C = 50 + 10X$
C = cost of ticket
X = # of mph over limit

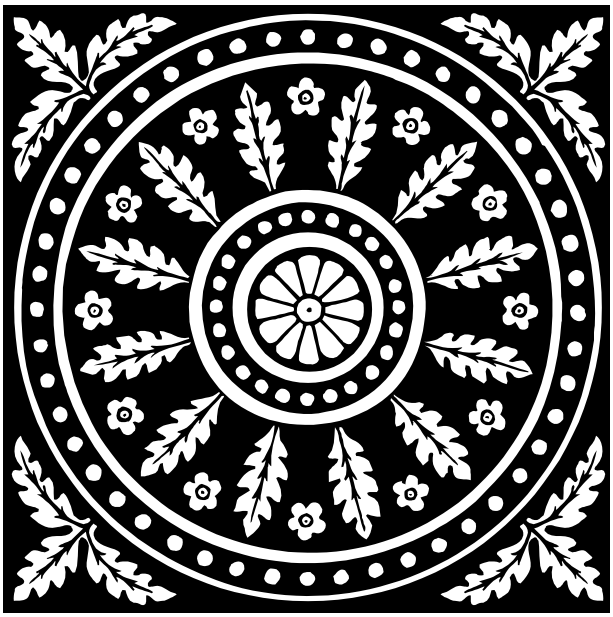
At 85 MPH it breaks even between Vermont and Massachusetts. If you are going over 85 mph in either state you won't to get your ticket in Mass because it is cheaper when you add it up. If you are below 85 you want it in Vermont.



Making Squares

A piece of wire 63 inches long is cut into two parts. Each part is then bent to form a square. If the difference between the measures of the perimeters of the two squares is 5 inches. What is the sum of the areas of the two squares?



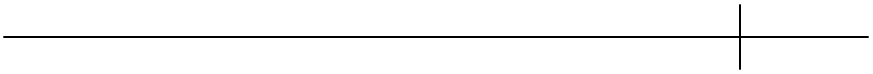


Expert
Math 7&8 - 0041

Making Squares

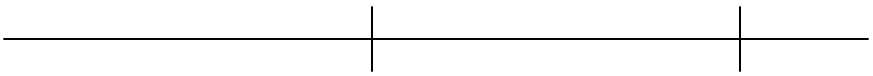
I need to find the sum of the areas of two squares. I know that the squares are cut from a piece of wire measuring 63 inches. I also know that the perimeters have a difference of 5 inches.

I am first going to find out how the wire was cut. First I will subtract 5 from 63 getting a sum of 58 inches.



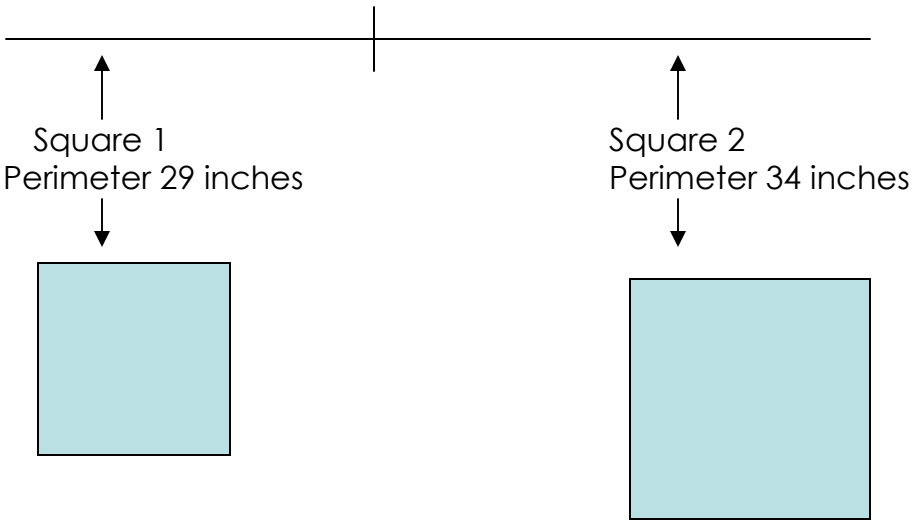
58 inch piece of the wire 5 inch piece

Now I will divided 58 inches by 2 because this would be the perimeter if the two squares had the same perimeter.



29 inches 29 inches 5 inches

That means each square would have a perimeter of 29 inches. Now I will add back the 5 inches that I subtracted to one of the squares making its perimeter 34 inches . Now I have two squares whose perimeters differ by five inches and whose total perimeter measures 63 inches, the length of the wire.



Now I have to find the measure of the sides of each of these squares. I need to do this so I can find the area of each square. I will use the formula for the perimeter of a square, P = 4s. I will substitute 29 for the P, perimeter and then find s, the side measure. I will do the same for the second square except I will use 34 for the value of P, perimeter.

Perimeter of 29 inches
P = 4s
29 = 4s
7.25 = s
Each side measures 7.25 inches

Perimeter of 34 inches
P = 4s
34 = 4s
8.5 = s
Each side measures 8.5 inches

Now I have to find the area of the two squares. Again I am going to use the formula for the area of a square, $A = s^2$ or s x s.

Square with sides 7.25 inches
$A = s^2$
A = 7.25 x 7.25
A = 52.5625 sq in

Square with sides 8.5 inches.
$A = s^2$
A = 8.5 x 8.5
A = 72.25 sq in

Now find the sum of the two squares.
52.5625 + 72.25 = 124.8125 sq inches.

This problem was like those that we had find all the areas of pens that we could make using a certain amount of fencing. Here is an example: You have 12 feet of fencing which is the perimeter.

Length in feet	Width in feet	Perimeter in feet	Area in square feet
11	1	12	11
10	2	12	20
9	3	12	27
8	4	12	32
7	5	12	35
6	6	12	36

Notice the largest is 36 sq. ft. Both problems have a fixed perimeter.

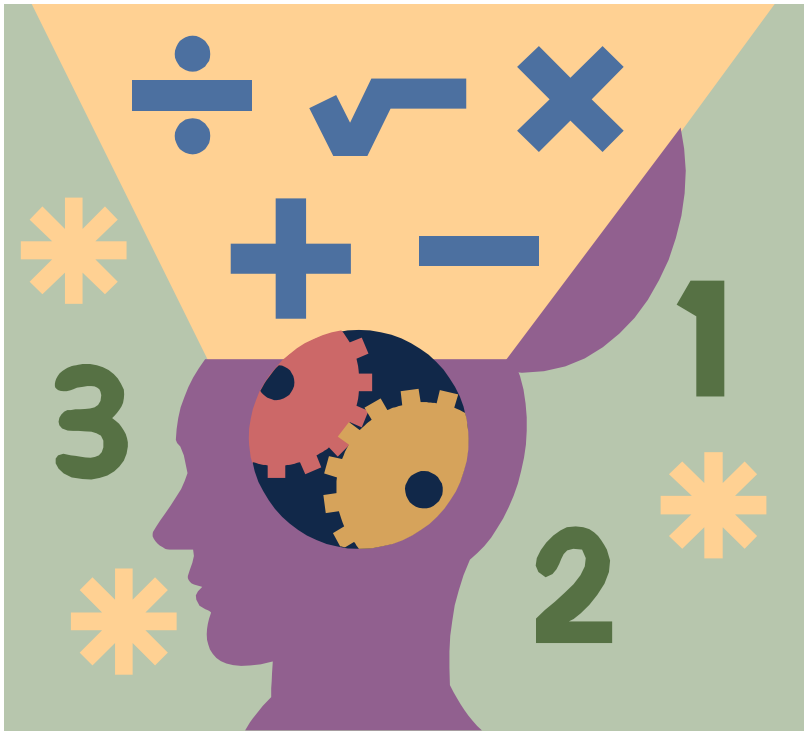
Task: Speeding Ticket #2

Criteria	Score Point	Rationale
Approach and Reasoning	4	The student's approach of creating a table of values and graph showing the fines and the break even point worked. Additionally, the student created two formulas for the problem (c = 10x + 50 and c = 5x + 100 where x is the number of mph above the speed limit).
Connections	3	The student created a formula while solving the problem (c = 10x + 50 and c = 5x + 100 where x is the number of mph above the speed limit)
Solution	3	The answer, "At 85 mph it breaks even between Massachusetts and Vermont. If you are going over 85 mph in either state you want to get the ticket in Mass because it is cheaper when you add it up. If you are below 85 you want it in Vermont" is correct and supported by the work shown.
Mathematical Language	3	The student uses algebraic equations with the variable defined (c = 10x + 50 and c = 5x + 100 where x is the number of mph above the speed limit).
Mathematical Representation	2	The student attempts two different representations. The table of values has incorrect fines for 55mph and 65mph. These should be $0.00 as shown in the graph. The graph does not label which line goes with which graph.
Documentation	2	The documentation has some gaps or confusing notation. The student uses y above the tables but c below. It appears that he/she uses these correctly. The tables are filled out with speeds but formulas are defined in terms of mph over the speed limit. Again it appears that this was used correctly. These are just a few of the things that could have been explained better.

Task: Making Squares

Criteria	Score Point	Rationale
Approach and Reasoning	4	The student's approach of dividing the wire, finding the length of the sides of the squares using the perimeter formulas, then finding the areas using the area formulas worked for solving this problem. The student also justifies why they need to use the formulas.
Connections	3	The student identified formulas used to solve the problem and relates the problem to another problem having fixed perimeters.
Solution	3	The solution is correct and supported by the work shown.
Mathematical Language	3	The student uses the mathematical terms perimeter, area, and squares used in the task. Additionally, the student uses the symbolic language of algebra in the formulas and uses the decimal notation.
Mathematical Representation	3	The diagrams showing the division of the wire and the diagrams of the two squares are appropriate and accurate
Documentation	3	The student's documentation clearly shows how the problem was solved and the reasoning used. The answer is given and the solution is well organized.

Portfolio One



2006 - 2007Mathematics Portfolio Calibration – Grade 7
Table of Contents for Student 1

Best Piece	Title of Task	Task Attached	Mathematical Concepts Addressed
1	Growing Cubes	√	7.7 Geometry and Measurement
2	Speeding Ticket #1	√	7.8 Algebra and Functions
3	Bouncing Ball #1	√	7.6 Number and Operations
4	Ping Pong Tournament #1	√	7.9 Data, Statistics and Probability
5	Tug Of War #1	√	7.8 Algebra and Functions

Growing Cubes

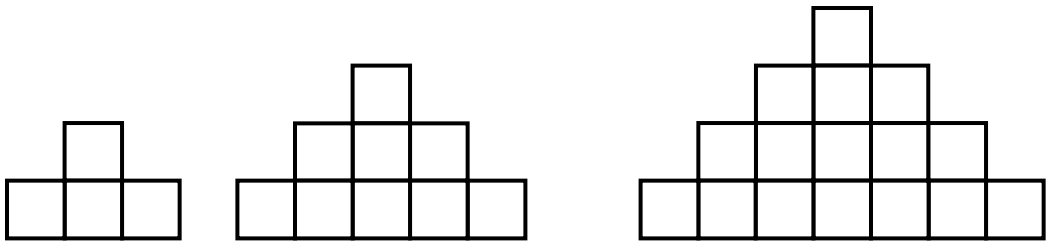


Figure 1 Figure 2 Figure 3

The figures above are made with cubes. In this problem you are to determine the following about the three figures above as well as the 12^{th}, 20^{th}, and Nth figures.

- The number of cubes used to construct each model.
- The surface areas of each of the models.

Remember to look for patterns and formulas.

Criteria	A &R	Conn	Sol	Lang	Rep	Doc
Scores						

# of cubes		
1.	4	+ 5
2.	9	+ 7
3.	16	+ 9
4.	25	+ 11
5.	36	+ 13
6.	49	+ 15
7.	64	+ 17
8.	81	+ 19
9.	100	+ 21
10.	121	+ 23
11.	144	+ 25
12.	169	+ 27
13.	196	+ 29
14.	225	+ 31
15.	256	+ 33
16.	289	+ 35
17.	324	+ 37
18.	361	+ 39
19.	400	+ 41
20.	441	+ 43

1 - 4 cubes
2 - 9 cubes
3 - 16 cubes
12 - 169 cubes
20 - 441 cubes
n^{th} - # of cubes + (odd + 2)

To get this answer, I first counted how many cubes were in the first, second, and third buildings. Next I realized that every time, first was adding 5 then 7, then 9, then 11.....and so on. On each problem it was taking the (odd) + # and adding 2 to get the next + number.

2.

1 - 20
2 - 25
3 - 32
12 - 185
20 - 457
n^{th} - [# of cubes + (odd + 2)] + 16 = surface area u

How I got this problem was, first I added the whole surface area for the 1st, the 2nd, and the 3rd buildings. Then I tried to find an observation or some sort of way to find the rest of the numbers that I needed. I figured out that on the 1st, 2nd, 3rd building, all that happened was, you added 16 to the total amount of cubes. I tried this with a couple more using math toy cubes and found out my connection worked with the rest of the buildings.

1	-	4	+	16	=	20	=	surface area for 1.
2	-	9	+	16	=	25	=	surface area for 2.
3	-	16	+	16	=	32	=	surface area for 3.
12	-	169	+	16	=	185	=	surface area for 12.
20	-	441	+	16	=	457	=	surface area for 20.

Work is shown.....I also used the chart above to help determine the surface areas.

Extra:

building #		surface area
21	+ 16	500
25	+ 16	692
30	+ 16	977

Speeding Ticket #1

In Massachusetts the fine for speeding is a flat fee of $100.00 plus $5.00 for each mile per hour above the 55 mile speed limit. In Vermont the fine is a flat fee of $50.00and $10.00 for each mile per hour above the 65 mile speed limit.

Recently you were stopped for speeding right on the border between Massachusetts and Vermont. Unfortunately for you, you were stopped by BOTH a Vermont and Massachusetts trooper. They have decided to let YOU decide which state will have jurisdiction. Choose which state you would like to be fined by and give reasons.

Criteria	**A &R**	**Conn**	**Sol**	**Lang**	**Rep**	**Doc**
Scores						

Speeding Ticket

Fine Chart

Speed	VT	MA
55	$0	$0
60	$0	$125
65	$50	$150
70	$100	$175
75	$150	$200
80	$200	$225
85	$250	$250
90	$300	$275
95	$350	$300
100	$400	$325

I would choose to get the ticket from VT for anything up to $250 which is 5mph to 20 mph over the speed limit. I would choose MA for the ticket from $250 $325 because it is cheaper. It would be 30mph to 55mph over the speed limit.

This problem is like the CD music company's portfolio problem. It is like that because you had to decide which company is best to choose from depending on price per item. To find the best deals.

VT

$50 + (10 × mph over) = $ fine

MA

$100 + ($5 × mph over) = $ fine

Bouncing Ball #1

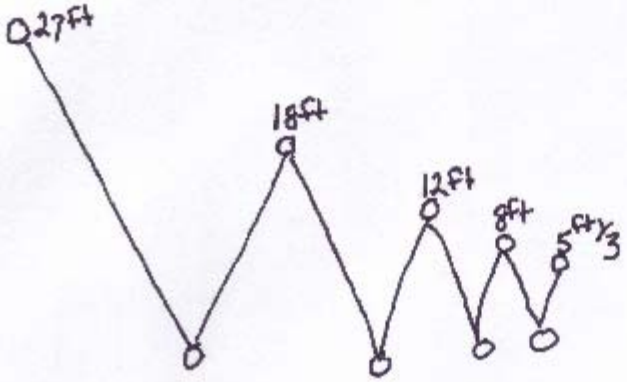
A special rubber ball is dropped from a window that is 27 feet high. Each time the ball hits the ground it bounces back (rebounds) two-thirds of the distance it fell.

Show or explain how far the ball has traveled when it hit the ground the fourth time.

Show or explain how high the ball bounces after hitting the ground the fourth time.

Criteria	A &R	Conn	Sol	Lang	Rep	Doc
Scores						

This Shows the distance the ball has traveled to the forth bounce



27
18
18
18
12
12
8
8
8
5 ft 1/3
108 1/3

Solution

For each number I divided by 3 and kept 2 of my answer

÷27 / 3 / ×9 / 2 / 18 bounce 1

÷18 / 3 / ×6 / 2 / 12 bounce 2

÷12 / 3 / ×4 / 2 / 8 bounce 3

÷8 / 3 / ×2 / 2 / 5 1/3 bounce 4

Solution 2

5 1/3 is how far the special rubber bouncy ball has traveled on the fourth bounce

Ping – Pong Tournament

You have a job organizing a ping – pong (table tennis) competition for some students in your class.

Here is important information you need to organize the tournament.

All matches are singles – one person plays against one person.
All players have to play all other players ONCE.
Individual ping – pong matches take about half an hour.
You have four ping – pong tables available.

Six people register in advance for the competition. If no other people register, then how many games will be played in the tournament?

Last year, nine people registered at the last minute. If that happens again this year, there will be a total of fifteen people for the tournament. If this happens, how many matches will you need to schedule for the tournament? If you use all four tables as often as possible, how long will the tournament take?

Show all of your work, including scratch work, and write your complete solution. You can use charts, tables, graphs, or drawings.

In your solution be sure to include the following:
Factors that might affect the solution to the problem.
How you solved the problem.
Reasons for decisions you made along the way.
Anything you discovered as you solved the problem.
Accurate, appropriate mathematical language.
Accurate, appropriate representation.

Then check. Did I complete all parts of the problem? Will someone who reads my solution know how I solved this problem and the reasons for my decisions?

Criteria	**A &R**	**Conn**	**Sol**	**Lang**	**Rep**	**Doc**
Scores						

Math

Ping-Pong Tournament

If no other people get registered other than the current six, _____ games will be played.

How I found the answer:

Six people → Letters = 1 person in tournament

Letters	A	B	C	D	E	F
who they played ↓	B	C	D	E	F	
	C	D	E	F		
	D	E	F			
	E	F				
	F					
Total games	5	4	3	2	1	0

= 15 games played

5+4+3+2+1+0 = 15 games

Sum of Consecutive Numbers

This was similar to the handshake problem where everyone shakes each others hands 1 time.

N = # of people

$N \times (N-1) \div 2 = 15$

$6 \times (6-1) \div 2 = 15$ → doing the problem twice tells you that you are correct if they match answers!

$30 \div 2 = 15$

If nine other people joined the tournament and four tables were available, how many matches would there be?

How I Found The Answer:

15 X 14 = 210 ÷ 2 = 105 games for 15 people

105 ÷ 4 (tables) because there are 4 tables

$$4\overline{)105}\quad 26.25$$

→ how many times each table gets used

26 ÷ 2 = 13 hours for 26 games + 1½ hours for extra game = 13½

Mathematical Tug - of – War #1

Your problem is to use the information given below to figure out who will win the third round in a tug – of – war.

Round 1: On one side are four acrobats, each of equal strength. On the other side are five neighborhood grandmas, each of equal strength. The result is dead even.

Round 2: On one side is Ivan, a dog. Ivan is pitted against two grandmas and one acrobat. Again, it's a draw.

Round 3: Ivan and three of the grandmas are on one side and the four acrobats are on the other.

Who will win the third round? Explain your reasoning!

Criteria	**A &R**	**Conn**	**Sol**	**Lang**	**Rep**	**Doc**
Scores						

=4 - 5=

= I — 6A 1=

I 6 3 - 4

I Van, because I van is equal to 1 Acrobat & 2 grandmas = I Van + 3G

each Acrobat = 125

I Vans Team over Powers Acrobats team by 1A

I = 1A
2G
3G

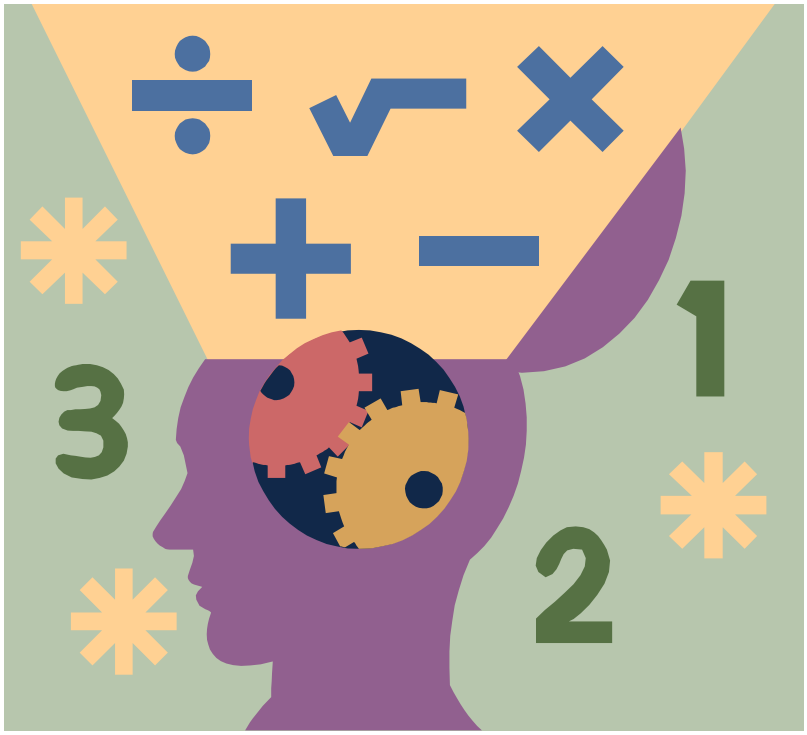
1A = 1 1
1G > 1A
1G

1G 1A - .25
1G 1A - .25
1G 1A - .25

+25
75 - 1 + 1 = 2G

5h 1A - 4A

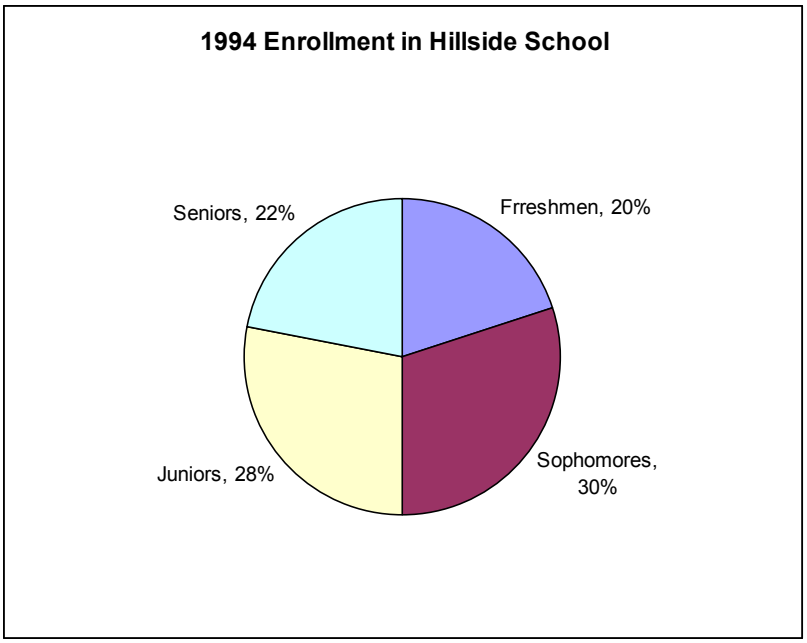
Portfolio Two

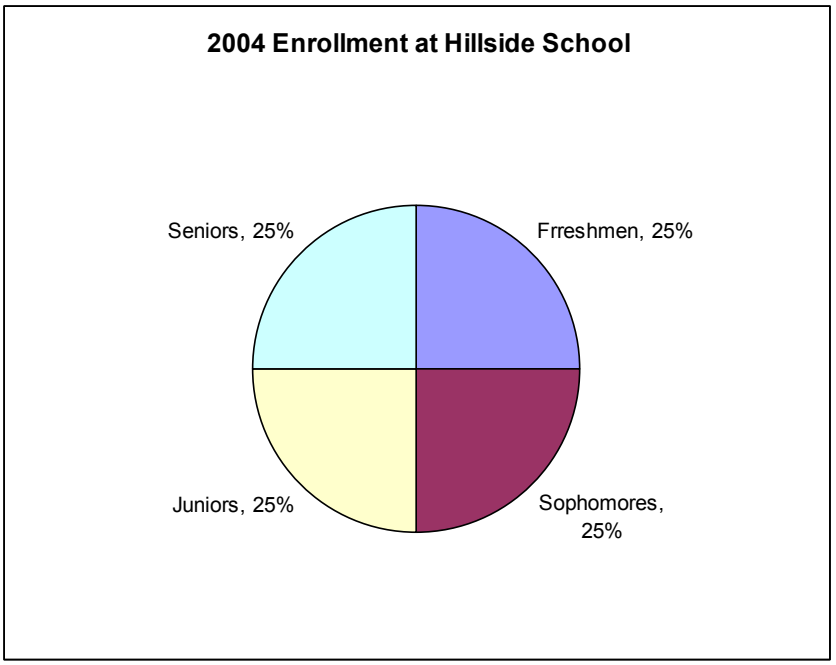


2006 -2007 Mathematics Portfolio Calibration – Grade 7
Table of Contents for Student 2

Best Piece	Title of Task	Task Attached	Mathematical Concepts Addressed
1	Increases in the Freshman Class	√	7.9 Data, Statistics and Probability
2	Tug of War #2	√	7.8 Functions and Algebra
3	Penned In	√	7.7 Geometry and Measurement
4	R U Nuts	√	7.8 Functions and Algebra
5	Bouncing Ball #2	√	7.6 Number and Operations

Increase in the Freshman Class





In 1994, the enrollment at Hillside School was 600 students. In 2004, the enrollment at Hillside School increased by 80 students. What was the percent in increase in the freshmen class from 1990 to 2004?

Increase in the Freshmen Class

The problem asks me to find the percent of increase in the freshmen class from 1994 to 2004. I am given two circle graphs showing the percent of the students in the school in each class for both 1994 and 2004. I also know that there were 600 students in the school in 1994 and that there were 80 more students in the school in 2004.

First I will add the 80 students to the school population in 1994 to find the number of students in the school in 2004. There were 680 students in the school in 2004

Now I am going to organize the information so that it is easier to see what I have to work with.

Total Number of Students in 1994	Percent of Students That Are Freshman	Number of Freshman in 1994	Total Number of Students in 2004	Percent of Students That Are Freshman	Number of Freshman in 2004
600	20%		680	25%	

To find the number of freshmen in each year multiply the number of students by the percent.

1994 freshmen = 20% of 600
freshmen = .20 x 600
freshmen = 120

2004 freshmen = 25% of 680
freshmen = .25 x 680
freshmen = 170

The freshman class increased by 50 students.

Mathematical Tug - of – War #2

Your problem is to use the information given below to figure out who will win the third round in a tug – of – war.

Round 1: On one side are four acrobats, each of equal strength. On the other side are five neighborhood grandmas, each of equal strength. The result is dead even.

Round 2: On one side is Ivan, a dog. Ivan is pitted against two grandmas and one acrobat. Again, it's a draw.

Round 3: Ivan and three of the grandmas are on one side and the four acrobats are on the other.

Who will win the third round? Explain your reasoning!

Criteria	**A &R**	**Conn**	**Sol**	**Lang**	**Rep**	**Doc**
Scores						

Ivan = 2 g / 1 a

1 a = 1.25 g

1 g = .8 a

Ivan and the grandmas would win because Ivan equals 1 acrobat and 2 grandmas, so that takes away 1 acrobat from the 4 and he adds 2 more grandmas. The 5 grandmas can take on the 3 acrobats. This problems reminds me of all of the problems.

Penned In

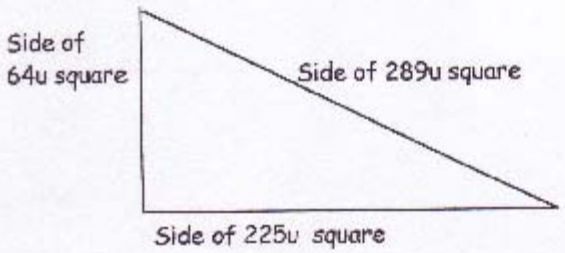
Three squares with areas of 64, 225, and 289 square units are arranged so that when vertices coincide a triangle is formed. Find the area of that triangle.

Criteria	A &R	Conn	Sol	Lang	Rep	Doc
Scores						

Portfolio- Triangle Troubles

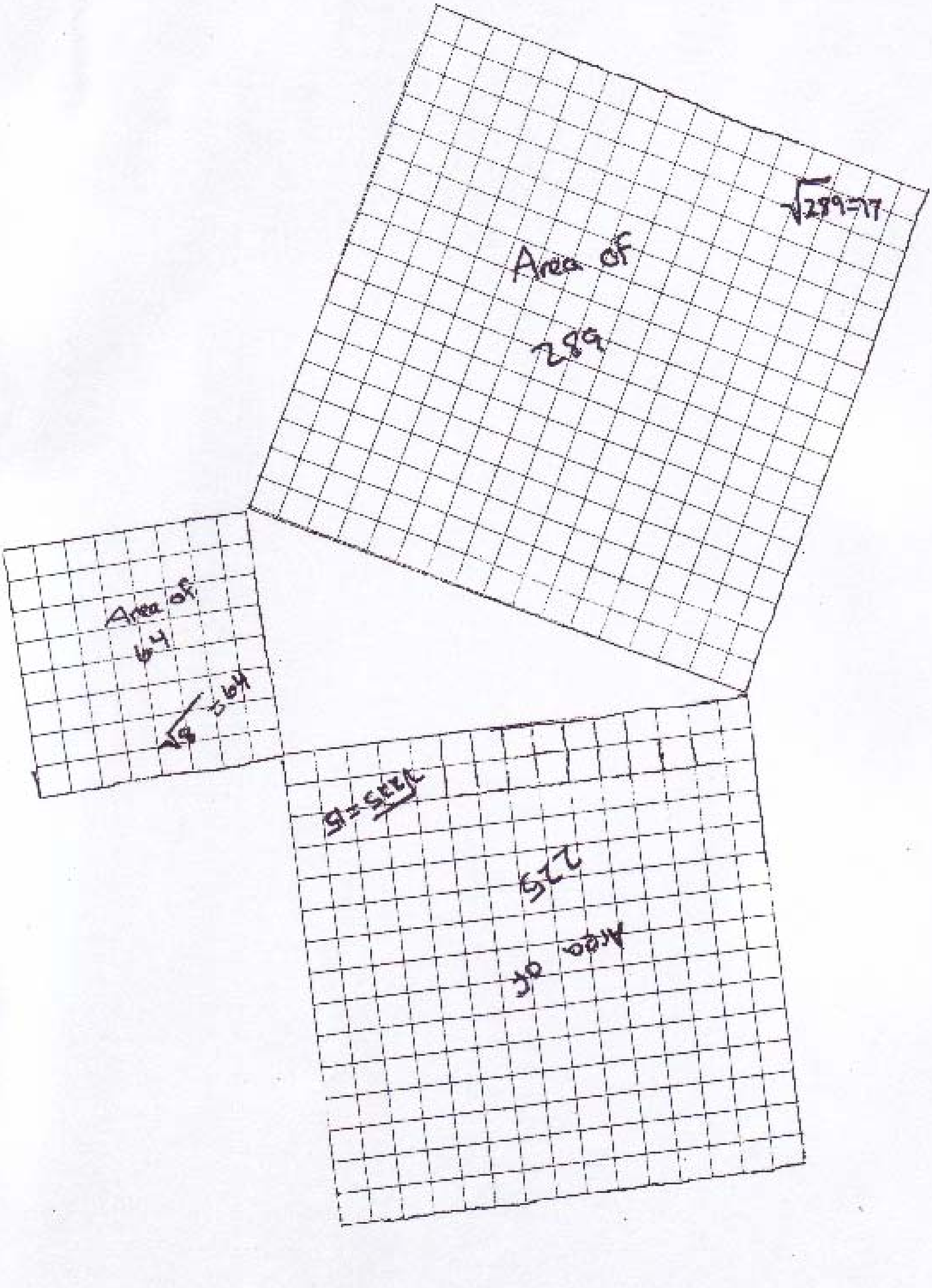
Three squares were areas of sixty-four, two-hundred-twentyfive, and two-hundred-eighty-nine square units are arranged so that when vertices coincide a triangle is formed. Find the area of that triangle. Something that might effect the solution of this problem is if the areas were different, or had different types of measurement, i.e.- inches, centimeters, meters, ect.

I first approached this problem by figuring out the area of each square. I knew that a number needed to be multiplied by itself to be the area of a square, so I found the square root of each area number. For the 289 unit (u) area I found that the square root was 17. For the 225u area the square root was 25, and last, the square root of the 64u area was 8. So, I made three squares. One with each given area. (See work on last page of portfolio) I then connected the sides of these three squares to make a triangle (also shown of last page of portfolio).



I found that when I did this, a triangle was formed. I then needed to find the area of that triangle. I knew the formula for finding the area of a triangle was Area=1/2*b*h. Or, Area equals one half multiplied by the base, multiplied by the height. The base of the triangle was 15u, the height was 8u. Multiplied together, that was 120u. Half of that is 60u. The area of the triangle was 60u.

This problem is similar to one of the problems we have worked on in math class. We made Stravinsky triangles, using a compass and a ruler. It did not really matter the kind of units we used, just like in this problem. Something that I found really interesting in this problem was that the triangle that was formed was a right triangle. I hadn't expected the triangle to end up that way since all the sides were different measurements. A formula that works for this problem, and will work for all problems that someone would be trying to find the area of a triangle would be one half of base times height. A way that this problem could apply to the real world is if you worked at a amusement park, and were trying to figure out a way to make shapes so they can be seen from high above. You would need to know the area in order to cut the brush or grass.


Area of
289
√289=17
Area of
64
Area of
225
√225=15

Are You Nuts?

In a small mall in the town where I live, there is a specialty shop that I like a lot:

The Nut House. It sells nuts of all kinds, singly or in mixtures of different kinds. Two kinds that I really like are peanuts and cashews.

Peanuts go for $1.10 per pound and cashews run $1.70 per pound. But you can buy them as a “mixture” for $1.35 per pound.

The display container for the mixture holds 60 pounds of nuts. How many pounds of each kind of nut must be blended in order to produce a mixture with that “per pound” value?

Criteria	A &R	Conn	Sol	Lang	Rep	Doc
Scores						

A Pound of Nuts Makes All the Difference

In a store in the town where I live, there is a specialty nut shop called The Nut House. It sells all kinds of nuts, singly, or in mixtures of different kinds. Peanuts go for $1.10 per pound and cashews run $1.70 per pound. But you can buy them as a "mixture" for $1.35 per pound. The display container for the mixture holds 60 pounds of nuts. How many pounds of each kind of nut must be blended in order to produce a mixture with that "per pound" value? This is the portfolio problem my class was asked to solve. Something that would effect the solution of this problem would be if there were more variables to the problem, such as a different kind of nut.

I first approached the problem by making two separate equations. First I figured out that the pounds of peanuts and cashews put together had to equal 60 pounds so I made an equation of p(pounds of peanuts)+c(pounds of cashews)=60 pounds. So it looked like this: p+c=60. Then, I knew I needed an amount of money to work out this equation. The problem said that it was $1.35 a pound for a mixture, and there were 60 pounds, so I multiplied 60 pounds by $1.35 and got $81. Then I figured out that to find out what p and c were, I had to multiply each of these by the cost per pound. So I made another equation, one where I can plug in numbers to start the process of solving it. This equation was : 1.1p+1.7c=$81 I then started to figure out this equation. I divided both sides by 1.1, and subtracted 1.7c from each side, to get a new equation of p=$81-1.7c/1.1. I realized I didn't need to solve it , because I then proceeded to making a spreadsheet of the data, using this equation. (Stapled to last page of portfolio, first two highlighted columns. Filling down this spreadsheet, I found the answer, 25 cashews and 35 peanuts. This is only one way I solved this problem. Another way I did it was through plain and simple algebra. Doing all of

the same steps I did to get the equation 1.1p−1.7c=$81, I then started to solve the equation. My work is shown below:

$1.1p + 1.7c = 81$

$1.1 \cdot (60-c) + 1.7c = 81$

$(66 - 1.1c) + 1.7c = 81$

$-66 \quad -66$

15

$1.1c + 1.7c = 15$

$\frac{.6c}{.6} = \frac{15}{.6}$

$c = 25$

$c = 25$

$p = 35$

$p + c = 60$

$-c \quad -c$

$p = 60 - c$

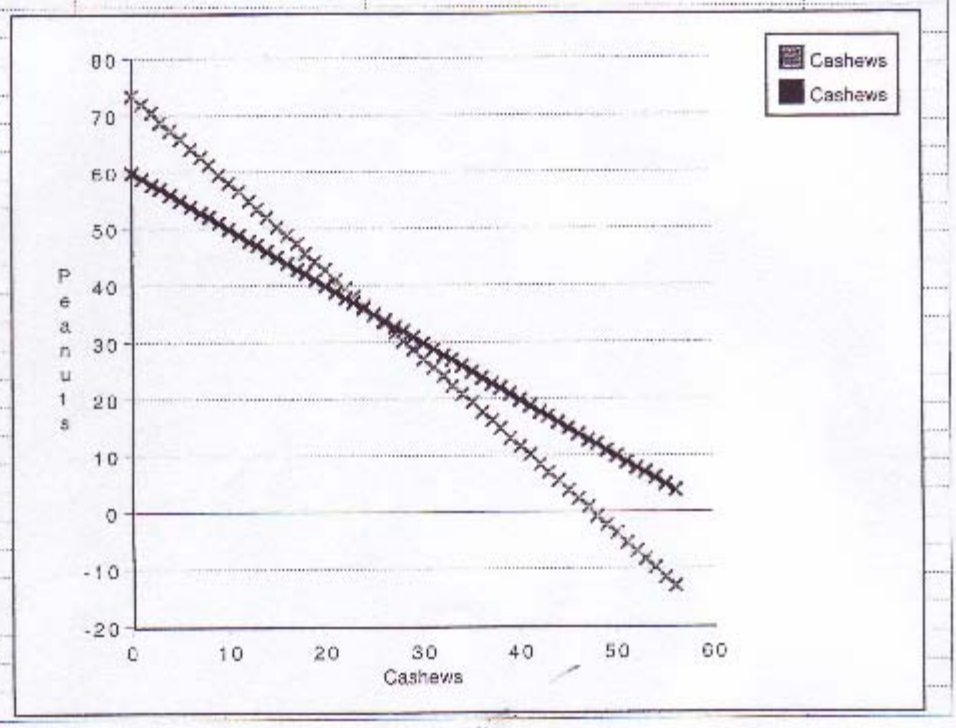
$p = 35$

I took the old equation f p+c=60 and refitted it to being p=60-c, which is the same equation, but in a different form. When I found out that c=25, I subtracted that from 60, and got p=35.

My final answer is that there must be 25 cashews and 35 peanuts blended in order to make $1.35 per pound value for 60 pounds. Something that I noticed while solving this problem was that there were two different ways to solve this particular problem and I find that very interesting because it is a very complex problem. This problem relates heavily to what we have been learning about means, extremes, and equation solving.

	A	B	C	D	E	F	G
1	Cashews	Peanuts	Cashews	Peanuts			
2	0	73.63636364	0	60			
3	1	72.09090909	1	59			
4	2	70.54545455	2	58			
5	3	69	3	57			
6	4	67.45454545	4	56			
7	5	65.90909091	5	55			
8	6	64.36363636	6	54			
9	7	62.81818182	7	53			
10	8	61.27272727	8	52			
11	9	59.72727273	9	51			
12	10	58.18181818	10	50			
13	11	56.63636364	11	49			
14	12	55.09090909	12	48			
15	13	53.54545455	13	47			
16	14	52	14	46			
17	15	50.45454546	15	45			
18	16	48.90909091	16	44			
19	17	47.35363636	17	43			
20	18	45.81818182	18	42			
21	19	44.27272727	19	41			
22	20	42.72727273	20	40			
23	21	41.18181818	21	39			
24	22	39.63636364	22	38			
25	23	38.09090909	23	37			
26	24	36.54545455	24	36			
27	25	35	25	35			
28	26	33.45454546	26	34			
29	27	31.90909091	27	33			
30	28	30.36363636	28	32			
31	29	28.81818182	29	31			
32	30	27.27272727	30	30			
33	31	25.72727273	31	29			
34	32	24.18181818	32	28			
35	33	22.63636364	33	27			
36	34	21.09090909	34	26			
37	35	19.54545455	35	25			
38	36	18	36	24			
39	37	16.45454545	37	23			
40	38	14.90909091	38	22			
41	39	13.36363636	39	21			
42	40	11.81818182	40	20			
43	41	10.27272727	41	19			
44	42	8.727272727	42	18			
45	43	7.181818182	43	17			
46	44	5.636363636	44	16			
47	45	4.090909091	45	15			
48	46	2.545454546	46	14			
49	47	1	47	13			
50	48	-5.454545e-1	48	12			

	A	B	C	D	E	F	G
51	49	-2.09090909	49	11			
52	50	-3.63636364	50	10			
53	51	-5.18181818	51	9			
54	52	-6.72727273	52	8			
55	53	-8.27272727	53	7			
56	54	-9.81818182	54	6			
57	55	-11.3636364	55	5			
58	56	-12.9090909	56	4			
59							
60							



Bouncing Ball #2

A special rubber ball is dropped from a window that is 27 feet high. Each time the ball hits the ground it bounces back (rebounds) two-thirds of the distance it fell.

Show or explain how far the ball has traveled when it hit the ground the fourth time.

Show or explain how high the ball bounces after hitting the ground the fourth time.

Criteria	A &R	Conn	Sol	Lang	Rep	Doc
Scores						

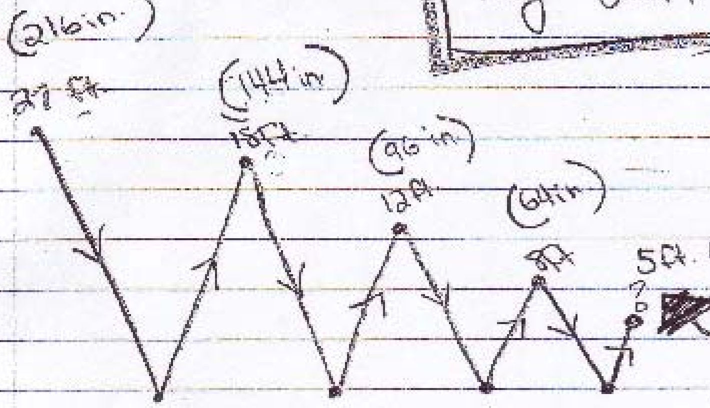
What I had to find out:

Show or explain how far the ball has traveled when it hit the ground the 4th time.

AND

Show or explain how high the ball bounces after hitting the ground the fourth time.

My Work



The inches are really 2/3 of the feet (ex. 8 ft., 2/3 of it is 64 in.)

Converting Feet to inches to make the problem work

27 × 8 = 216 in.

18 × 12 = 216; 216 ÷ 3 = 72; 72 + 72 = 144 in.

12 × 12 = 144; 144 ÷ 3 = 48; 48 + 48 = 96

12 × 8 = 96; 96 ÷ 3 = 32; 32 + 32 = 64 in.

Solution #2

2/3 of 8 ft. = 64 in. so the ball would bounce up 5 ft. 4 in.

The ball bounces 27 ft. once, 18 ft. twice, 12 ft. twice, 8 ft. 2 times. and

64 ÷ 12 = 5 R 4 → 5 ft. 4 in.

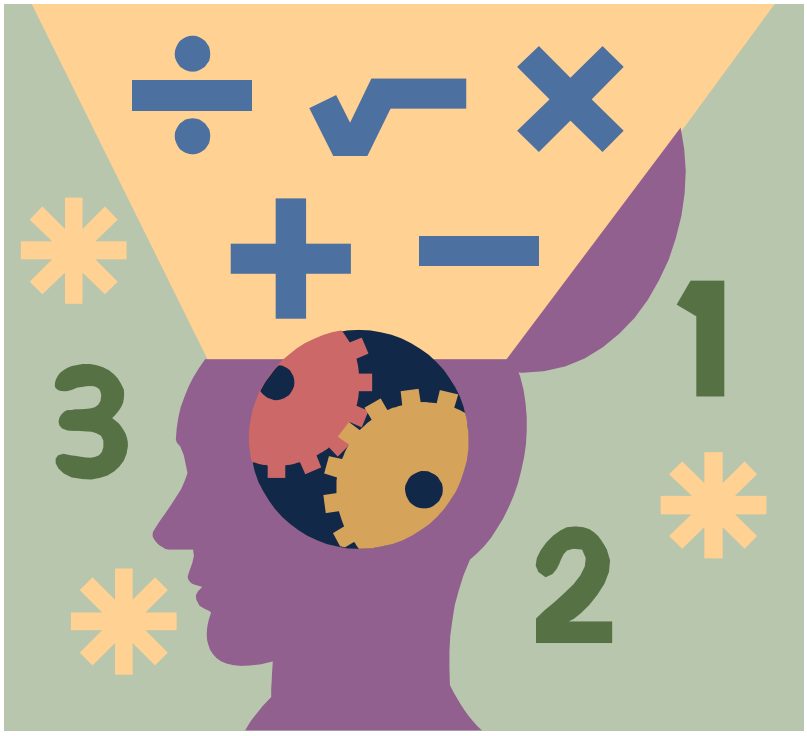
27 + 18 + 18 + 12 + 12 + 8 + 8 = 103 ft.

Solution # 1

The ball travels 103 ft. after hitting the ground the 4th time

Rationales

Portfolio One



Task: Growing Cubes

Criteria	Score Points	Rationale
Approach & Reasoning	2	The student's approach of extending the chart to find the number of cubes for the 12^{th} and 20^{th} figures worked . However the work for the surface area has some flawed reasoning and the formulas as stated do not work.
Connections	2	The student made the mathematically relevant observation, " Next I realized that every time, first was adding 5, then 7, then 9, then 11 … and so on."
Solution	2	The solution contains some correct parts such as the number of cubes for the 12^{th} and 20^{th} figure.
Mathematical Language	1	The student used the word cube from the task. There are many uses of the language of computation. The attempt at algebraic notation contains flaws.
Mathematical Representation	2	The student attempted to use tables but the columns are not labeled.
Documentation	2	The documentation of the solution contains some clear parts but contains some gaps in the reasoning. The formulas need to explain that odd here means the previous odd number. The student does not explain how he/she found the surface area of the first figure as 20.

Task: Speeding Ticket #1

Criteria	Score Points	Rationale
Approach & Reasoning	4	The approach of making a chart to solve this problem worked. Additionally the student created formulas, $50 + ($10 x mph over) = $fine and $100 + ($5 x mph over) = $fine to solve the problem.
Connections	3	The student created two formulas, $50 + ($10 x mph over) = $fine and $100 + ($5 x mph over) = $fine to solve the problem.
Solution	2	The solution is correct for parts of the problem and work supports those parts. However, this is a "break even" problem and the student's solution does not recognize this. The student's answer is, "I would choose to get the ticket from VT for anything up to $250 which is 5 mph to 20 mph over the speed limit. I would choose MA for the ticket from $250 - $325 because it is cheaper." The student did not recognize $250 as the same in both states and it appears that fines greater than $325 do not exist.
Mathematical Language	2	The solution shows sparse use of the language of algebra ($50 + ($10 x mph over) = $fine and $100 + ($5 x mph over) = $fine).
Mathematical Representation	3	The table is appropriate, accurate and used to solve the problem.
Documentation	2	There are some clear parts but the solution has some gaps. The reader is not sure if the formulas were used to create the table or if they were put in the piece to show algebraic reasoning. The answer is not clearly written so you do not know if this student understands that there is a point where the fines are the same.

Task: Bouncing Ball #1

Criteria	**Score Points**	**Rationale**
Approach & Reasoning	3	The student's approach of making a diagram of the problem and finding 2/3 of the distance would work for solving the problem.
Connections	1	The response stops without making a connection
Solution	2	The solution 5 1/3 is the distance of the bound after the 4^{th} bounce is correct , but this was added into the total distance when the ball hits the ground for the 4^{th} time thus getting a wrong answer.
Mathematical Language	1	The student uses the notation 5 1/3 and everything else is the language (notation) of computation.
Mathematical Representation	3	The diagram showing how the ball bounces is correct and appropriate.
Documentation	2	There are some clear parts to this solution (adding of the distances) but it is not clearly explained what is meant by "kept 2 of my answer" when finding 2/3 of a number.

Task: Ping – Pong Tournament

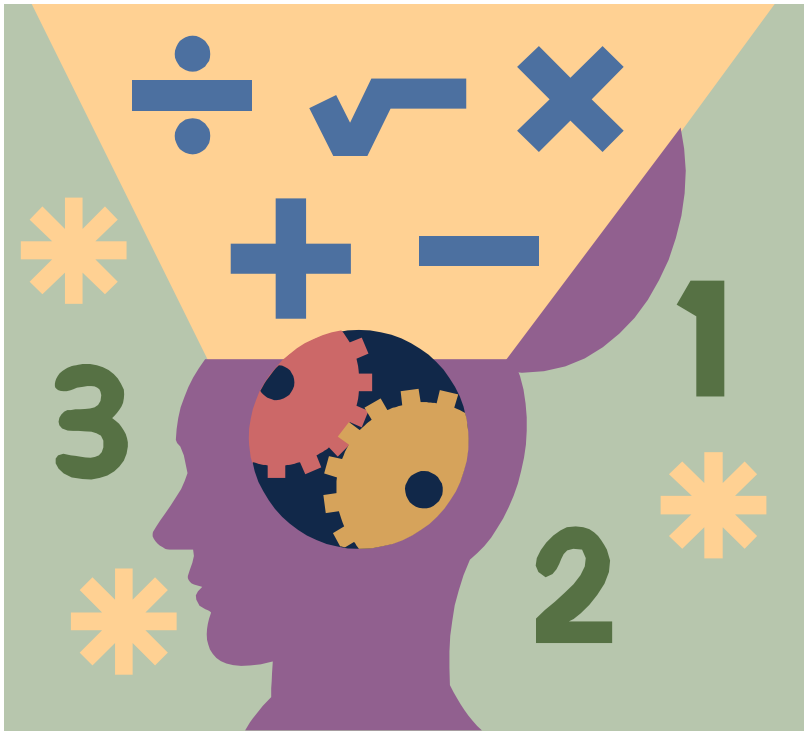
Criteria	Score Points	Rationale
Approach & Reasoning	4	The student's approach of making a table to show who played who and adding up the number of games worked. Additionally, the student verifies his/her solution by using a formula that was used in a similar problem (handshake).
Connections	3	The student identified a formula used while solving the problem and shows that it yields the same answer as the table.
Solution	3	The student's answers, 15 games for 6 people, 105 people for 15 people and 13 ½ hours for all 105 games are correct and supported by the answers shown.
Mathematical Language	3	Student uses symbolic algebraic language with variables defined. $N \times (N - 1) \div 2$
Mathematical Representation	3	The student's tables showing who each player plays and how many games were played is appropriate, accurate, and used as part of the solution.
Documentation	3	The documentation clearly shows how the problem was solved and the reasoning used. The answers are given and the solution is well organized.

Task: Mathematical Tug of War

Criteria	Score Points	Rationale
Approach & Reasoning	3	The student's approach of finding the strength of each acrobat in relationship to the grandmas worked for solving this problem.
Connections	1	The student's solution stops without making any connections.
Solution	3	The answer, " Ivan's team overpowers acrobats team by 1A." is correct, and the work shown supports the answer.
Mathematical Language	1	The student's mathematical language is limited to formulas that appear without explanation, derivation, or use.
Mathematical Representation	1	The student did not attempt any mathematical representation that could be used to solve this problem.
Documentation	2	The student's documentation contains some clear parts, reasoning and subtraction ("5g 1A – 4A) but there are gaps in how the .25 and .75 were used and in the meaning of "1 + 1G = 2G".

Rationales

Portfolio Two



Task: Increase in the Freshman Class

Criteria	Score Points	Rationale
Approach & Reasoning	2	The student's approach of finding the percent of freshman in each class leads to solving only part of the problem. The student does not find the percent of increase in the freshman class.
Connections	1	The solution stops without making any connections
Solution	2	The number of freshmen given for the years 1994 and 2004 are correct. However the student does not find the percent of increase.
Mathematical Language	1	The student uses the symbolic notation for percents given in the task and additionally writes the percents as decimals. This one use does not merit a level 2 response.
Mathematical Representation	2	The student's table organizes the information in the task and is appropriate, but not complete. The student should then fill in the missing values.
Documentation	3	The documentation of the solution clearly shows how the student solved this problem. The fact the student just found how many more freshman were in the class in 2004 shows that the student did not understand that he/she needed to find the percent of increase.

Task: Mathematical Tug-of-War #2

Criteria	Score Points	Rationale
Approach & Reasoning	3	The student's approach of reasoning through the concepts of equality and using substitution worked for solving the problem. From round 1 the student gets the statements 1a = 1.25g and 1g = .8a
Connections	1	The response stops without making any connections.
Solution	3	The answer, " Ivan and the grandmas would win …" is correct and supported by the reasoning used.
Mathematical Language	1	The student uses the mathematical terms equals and adds. This is limited to the language of computation. The formulas 1a = 1.25g and 1g = .8a appear without explanation or derivation.
Mathematical Representation	1	The student did not attempt any mathematical representation to solve or communicate his/her solution.
Documentation	2	The student's documentation contains some clear parts but there are gaps in how the problem was solved. It is clear that the student reasoned for quantities that were equal, but it is unclear what quantity the student takes away from or how he/she uses the equations.

Task: Penned In

Criteria	Score Points	Rationale
Approach & Reasoning	3	The student's approach of finding the lengths of the sides of the square, creating a triangle, and finding the area of the triangle worked for solving this problem.
Connections	2	The student made a mathematically relevant observation, "I found the number needed to be multiplied by itself in order to be a square."
Solution	2	The solution is correct for most of the problem. However, the student's answer of, "The area of the triangle was 60u" is incorrectly labeled for an area problem. Solution should be 60 square units.
Mathematical Language	3	The student correctly uses the mathematical terms base, height, right triangle, square root, and formula. The student correctly writes the formula for the area of a triangle symbolically.
Mathematical Representation	3	The student's use of a labeled diagram and a model of the squares forming the triangle are appropriate, accurate, and used as part of the solution.
Documentation	2	The student's documentation contains some clear parts but there are gaps in how the problem was solved. The student did not identify the triangle formed as a right triangle, therefore, there is no defense of the choice for the base and height of the triangle.

Task: Are You Nuts

Criteria	Score Points	Rationale
Approach & Reasoning	4	The student's approach of using a spreadsheet worked for solving the problem. Additionally the student verified his/her solution by creating two equations and solving them algebraically.
Connections	3	The student created two equations, p + c = 60 and 1.1p = 1.7c = $81, which were used in the solution.
Solution	3	The student's answer of "…I found the answer, 25 cashews and 35 peanuts" is correct and supported by the work shown. Note that the answer is not labeled in pounds in either statement of the solution but the question asks for how many pounds so the labeling of pounds in done in the question.
Mathematical Language	3	The student correctly uses the mathematical terms variables, equations, spreadsheet, data, column, and the symbolic language of algebra. Note however that the equation "p= $18-1.7c/1.1" is written incorrectly. It should be p = ($81-1.7c)/1.1. However, this will not lower the score of a piece that is rich in language.
Mathematical Representation	3	The student's spreadsheet was appropriate and accurate. The line graph represents the data from the spreadsheet but is not mentioned in the solution.
Documentation	2	The student's documentation contains some clear parts and the algebraic solution. However, it is not clear how the four columns were filled out. The formulas used in each column should have been given.

Task: Bouncing Ball #2

Criteria	Score Points	Rationale
Approach & Reasoning	3	The student's approach of making a diagram of how the ball bounces and converting the feet to inches, finding one-third of the distance and then adding it twice worked for solving the problem
Connections	1	The solution stopped without making any connections
Solution	3	The student's solutions " The ball travels 103 feet … and 2/3 of 8ft = 64 in so the ball bounced 5 ft 4in" are correct and supported by the work shown.
Mathematical Language	2	The student uses the notation ft and in for feet and inches which is considered sparse use of the language of measurement.
Mathematical Representation	3	The diagram of the way the ball bounces is correct and appropriate and labeled both ft and in.
Documentation	3	The solution shows how the problem was solved and the reasoning used. The answers are given and the solution is fairly well organized.