Accelerated Algebra II DSPA - General Guidelines

The district assessments in this booklet will be given following these guidelines:

Calculators can be used on all DSPA's unless otherwise stated on the assessment.

MA-AX-01   **Sequences & Functions** - To be given after completion of Unit 2.

MA-AX-02   **Exponential Functions & Properties of Exponents** - To be given after completion of Unit 3.

MA-AX-03   **Parent Graphs & Transformations** - To be given after completion of Unit 4.

MA-AX-04   **Systems of Equations & Matrices** - To be given after completion of Unit 5.

MA-AX-07   **Probability & Counting Problems** - To be given after the completion of Unit 10 and the first portion of Unit 11.

Alternative forms of assessment, which is encouraged by CPM, can be used for Units 6-9 from the textbook. These can be in the form of partner or team tests, presentations, or portfolios. These will not reported as DSPA's.

Enter the **percent** score for each student in PowerGrade after each assessment.

Name _____

1. (25pts)   Fill in the blanks with the next three terms of each sequence. Then state if the
                sequence is geometric or arithmetic. Write the general equation for the <u>arithmetic
                sequence</u>: t(n) =

       3, 9, 15, 21, ____ , ____ , ____

       3, 12, 48, ____ , ____ , ____

2. (10 pts)   Give the next three terms of the geometric sequence below. What would you expect
   the 225th term to be really close to? <u>Explain</u>.

       12, 6, 3, ____, ____, ____,

3. (10 pts)   Dino and Jessica were doing their homework when Dino got to a problem that only
                had the numbers 2, 6,... written down. Dino said he remembered the teacher saying
                this was an arithmetic sequence while Jessica was sure it was a geometric sequence.
                If Dino is right, find the <u>next three terms of the sequence **and the rule**</u>. Explain how
                you found his rule. Jessica found in her notes the number 266 is an output of the
                sequence. <u>Explain</u> how you know for sure whether or not it could be an arithmetic
                sequence.

4. (10 pts) State the domain and range of this graph:

    domain →

    range →
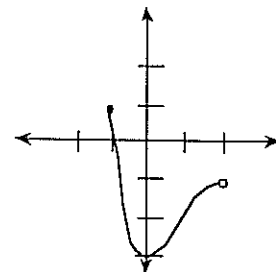
5. (10 pts) $f(x) = 2x^2 + 5x,$ find f(2) = , find f(-3) =

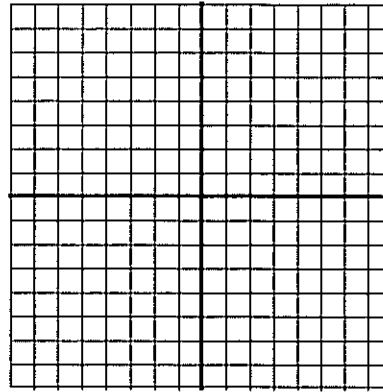6. (15 pts) The table below shows how much Randi's Rent-a-Wreck charges for driving various distances in her cars.

Miles Driven	50	75	100	200
Rental Charge	$25	$30	$35	$55

a) Graph the data. Label your axes.

b) What is the equation of the line going through these points?

c) How much would it cost to drive one of Randi's cars zero miles?
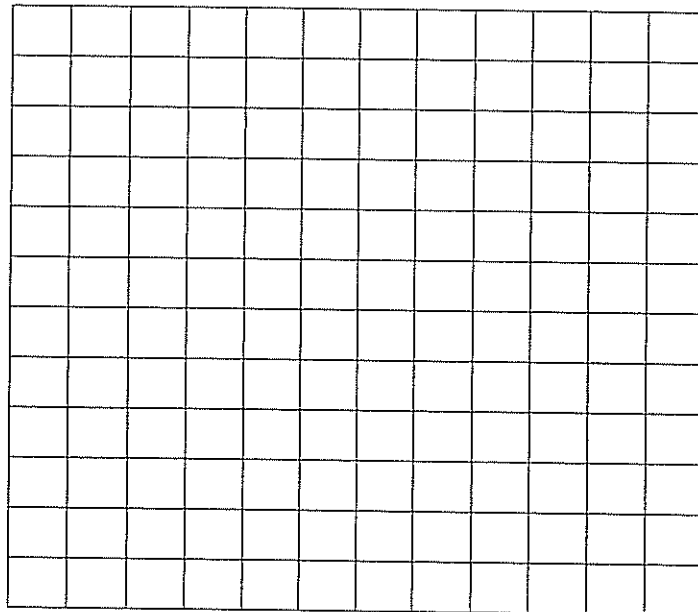
7. (20 pts) Investigate the equation:

$$y = x^2 - x - 6$$

a) Graph the equation. What is the name of the curve?

b) What is the y–intercept? Show work for full credit.

c) What are the x–intercepts? Show work for full credit.

Name_____

Page 1 is to be completed without the use of a calculator.

1) (40 pts) Simplify the following.

$5^{-2} =$

$16^{1/2} =$

$8^{2/3} =$

$x^{-7} =$

$(x^5)(x^8) =$

$(3m^4)^2 =$

$17^0 =$

$\dfrac{x^5 y^{-3}}{x^2 y^4} =$

2. (10 pts)   Write the description of a situation that could fit the function,

$$h(x) = 2,420(1.05)^x$$

3. (20 pts) You have just inherited $5000 from an old, incredibly rich (and smart) math teacher. However there is one condition. You have to decide whether to put the money in a 9% annual percentage rate compounded yearly or an 8.75% annual rate compounded **quarterly**. Each account will be compounded for 5 years. If you choose the account that generates the most interest, then the story is that you will receive the money in 5 years. Show how much money each account is worth after 5 years, including your work, to justify which plan you'd choose.

4. (20 pts) The number of people that smoke cigarettes in Amador County has been decreasing at a rate of 5% per year. As of September 1994, the number of people who smoke in the county was 4000. Answer the following questions assuming this rate of decrease will continue.

   a) Write an equation that will represent the number of smokers in Amador County in the nth year. (Assume the start time is 1994.)

   b) According to your model, how many smokers will there be in Amador County in September of the year 2010?

5. (10 pts) Tomas' grandfather put $1000 in the bank for him when he was born. The account has been earning 9% interest every year (compounded yearly). Tomas is now 18 years old and wants to take out the money so he can go to college. How much money does he have now? Show how you got your answer.

1. (25 pts)   Consider the graph of the equation: $f(x) = (x + 5)^2 - 3$
Make **one** change in the equation of $f(x)$ so that the graph of $f(x)$:

a)   opens downward.

b)   has no x-intercepts.

c)   is narrower (stretched up).

d)   is moved to the right.

e)   has an "S" shape, (like this: $\int$).

2) (15 pts)   Graph the equations of these two circles on the same graph. Find one point on the
biggest circle and show that it works in the equation.

$x^2 + y^2 = 4$ $(x - 5)^2 + (y + 2)^2 = 9$
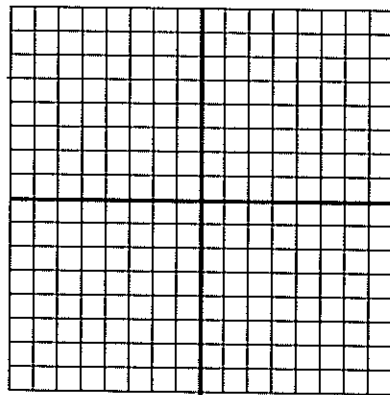
Show your work below:

3. (10 pts)   Fill in the blank to Complete the Square.

$x^2 + 8x + \underline{\quad}$

4. (15 pts)   Which of the following is easier to graph, the first equation or the second. **Explain.**

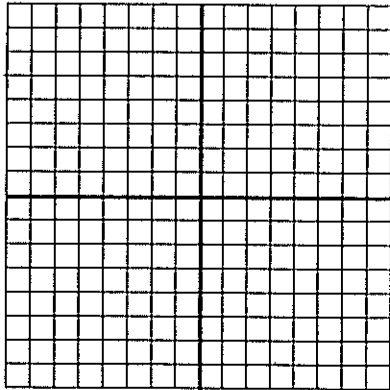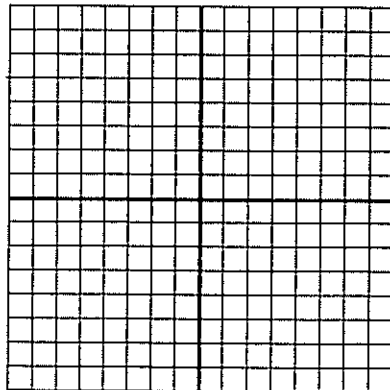$$y = (x + 2)^2 + 5 \qquad\qquad OR \qquad\qquad y = x^2 + 4x + 9$$

Show two ways to prove that both equations should give you the same graph. First, show your work by expanding the first equation. Next, complete the square in the second equation.
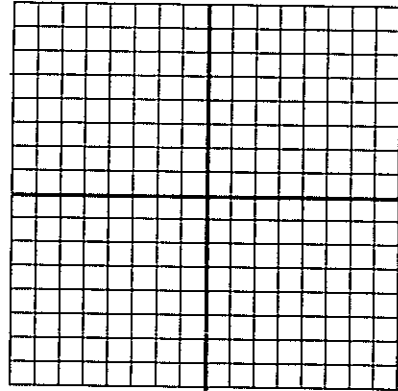
Graph the equation: $y = (x + 2)^2 + 5$

5. (10 pts)   Graph the parent graph, $y = x^3$.

Now write an equation that is a translation of this graph to the left: _____
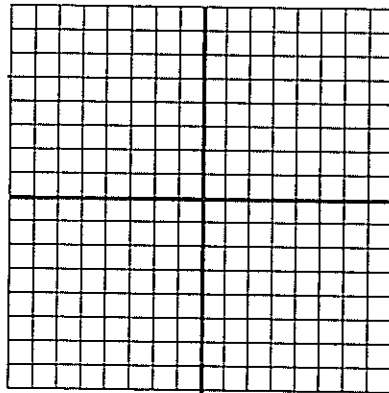Graph your equation, also.

6. (15 pts) Fill in the table and then graph $y = 2^x$. Are there any asymptotes? **Explain.**

x	y
-2	
-1	
0	
1	
2	
3	

7. (10 pts)   Write the equation for an absolute value function (the parent graph is $y = |x|$), and then graph the equation. Make sure it has at least two transformations.
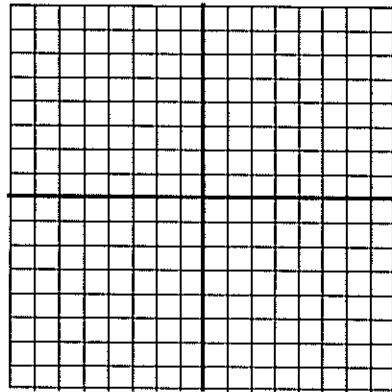
Equation: _____

1. (20 pts)   Solve the following system of equations two ways, algebraically and by graphing. Did you get the same answer? Explain. Can you prove your answer is correct? Explain.

$$y = 3x - 3$$
$$5x + 2y = 16$$

2. (10 pts)   Gloves R' Us was having a great day at their warehouse. At the end of the day Dan, the owner, realized he just had the biggest day in Gloves R' Us history with a total of 127 pairs of gloves sold. As he was heading back to restock for the next day, he asked his new employee, Mittsy, how many of each (cloth and rubber) they had sold. Poor Mittsy, being new, did not know that she was supposed to keep them separate. All she knew was that the rubber gloves were $8.95 each, the cloth gloves were $6.95 each and the total sales for the day $1070.65. Help Mittsy keep her job by finding out how many of each type of glove was sold so Dan, the glove man, can restock.

3. (10 pts)   Three cans of soda and two bags of chips cost $2.72 and two cans of soda and four bags of chips cost $3.92. What is the cost of each item? A complete response will include an equation(s) and your work clearly shown.
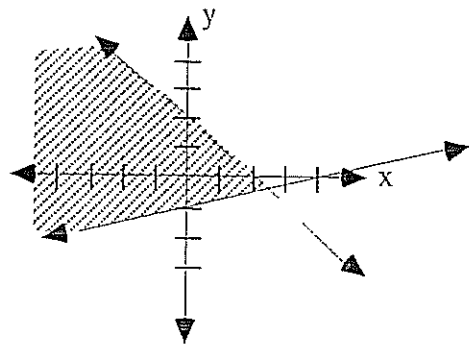
4. (10 pts)   Solve the following system.

$$x + 3y + 2z = -2$$
$$2x - y - z = -9$$
$$x - 2y + 5z = 1$$

5. (10 pts) What inequalities describe the region at right. Notice that one line is solid and the other is dashed.

6. (20 pts)   Consider the matrices below:

$$A = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}, \quad B = \begin{bmatrix} 4 & -1 \\ 3 & -5 \end{bmatrix}, \quad C = \begin{bmatrix} 3 & 7 & 2 \\ 6 & -1 & 1 \end{bmatrix}, \quad D = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$$

a)   What is A^{-1}?

b)   What is AC?

c)   What is DA?

d)   What is A + B ?

7. (20 pts)   A rocket at ground level is fired into the air. After one second the rocket is at 35 feet above the ground and after two seconds it is at 40 feet above the ground. You can assume a parabolic path.

a)   Write the three data points.

b)   Find the equation of the parabola that fits the data by setting up a system of equations. (Remember: $y = ax^2 + bx + c$ is the general form of a quadratic function.)

c)   Draw and label a sketch of this situation. Make sure you scale the axes properly.
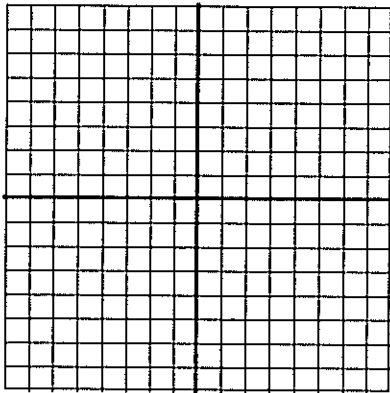
d)   Find when the rocket will hit the ground.

1. (20 pts)   A jar contains 6 blue marbles, 7 red marbles, two green marbles, and ten yellow marbles.

    a)   If you reach into the jar without looking, what is the probability of pulling out a red marble?   a green marble?

    b)   Davis pulled out a blue marble and kept it. Tess reached in.

        What is the probability she pulls out a blue marble as well?

        What is the probability that it is yellow instead?

2. (15 pts)   A card is drawn at random out of a 52 card deck.

    a)   Find P(drawing a face card).

    b)   Find P(drawing a heart).

    c)   Find P(drawing a spade) if you know a black card was drawn.

3. (15 pts)   A penny, a nickel, and a dime are all flipped.

    a)   List all elements of the sample space (i.e. HHH, . . .).

    b)   What is the probability of getting no tails?

    c)   What is the probability of getting exactly one tail?

4. (20 pts) At Fun Days, the East High Math club wanted to raise a lot of money. To accomplish this the members designed a new game. For $1.00, a player can "buy" two darts. The player first tries to hit Dart board #1 to earn a dollar amount. Then, the player throws the second dart at Dart board #2 to find the "divisor." The dollar amount from the first dart board is then **divided by** the number on the second dart board. This is the amount the player wins.

| $0.50 | $5.00 |
| | $1.00 |

Dart board #1

Dollars

| 2 | 5 |
| | 3 |

Dart board #2

Divisor

a)   What is the most money a contestant can win? Explain.

b)   What is the least amount of money a contestant can win? Explain.

c)   Find the probability of winning the largest amount of money. Show all work.

d)   Find the probability of winning the smallest amount of money. Show all work.

5. (10 pts) Five people from a class of 32 are to be chosen.

How many ways can they be chosen to serve on the student activities committee?

How many ways can they be chosen to be president, vice-president, secretary, treasurer, and publicity manager?

6. (10 pts) In North Dakota, most license plates consist of five letters. How many different license plates are there if the letters can be repeated?

Make up a five-letter license plate that has repeated letters on it. What would be your probability of getting this plate (assuming you were getting a license plate in North Dakota).

7. (10 pts) Bill was traveling from Gillette to Orlando, passing through Denver. To get from Gillette to Denver, Bill could hitch-hike, take a bus, or fly. To get from Denver to Orlando, Bill could take a train or plane.

Make a tree diagram showing the possible ways for Bill to get from Gillette to Orlando.

How many possible ways are there for Bill to get from Gillette to Orlando?