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.

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

MA-A2-01   **Sequences/Linear Functions** - to be given after completion of Unit 2.

MA-A2-02   **Exponential Functions/Polynomials** - to be given after completion of Unit 3.

MA-A2-03   **Parent Graphs and Transformations/Function Notation, Domain and Range** - to be given after completion of Unit 4.

MA-A2-04   **Systems of Equations and Matrices/Equations of Lines** - to be given after completion of Unit 5.

MA-A2-05   **Probability and Counting Problems** - to be given after completion of a probability packet.

MA-A2-06   **Inverse Functions and Logarithms/Rational Equations and Expressions/ Properties of Exponents** - to be given after the completion of Unit 6.

Name _____

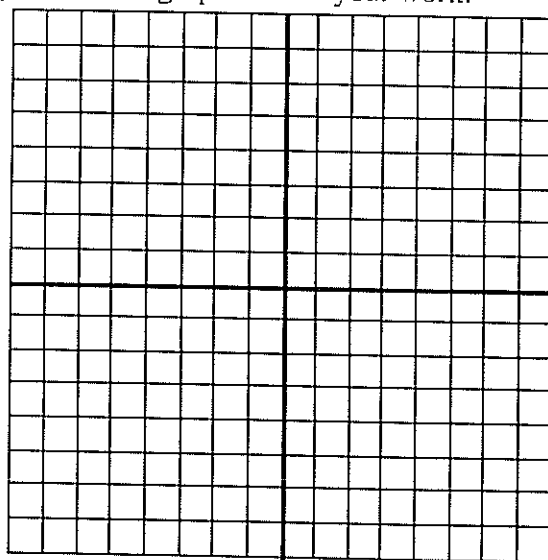1. (15 pts)   Graph: $y = \dfrac{3}{4}x + 2$

Slope: _____

y-intercept: _____
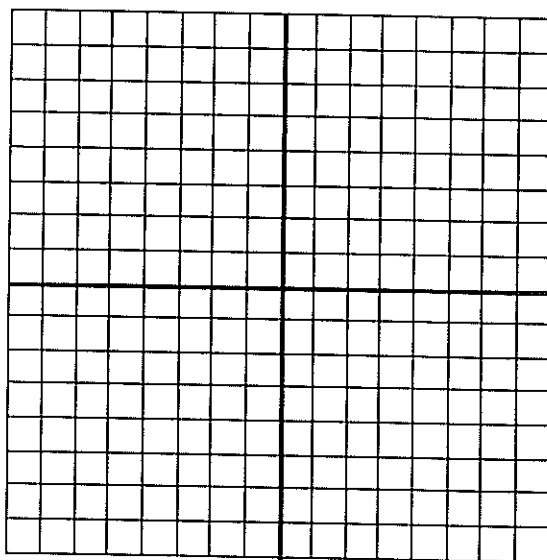
2. (15 pts)   First, find the x and y-intercepts for **2x + 3y = 12**, then graph. Show your work.

x-intercept:

y-intercept:

3. (25pts)   Fill in the blanks with the next three terms of each sequence. Then state if the sequence is geometric or arithmetic.

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

3, 12, 48, ____, ____, ____   _____

Write the equation (rule) for the <u>arithmetic sequence</u>: t(n) = _____

4. (10 pts)   Give the next three terms of the geometric sequence below. What would you expect the 200th term to be really close to? Explain.

12, 6, 3, _____, _____, _____,

5. (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 next three terms of the sequence and the rule. Explain how you found his rule.

6. (15 pts)   Write the first four terms of a **Geometric** Sequence:

Now write the first four terms of an **Arithmetic** Sequence:

Explain, using correct terminology, why the first sequence is geometric and the second sequence is arithmetic.

7. (10 pts)   In the sequence: 3, 7, 11, 15....
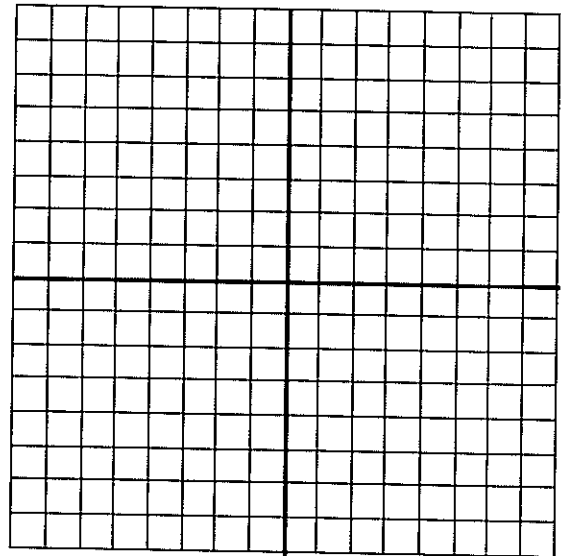
What is the equation (rule): t(n) =

Is 215 a term in this sequence? _____ Explain or show your work.

Name _____

1. (20 pts)   Graph: $y = 2^x$

What type of function is this? _____

What is the y-intercept? _____

Draw a dashed line to show the horizontal asymptote for this function.

2. (10 pts)   Explain how the curve of a graph similar to the one above can represent population growth or the investment of money.

3. (10 pts)   Write the description of a situation that could fit the function, $f(x)=2,000(1.10)^x$

4. (10 pts)   Your older sister received $1000 for graduation. She invested it in an account that yields 9% annual percentage rate compounded yearly. She asks you how much it will be worth in 20 years...what's your answer? (Show your equation).

5. (10 pts) If you buy a used car for $4,000 and it depreciates 15% each year, what will the value of the car be in 5 years? (Show your work, or your equation.)

6. (20 pts) Simplify the following expressions:

$(x + 7)(x + 4)$ $(3x - 4)(2x + 3)$

$(m + 4)(m^2 + 3m - 5)$ $(4y - 7)^2$

7. (20 pts) Factor the following expressions:

$x^2 + 7x + 12$ $12x^3 + 18x^2 - 20x^5$

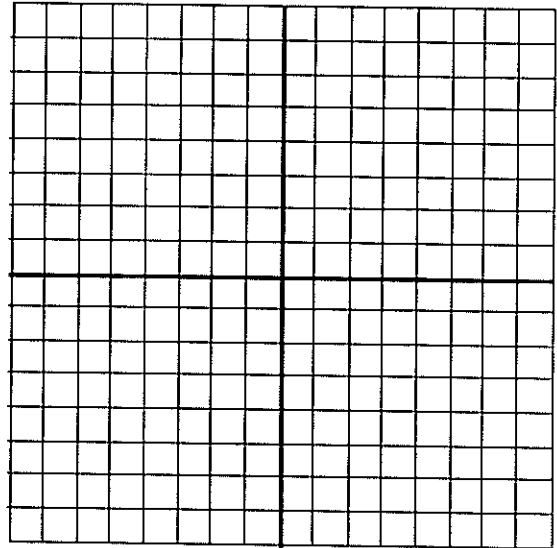$x^2 - 49$ $2x^2 + 7x - 4$

Name _____

1. (15 pts)   On the graph at right, first graph:

$y = x^2$

Then graph,

$y = (x + 3)^2 - 5$

Explain how you graphed the second
function without making a table or chart.

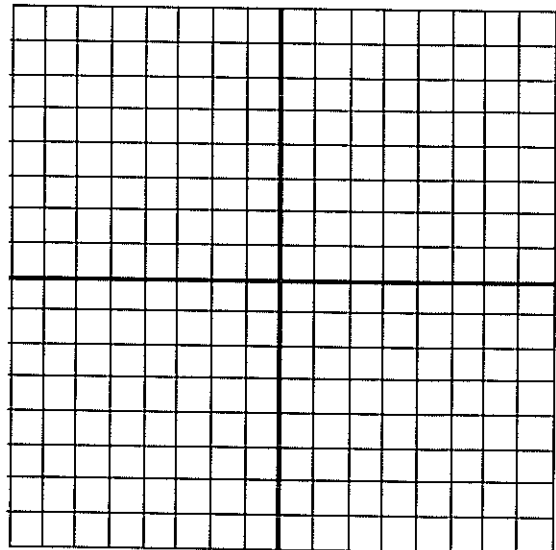2. (10 pts)   Explain the **similarities and differences** of the graphs of the following functions:

$y = 3x^2$ and $y = -\dfrac{1}{4}x^2$

3. (18 pts)   Graph the following functions
on the graph at right.

a) $y = x^3$

b) $y = |x - 3| + 4$

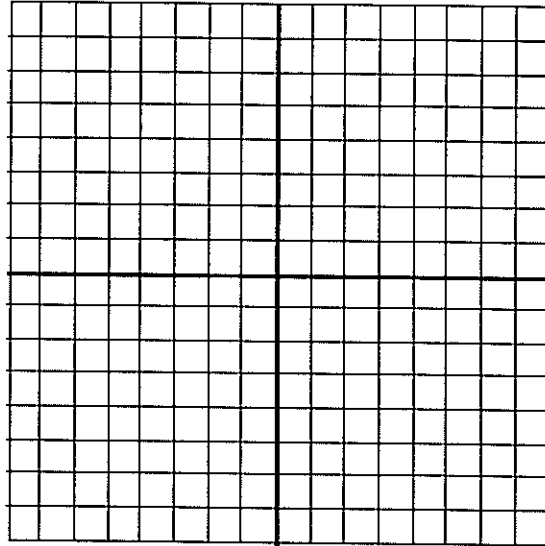c) $y = 2(x+6)^2 + 2$

4. (5 pts)   Which of the above functions has a **domain** of x = All Real Numbers and a **range** of $y \geq 2$?

5. (20 pts)   Graph the two circles on the graph at right:

a) $x^2 + y^2 = 9$

b) $(x - 6)^2 + (y+5)^2 = 4$

6. (25 pts)   Use the following functions for a-d:

$f(x) = 3x + 1$ $g(x) = x^2$ $h(x) = x - 5$
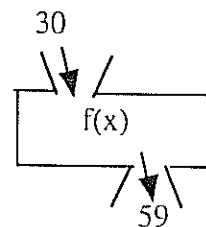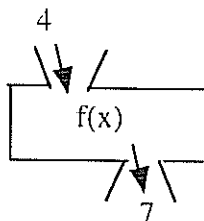
a) $f(-4) =$

b) $g(5) =$

c) $h(n+3) =$

d) Find the value of x when $h(x) = 12$

e) State the domain and range for $g(x)$:

7. (7 pts)

10   4   30

f(x)   f(x)   f(x)

19   7   59
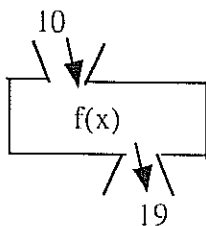
Examine the function machine in the above examples.
If the domain (input) of the function machine above is 7, what is the range (output)?

What is the rule for the above function?

Name _____

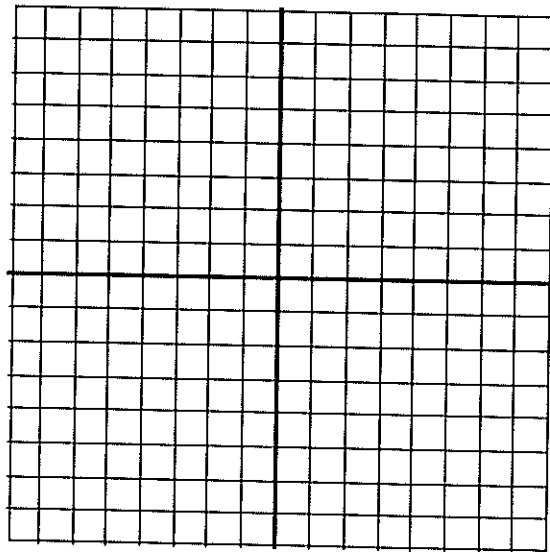1. (10 pts)   Solve the system of equations by elimination (show your work):

$3x + 5y = 26$

$2x - 3y = -8$

2. (10 pts)   Solve the system of equations by graphing, then explain or show how you know the solution you found is correct.

$y = 3x - 1$

$y = -\dfrac{1}{2}x + 6$

3. (10 pts)   Solve the system of equations by substitution (show your work):

$x = 4y - 3$

$7x - 3y = -96$

4. (10 pts)   Solve the system of equations algebraically or by using matrices:

$$x + 3y - 2z = 13$$

$$2x - y + 4z = -13$$

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

5. (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.

6. (10 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.)

7. (15 pts)   Find the equation of the line on the graph.

State one equation of a line that is parallel to this line.

State an equation of a line that is perpendicular to this line, and has a y-intercept of 4.
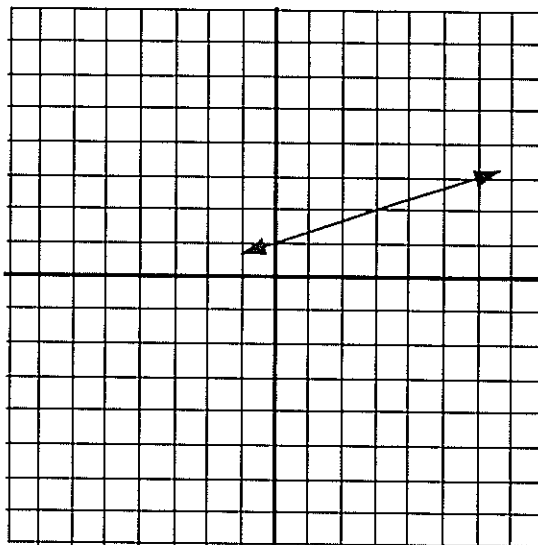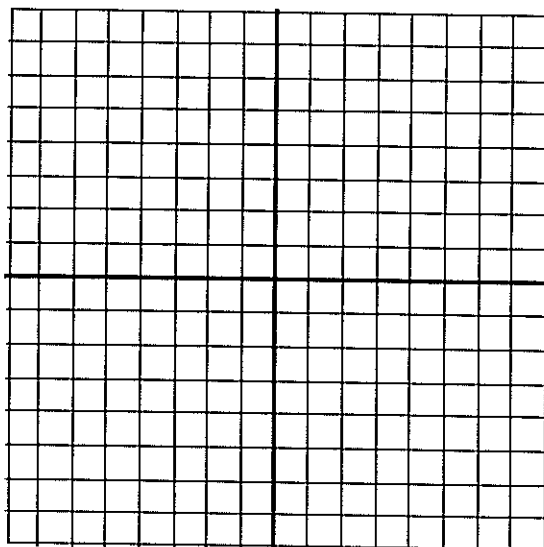
8. (10 pts)   Find the equation of a line that has a slope of 2 and goes through the point (1, 4).

9. (10 pts)   Find the equation of a line that goes through the points (2,-4) and (-1,2).

10. (5 pts)   Graph the system of inequalities:

$2x + 6y \geq -12$

$y < 2x - 5$

Name_____

1. (20 pts)   A jar contains 6 blue marbles, 7 red marbles, 2 green marbles, and 5 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.   Then Tess reached in.

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

          What is the probability that it is green 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 diamond).

   c)   Find P(drawing a black face card)

3. (10 pts)   A bag of jelly beans has 3 cherry, 5 licorice, and 2 orange.

   a)   If two jelly beans are drawn, what is the probability they are both licorice?

   b)   If two jelly beans are drawn, what is the probability the first one is cherry and the
          second one licorice?

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 24 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 Montana, most license plates consist of seven letters. How many different license plates are there if the letters can be repeated?

Make up a seven-letter license plate. What would be your probability of getting this plate (assuming you were getting a license plate in Montana).

7. (10 pts) Bill was traveling from Gillette to Orlando, passing through Denver. To get from Gillette to Denver, Bill could drive, 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?

8. (5 pts) How many different batting line-ups can be chosen from a 13 man baseball team. (There are 9 players in a baseball line-up and order does matter).

Name _____

1. (24 pts)   Solve the following logarithmic equations:

a) $\log_2 16 = x$ b) $\log_x 25 = 2$ c) $\log 1000 = x$

2. (8 pts)   Solve the following equation by guess and check, or by using logarithms. <u>Round
your answer to the nearest hundredth.</u>

$3^x = 14$

3. (8 pts)   Find the inverse function (undoing function) for the following function.

$y = x^2 - 5$

4. (30 pts)   Simplify the following expressions. Do not leave any negative exponents in your answer.

a) $x^3 \cdot x^5$ b) $(3m^5)^2$ c) $\dfrac{x^3 y^8}{xy^4}$

d) $8^{\frac{2}{3}}$ e) $(6x^4)(3x^{-9})$ f) $25^{\frac{1}{2}}$

5. (20 pts)   Simplify the rational expressions:

a) $\dfrac{2x+8}{x^2-16}$

b) $\dfrac{7x}{x^2-25} \bullet \dfrac{x^2+7x+10}{14x}$

c) $\dfrac{2x-9}{x+4} + \dfrac{7x+4}{x+4}$

d) $\dfrac{3}{x+2} + \dfrac{5}{x-1}$

6. (10 pts)   Solve the following rational equations.

a) $\dfrac{3}{x+2} = \dfrac{5}{x-6}$

b) $\dfrac{5}{x} + \dfrac{3}{5} = \dfrac{1}{2}$