

# MATH + GAMES = FUN

# JEOPARDY

- Preview to unit
- Seatwork during unit
- Review at the end of unit

## A - JEOPARDY BOARD

Example: Polynomial Unit

POINTS/RULES			
100 Row (No Mistakes)	Simplify $4x-2x^2-10x+5x^2$	Simplify $-6x^2y+2xy^2-8xy^2+3x^2y^2$	Simplify * $-4a-(-2b)+(-3a)-(+5b)$
200 Row (1 Mistake)	Simplify $3x(x-2)$	Simplify $-x-2x(x+3y-1)$	Simplify $-2a(a+3b-1)$
300 Row (2 Mistakes)	Simplify $(4x-1)(2x+5)$	Simplify $(2x-3y)(-x+y)$	Simplify * $(2m-3n)^2$
400 Row (3 Mistakes)	Simplify $(2x-y+5)^2$	Simplify $(2x+y-5)(x-1)$	Simplify * $(2x+3)(x-y+1)$
500 Row (4 Mistakes)	Simplify $(3x-3y-2)^2$	Simplify * $(4x-3)(x+1)-(x+4)^2$	Simplify $x-(3x-1)^2$

# JEOPARDY


Category

100  
Points

200  
Points

300  
Points

400  
Points

500  
Points

# BOWLING


- seatwork during unit
- review
- each frame consists of completing several easy questions or one difficult question

Teams of 5 to 8 players

Team with perfect score	STRIKE!!	25 points
Team with 1 mistake	SPARE!	20 points
Team with 2 mistakes		10 points
Team with 3 or more mistakes	GUTTER BALL!	0 points

Ask "How many had a perfect answer?" A perfect answer includes perfect form. Calculate how many in the team made a mistake.

## HIGH SCORE WINS!

EXAMPLE FRAMES:

Gr. 11/12

Frame 1:

Graph  $x^2 + y^2 = 25$

Frame 2:

Graph  $(x-1)^2 + (y+2)^2 = 9$

Frame 3:

Graph  $x^2 + 2x + y^2 = 8$

etc.

Gr. 7-9

Frame 1:

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

Frame 2:

Simplify  $[4 - 2(6) + 7(2)] \div 3$

Frame 3:

Simplify  $(-2)^3 - (-5)^2 + 4(3)^2$

etc.

# GOLF

Golf course on overhead acetate.  
Score card on board.

	Hole #1	Hole #2	Hole #3	Hole #4	Hole #5	Hole #6	Hole #7	Hole #8	Hole #9	Total Score
Team #1										
Team #2										
Team #3										
Team #4										

Each hole can be considered PAR 3.

Teams of 5 to 8 players.

Ask "How many had a perfect answer?"

Calculate how many in the team made a mistake.

A team with no mistakes scores a hole in one!

A team with mistakes requires the number of mistakes plus one to sink the ball.

## LOW SCORE WINS!

# MATH BINGO!

NEAT  
QUESTIONS!



FUN  
FOR  
THE  
WHOLE  
FAMILY!



GREAT  
PRIZES!

STIFF  
COMPETITION!


# WHEEL OF FORTUNE I

- This game could be played at any level of any subject - just design the questions accordingly!
- Wheel of Fortune does require advance preparation, but it's worth it. The students have a lot of fun!
- Wheel of Fortune also requires a good amount of class time to play. I would suggest setting aside a half-hour. Instead of giving seat work, let the students get their practice by playing!

## MATERIALS

- Overhead of the "Wheel". (See attached copy).
- Arrow and stand for spinning.
- Prepared overheads with normal, race and bonus questions. (See attached copies).
- Prepared puzzles for students to guess.
- Large sheets of paper for students to write on.

## INSTRUCTIONS

### ➤ To make the wheel :

1. With a permanent marker, draw the wheel on an overhead. See photocopy for the wheel I used.
2. Cut an arrow out of corrugated cardboard. You will need some type of stand that the arrow fits onto and spins around.
3. The wheel overhead gets placed on the projector. The stand is taped onto the centre of the wheel. Then the arrow fits onto the stand and you can spin it while the students see it all on the overhead!

### ➤ How to play the game:

1. Get the wheel set up on the projector.
2. Put the blanks of the word puzzle to be guessed up on the board. For example, I used:

B \_ A \_ R \_ T \_    S \_ I \_ M \_ P \_ S \_ O \_ N    (A CHARACTER)

R \_ O \_ L \_ L \_ E \_ R \_ B \_ L \_ A \_ D \_ E \_ S    (A THING)

M \_ A \_ R \_ C \_ H \_    B \_ R \_ E \_ A \_ K    (AN EVENT)

3. Split the class into 4 teams. I had 6 or 7 people on each team.
4. Set up a scoreboard on the chalkboard.
5. Put a large piece of paper in the middle of each team's area. They will do their calculations on this together.

6. Explain the rules of the game:

There are three modes of play:

Normal dollar value questions: There are \$50, \$100, \$200, \$300 and \$500 segments on the wheel. If a team spins and lands on any of these segments, their team will win that amount of money if they answer their question correctly. These questions are of medium difficulty.

Race questions: If a team spins and lands on the race segment, then all the teams compete to complete the question first. The first person to stand up and state the correct answer gets \$50 for their team. These questions are simple and fast.

Bonus questions: If a team lands on the bonus section, then they get to spin again until they land on a dollar value. If they answer the question correctly, then they double the dollar value they landed on. These questions are more challenging however!

See attached photocopies of the question overheads I used.

If a team lands on bankrupt, then they only lose their money if they do not answer their question correctly.

The game proceeds by each team taking their turn. Once they have spun the wheel and the mode of play is known, they are given their question and have about a minute to state their group's answer.

If the answer is correct, then the team gets the dollar value added to their score on the board and they get the chance to pick a letter and guess the puzzle. It is recommended that a list of letters picked that were not in the puzzle are listed on the board as well, so that they are not picked again.

The team to guess the puzzle gets \$500 and the game resumes with a new puzzle being put up on the board.

7. Decide how you are going to end the game (i.e. end of class, end of three puzzles, end of equal amount of turns, etc.). The winning team should get a prize. I handed out Hershey Kisses!

➤ Important...

1. Within a team, to ensure that each student is attempting the question, you need to stress that they are working in a group and have to mutually agree on their answer. This was not a problem, they wanted to get the answer right so much that they checked and rechecked with each other! As well, the big piece of scrap paper allows them all to scribble away at the same time.

2. To ensure that the whole class tries each question, whether it's their turn or not, tell them that they are the judges of the answers. You will not tell them if the team's answer is right. So if they are not careful, a team could get points for not even having the right answer. This worked really well. They certainly did not want to give away points.

3. Let them know that you can pull "judge's authority". I noticed that they got so excited at times that I had to reinforce the rules of the game.

## NORMAL ROUND

- 1) An athlete's times for the 100m dash are:  
11.3, 10.9, 11.4, 11.2, 10.9, 11.1, 17.2  
What is the mode of this data?
- 2) What is the mean of this data?
- 3) Would you take a sample or a census to collect data on the most frequently read newspaper in your town? Why?
- 4) Would you take a sample or a census to decide where to go on a family vacation?
- 5) If there are 1350 students at Markville S.S. and 32% are from Africa, how many African students are there?
- 6) If this is a tally :  $\text{||||}$   $\text{|||}$   $\text{|||}$   $\text{|||}$   $\text{|||}$   $\text{|||}$   
What is the frequency?
- 7) A segment of a circle graph shows 15.5% How many degrees is this?
- 8) A segment of a circle graph has an angle of  $123^\circ$ . What percent is this?
- 9) Give an example, other than ones given in your exercises, of data that would best be shown in a bar graph.
- 10) "4 out of 5 people prefer Coke". Is this misleading? Why?
- 11) What type of graph would you use to show the change in the population of a city over a ten-year period?

## RACE

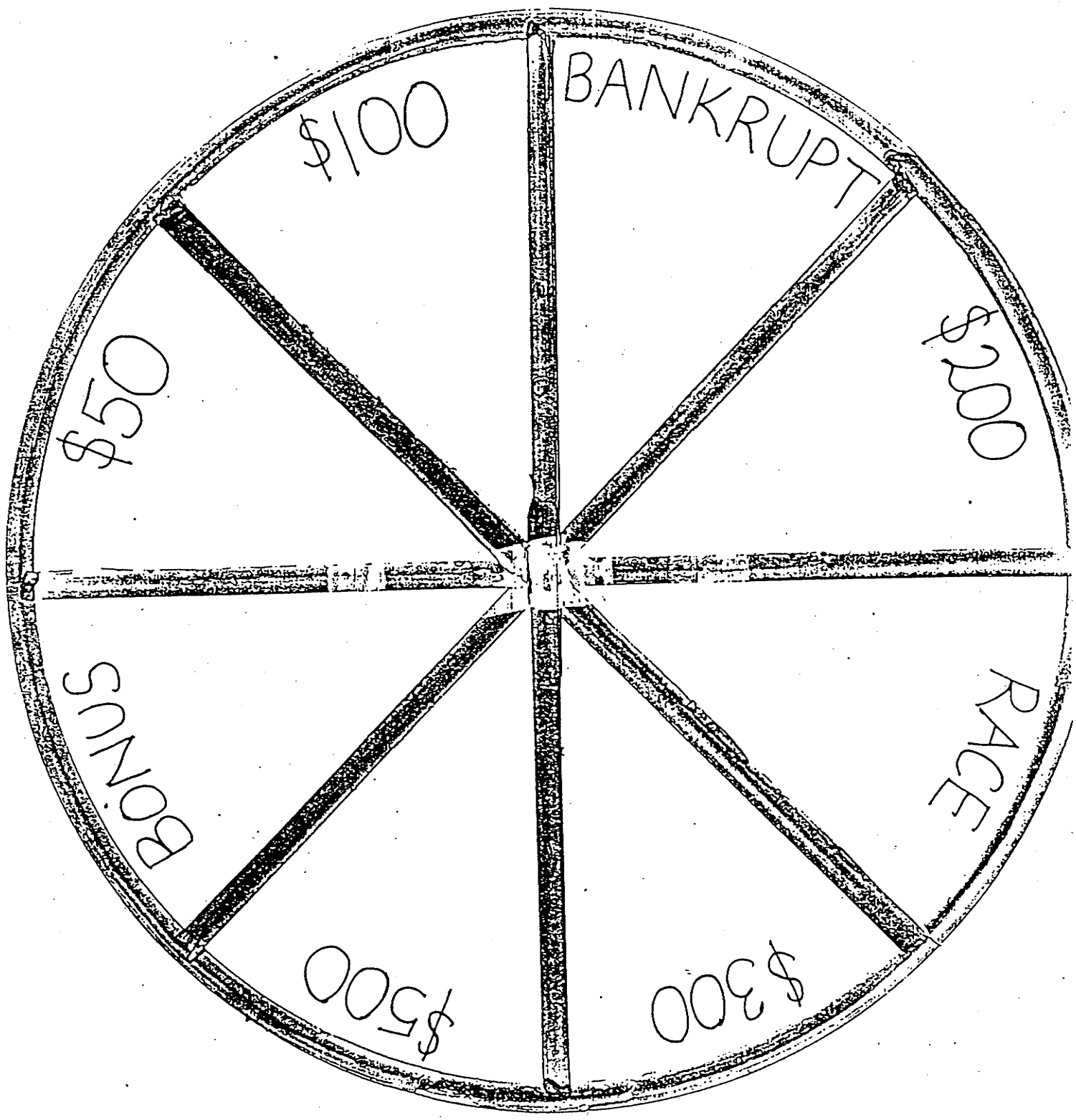
- 1) For this data: 7, 9, 10, 16  
What is the mean?
- 2) What is the median?
- 3) Express 45% as a fraction.
- 4) Express 88% as a decimal.
- 5) Express 56% as a fraction in lowest form.
- 6) Express  $\frac{12,350}{15,672}$  as a decimal to 2 places.
- 7) Change 0.8723 to a percent.
- 8) Express 1.234 as a fraction.
- 9) What is 25% of 100,000?
- 10) Express this tally as a frequency:

### |||| ### ||| ### |

## **BONUS**

double your money!

- 1) An athlete's times for the 100m dash are:  
11.3, 10.9, 11.4, 11.2, 11.2, 11.2, 10.9, 11.1, 17.2  
What is the median of this data?
- 2) If there are 1,423 students at Markville S.S. and 2.1% are South American, how many South American students are there?
- 3) What is 33.3% of \$65.80?
- 4) A circle graph shows the following percents:  
12.5%, 53%, 2%, 18.2%, 20.3%  
What is wrong with this graph?
- 5) If there are 17,450 people in your town and 52% are women, then how many are men?
- 6) Give an example, other than those in your exercises, where the data would best be shown in a histogram.
- 7) What type of graph would you use to best show the number of telephones for every hundred people in six different countries?



\$100

BANKRUPT

\$200

RACE

\$300

\$500

BONN

\$50




# JACKPOT

- Divide the class into 3 teams or use the entire class as one team.
- Draw names to determine the first member of the team who is the player on the mountain.
- Distribute the questions to the rest of the team.
- The player on the mountain chooses a team member and answers the question held by that member.
- If the question is
  - a) answered correctly, the player on the mountain scores the number of points on the question.
  - b) answered incorrectly, the member holding the question becomes the player on the mountain.
  - c) a jackpot question, the player answers it then changes places with the team member who held the jackpot question. Both players share the jackpot points (100 each) if the question is answered correctly.
- When there is a new player on the mountain, replace already used questions with new ones.
- Questions should be folded and stapled and only opened when chosen.

The game can be run for 20 minutes each day for a week.

A limit of 5 questions could be given to a "hot" player who then must switch with the member holding the 5th question.

# SPRINTER

SEASONAL SPORT      - 1 team at board  
                                 - 1 team at seats  
                                 (alternate)

FAMILY FEUD - "as above"

# WIN, LOSE OR DRAW!

- Daily practice
- Review at end of a unit which is conducive to sketches.

## Functions

One team member sketches a function (drawn from a hat). The team guesses the function.

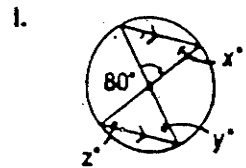
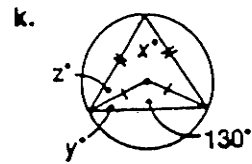
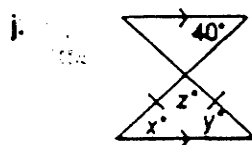
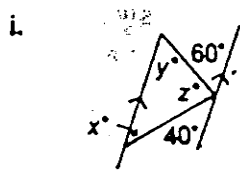
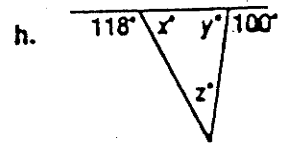
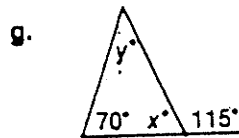
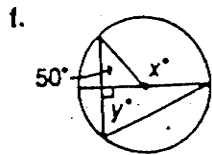
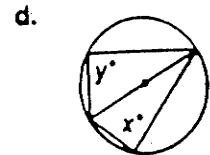
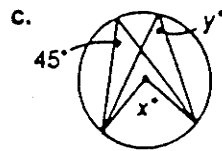
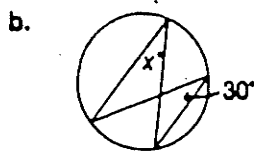
Scoring =>	drawn ✓	guess ✓	2 pts
	drawn ✓	guess X	1 pt
	pass to other team		
		guess ✓	1pt
	drawn X	guess ✓	1 pt
	drawn X	guess X	0 pts

## Geometry






One team member sketches a diagram on the board and answers the unknown values; team members have 30 seconds to fix any mistakes; pass to team 2 if necessary.

Scoring =>	drawn ✓	answered ✓	2 pts
	team corrections needed and done well		1 pt
	2nd team corrections needed and done well		1 pt

$y = x^2$	$y = x^2 + 4$	$y = (x - 4)^2$
$y = 2(x - 2)^2 + 3$	$y = -x^2$	$y = x^3 + 2$
$y = (x + 2)^3$	$y = 3x^3$	$y = -(x - 1)^3 - 2$
$y = \sqrt{x}$	$y = \sqrt{x - 5}$	$y = -\sqrt{x} + 5$
$y = -2\sqrt{x - 3} + 5$	$y =  x $	$y =  x  + 3$
$y =  x - 3 $	$y = \frac{1}{2} x  - 4$	$y = 2^x$
$y = 2^x + 1$	$y = 2^{x+3} - 1$	$y = 4 x - 3  + 5$



# FUNCTION AEROBICS

FUNCTION	DIAGRAM	VARIATIONS
$x^2$		$-x^2, 2x^2, \frac{1}{2}x^2, -2x^2, x^2 + 1, x^2 - 1, (x + 2)^2, \frac{1}{2}(x + 1)^2 + 2$
$x^3$		$-x^3, x^3 + 1, 3x^3, \frac{1}{4}x^3, (x - 1)^3, (x + 1)^3, x^3 + 2$
$2^x$		$2^{x+2}, 2^x, 2^x + 1, 2^x - 1, \frac{1}{2}(2^x), -(2^x)$
$ x $		$2 x , - x , -\frac{1}{2} x ,  x  + 1,  x - 1 $
$\sqrt{x}$		$-\sqrt{x}, \sqrt{x} + 1, \sqrt{x - 2}$

- \*\* Set to music
- \*\* Run for about 5 minutes
- \*\* HAVE FUN!!!

# VOLLEYBALL

Teams of 3 ..... take on names

Three questions on overhead

A Bump *(easy)*

A Set

A Spike question *(hardest)*

The team does the three questions and writes answers on a card (white boards)

Hold up !!!

Bump ✓	1 pt
Bump + Set ✓	2 pts
Bump + Set + Spike ✓	3 pts

# VOLLEYBALL

Possible questions

Equations Gr. 9

Bump

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

Set

$$3(x - 1) = 2x + 7$$

Spike

$$\frac{x}{2} - 3 = \frac{4x}{5}$$

Other Units

Equations Gr. 10

$$x + y = 2$$

$$x - y = 0$$

$$2x + y = 3$$

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

$$5x - 4y = 1$$

$$2x + 3y = 5$$

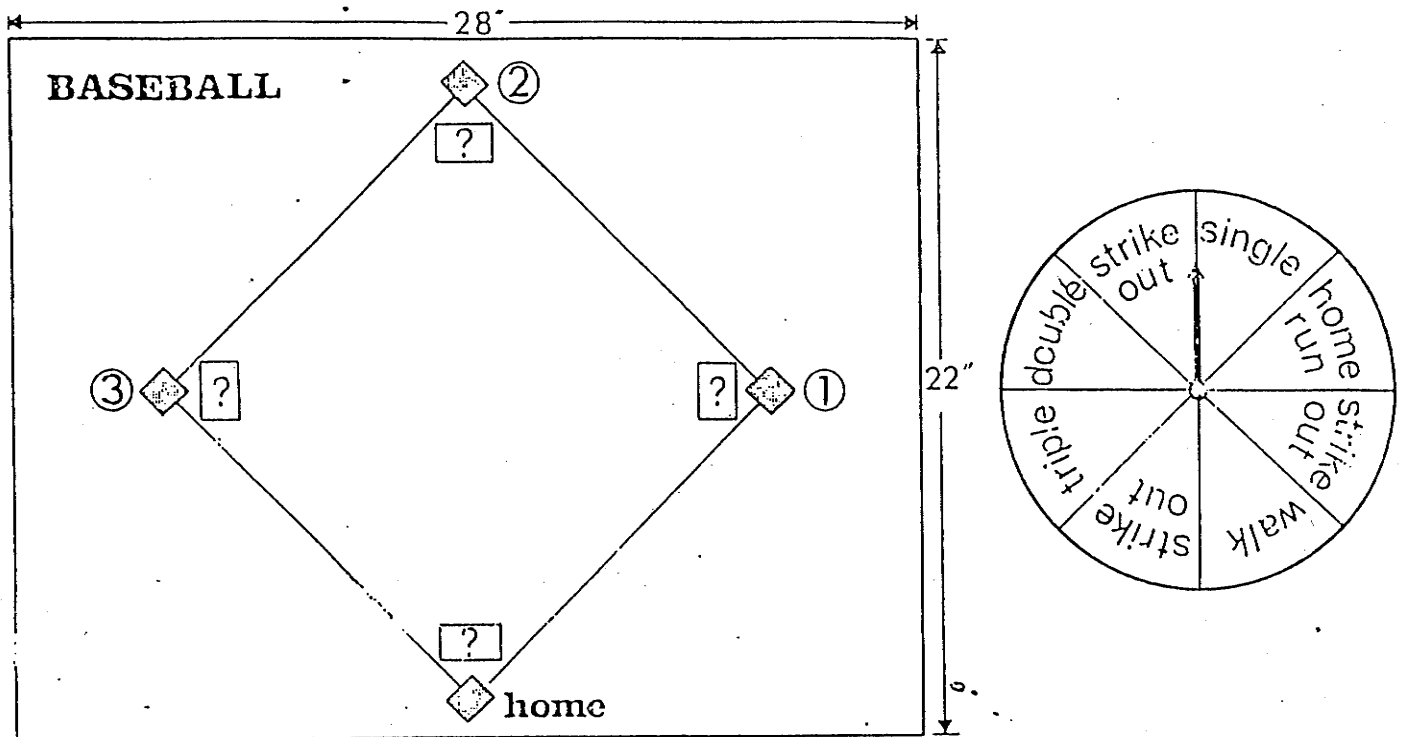
Quadratic equations Gr. 11

Algebra Gr. 9, 10, 11, 12

Word problems Gr. 10, 11, 12

Geometry Gr. 9, 10, 12

## BASEBALL



- Game board
- Spinner
- One marker per player
- Sixty question ? cards

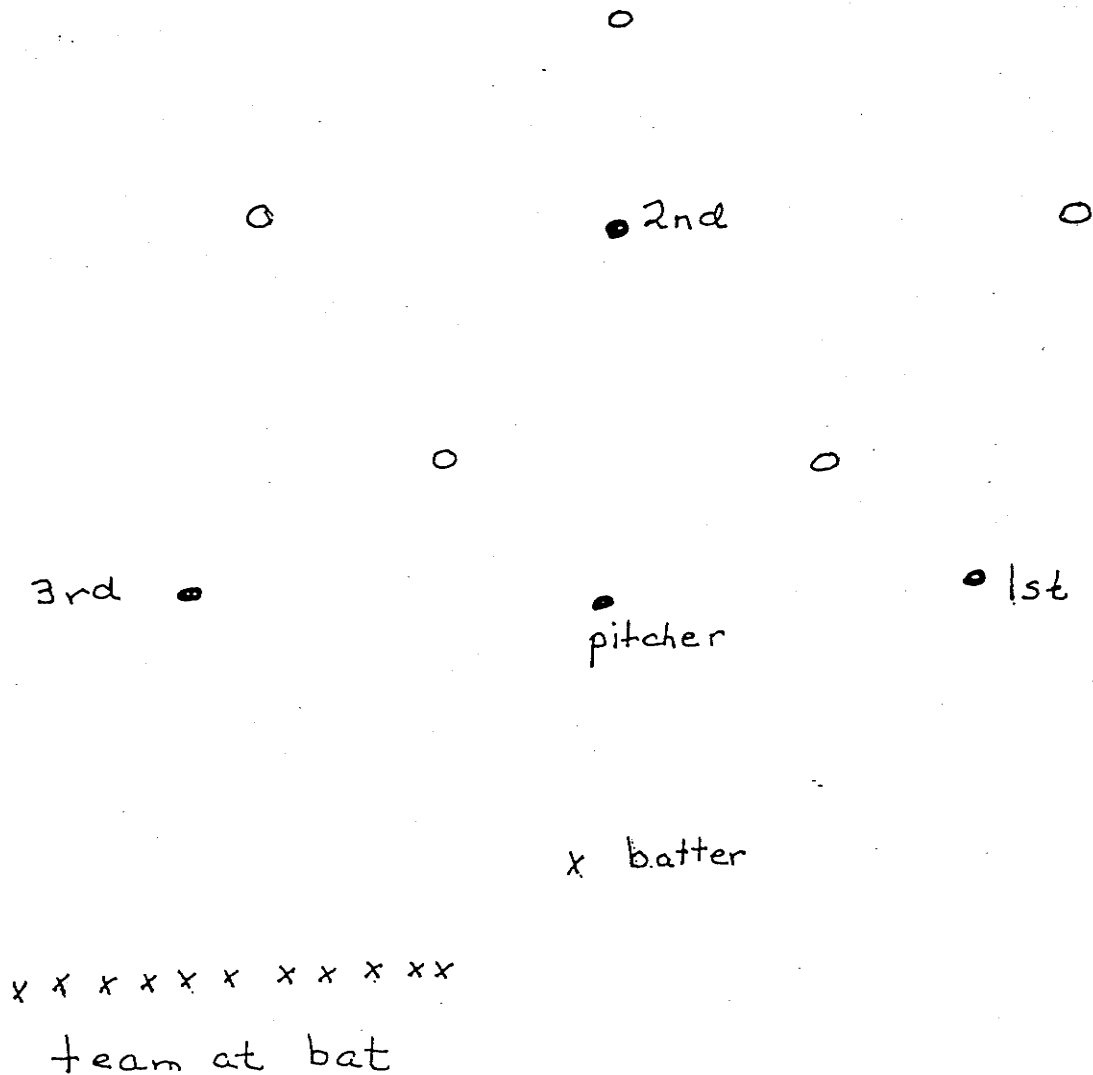
Fifteen question cards are placed face down at each base. These cards should be designed according to the needs of the classroom. It is advisable to make the questions progress in difficulty from first base to home.

A player from one team turns the spinner and places his marker on the board according to the following: *WALK* or *SINGLE* moves to first base, *DOUBLE* moves to second base, *TRIPLE* moves to third base, *HOME RUN* moves to home. The player chooses the top card from the pile beside the base. If he answers the question correctly, he remains on that base. If he answers incorrectly, his team has "struck out" and the opposing team is "up to bat". The card used is returned to the bottom of the deck. If the spinner lands on *STRIKE OUT*, the other team automatically is "up to bat". The teacher may vary the number of "outs".

The players travel around the bases as in regular baseball. The person who spins the dial is the only one who may answer a question. Each time a player reaches home, a point is scored for his team. The team with the greatest number of points is the winning team.

# BASEBALL

Each member of each team creates a question for their pitcher to pitch (on the unit chosen). Each member then creates the solution. The pitcher chooses questions at random to pitch to the other team.... the person at bat writes the answer on the overhead... if no one on the field yells "out" before the hitter gets to 1st base the player may continue the bases to home. (Each member in the field has a solution)





## TRIG PURSUIT GAME

**OBJECTIVE OF THE GAME:** (1) A review exercise for all properties , etc. learned in applied trigonometry (Grade 12 Advanced).

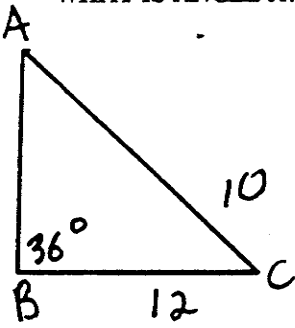
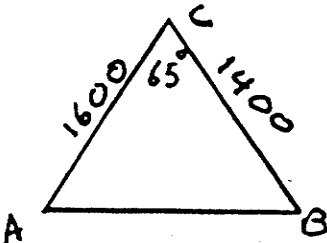
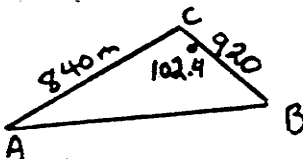
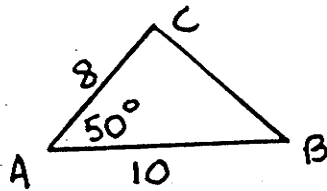
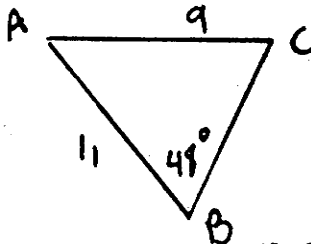
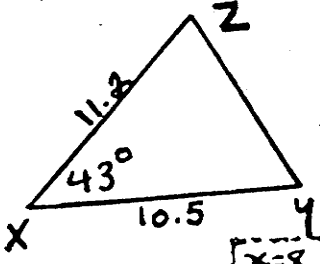
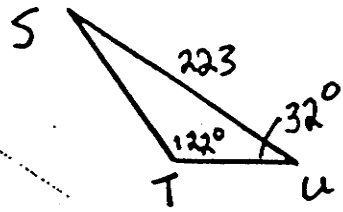
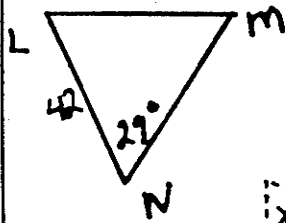
(2) Each team answers as many questions correctly as they can in order to advance along the board. The team who receives the highest number of points, at the end of the period, wins a prize.

### **RULES:**

1. The class divides into two teams.
2. The teams advance along the game board (displayed on an overhead) by a roll of the dice which indicates the number of spaces to move. Teams can move either to the right or left of the board.
3. If a player lands on category A1, the instructor will pick a question from this category and display the question on the overhead. If the team answers the question correctly they get one point. The same procedure applies to categories A2 and A3, (increased level of difficulty as you move from A1 to A3 category type questions). The correct answer in an A2 type question merits 2 points, and an A3 type question merits 3 points. The instructor keeps score on the blackboard.
4. The instructor selects the first person from each team to roll the dice. Then the team members to next roll the dice are those sitting clockwise from the first team member. All team members answer the category question on which they landed. After a predetermined length of time, all team members display their answer on white slates or small pieces of paper. If the entire team gets the correct answer, the team scores the appropriate points.

# ANSWER KEY

## CATEGORY 3

<p style="text-align: center;">1. WHAT IS ANGLE A?</p>  <p style="text-align: right; margin-right: 50px;"><math>36.9^\circ</math></p>	<p style="text-align: center;">2</p> <p>An architect is designing a solar heated house which will be 10 m wide. The south side of the roof will rise for 8 m at an angle of elevation of 60 degrees. At what angle of elevation will the north side of the roof rise?</p> <p style="text-align: right; margin-right: 50px;"><math>49^\circ</math></p>	<p style="text-align: center;">3</p> <p style="text-align: center;">FIND LENGTH AB</p>  <p style="text-align: right; margin-right: 50px;"><math>1621</math></p>
<p style="text-align: center;">4</p> <p style="text-align: center;">FIND ANGLE B.</p>  <p style="text-align: right; margin-right: 50px;"><math>36.7</math></p>	<p style="text-align: center;">5</p> <p>From the top of a 40 metre high cliff, an observer sights a yacht at an angle of depression of 25 degrees. How far is the boat from the foot of the cliff?</p> <p style="text-align: right; margin-right: 50px;"><math>96m</math></p>	<p style="text-align: center;">6</p> <p style="text-align: center;">WHAT IS a?</p>  <p style="text-align: right; margin-right: 50px;"><math>7.8</math></p>
<p style="text-align: center;">7</p> <p style="text-align: center;">FIND ANGLE C.</p>  <p style="text-align: right; margin-right: 50px;"><math>65.3</math></p>	<p style="text-align: center;">8</p> <p style="text-align: center;">SOLVE TRIANGLE XYZ.</p>  <p style="text-align: right; margin-right: 50px;"><math>x=8</math></p>	<p style="text-align: center;">9</p> <p style="text-align: center;">SOLVE TRIANGLE STU.</p>  <p style="text-align: right; margin-right: 50px;"><math>u=13</math></p>
<p style="text-align: center;">10</p> <p style="text-align: center;">SOLVE THE TRIANGLE NLM.</p>  <p style="text-align: right; margin-right: 50px;"><math>m=61^\circ</math></p>	<p style="text-align: center;">11</p> <p>A tunnel is to be built through a hill to connect points A and B in a straight line. Point C is chosen so that it is visible from both A and B. Angle c is 63 degrees, CA=2km and CB= 5km. Find length AB.</p> <p style="text-align: right; margin-right: 50px;"><math>4.46km</math></p>	<p style="text-align: center;">12</p> <p>An engineer wants to build a bridge over a river from point B to Point A. The distance from B to a point C is 520 m. Angle B is found to be 78 degrees and angle C is 54 degrees. Solve for angle A.</p> <p style="text-align: right; margin-right: 50px;"><math>48^\circ</math></p>

## ANSWER KEY

## CATEGORY 3

<p>1</p> <p>IF <math>\sin X = 8/17</math></p> <p>FIND <math>\sec X</math></p> <p><math>\frac{17}{15}</math></p>	<p>2</p> <p>IF <math>\cot X = 13/3</math></p> <p>FIND <math>\sin X</math></p> <p><math>\frac{8}{17}</math></p>	<p>3</p> <p>FIND 1 VALUE FOR</p> <p><math>\sin X = 0.1736</math></p> <p><math>10^\circ</math></p>
<p>4</p> <p>FIND ONE VALUE FOR</p> <p><math>\csc X = 1.0223</math></p> <p><math>X = 78^\circ</math></p>	<p>5</p> <p>WHAT IS THE <math>\cot X</math> OF 5</p> <p>DEGREES?</p> <p>11.43</p>	<p>6</p> <p>FIND THE <math>\sin</math> OF 131</p> <p>DEGREES?</p> <p>.755</p>
<p>7</p> <p>WHAT IS THE FORMULA</p> <p>FOR THE SINE LAW?</p> <p><math>\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}</math></p>	<p>8</p> <p><math>\cos 52 =</math></p> <p>.616</p>	<p>9</p> <p><math>\sec 25 =</math></p> <p>1.104</p>
<p>10</p> <p><math>\sin X = 5/13</math></p> <p>WHAT IS ITS <math>\tan</math> RATIO?</p> <p><math>\frac{5}{12}</math></p>	<p>11</p> <p><math>a^2 = b^2 + c^2 - 2bc \cos A</math></p> <p>WHAT IS THE FORM OF THE</p> <p><math>\cos</math>INE LAW USED TO FIND</p> <p>a</p>	<p>12</p> <p>IF <math>\tan X = 0.2341</math></p> <p>WHAT DOES <math>\cot X = ?</math></p> <p>4.2716</p>

# TREASURE HUNT!

Review at the end of solving linear systems

Materials:           overhead of school map  
                          overhead of cm grid  
                          six questions with integral solutions

Groups:             pairs

Arrangement:       Leave different coloured prizes in six rooms of  
                          the school.

When the students have solved a question, they  
look on the map for the ordered pair.

Students check their ordered pair with the teacher  
then proceed to the correct room.

The first pair to travel to all the rooms wins.

# RALLY MATH

Team Members: \_\_\_\_\_

Instructions: All street names are printed in bold type while all locations are printed in plain type.

A 'T' intersection is one where the road on which you are traveling ends and you are forced to turn left or right.

'Opportunity': If an instruction reads "Turn right at the third opportunity", it means that you are to take the third possible right turn.

All questions must be completed in order that they occur (with answers written in the spaces provided) to win the rally.

Do NOT make any marks on the map as this will render it useless for any future rallying.

You begin your rally at the west end of Easy Street (see map).  
You are driving east on Easy Street.

1. Evaluate

a = \_\_\_\_\_

- if a = \_\_\_\_\_, turn right at the first opportunity
- if a = \_\_\_\_\_, turn right at the second opportunity
- if a = \_\_\_\_\_, turn left at the first opportunity
- otherwise, turn left at the second opportunity

2. After making your turn, what is the name of the store in your rear view mirror?  
\_\_\_\_\_

3. Continue to drive along this street until you stop in front of a location that you can purchase fuel for your car since you are out of gas. What is the name of the owner of this service station?  
\_\_\_\_\_

Rearrange all 7 letters in the owner's name to spell the name of the North American car you are driving.

---

4. Continue to drive on this street until you reach a T intersection. Evaluate both of the following:

$$p = \underline{\hspace{2cm}} \qquad q = \underline{\hspace{2cm}}$$

If  $p = q$  then turn east, otherwise turn west.

5. Next, turn left at your  $n^{\text{th}}$  opportunity where

$$n = 1 \text{ if}$$

$$n = 2 \text{ if}$$

$$n = 3 \text{ if}$$

$$n = 4 \text{ if}$$

6. Drive north until you are beside a place that contains a large diamond, but not the kind that can be found on an engagement ring! What building do you see out your right window?
- 

Look around where you are now. You spot a sign that reads 'PSSS'. What do the letters stand for?

---

7. Continue to drive north until you reach a T intersection. Determine the following:
- 

If \_\_\_\_\_ turn left, otherwise turn right.

Are you heading east or west? \_\_\_\_\_

8. Convert  $x =$  \_\_\_\_\_

If  $x =$  \_\_\_\_\_ then turn left at the first opportunity.

If  $x =$  \_\_\_\_\_ then turn left at the second opportunity.

If  $x =$  \_\_\_\_\_ then turn left at the third opportunity.

What is the name of the building you see to your right?

---

10. Continue to drive until you reach a T intersection. What have you passed that reminds you of squash, but not the one you can eat?

---

11. Your next destination is a nearby store. To determine which store, follow these instructions:

- you have traveled on 6 different streets to arrive at your present location.
- look at the first letter in the names of the first 5 streets that you have driven on.
- unscramble these 5 letters to determine the type of item that is produced at your destination (there is one nearby store that will sell this item).

What is the item? \_\_\_\_\_

What is the owner's name? \_\_\_\_\_

Drive until you are in front of this store. This is your final destination.



# POLY WANT A NOMIAL?

## Rules:

Provide your own Playing pieces.

Roll one dice to determine who goes first - highest wins.

Each player rolls once in turn ..... refer to chart.....

<u>#</u>	<u>DIRECTIONS</u>
1, 3	Polynomial Time- answer the question on the top card - move ahead 2 spaces if ✓
2, 5	All play - all players do the question on the top card Move 2 if first and ✓ Move 1 if ✓
4	Challenge - Challenge another to question on top Move 3 if first and ✓ Move back 1 if last
6	Free - move 1

Players may set a time Limit/ question

HAVE FUN!!!!

# QUESTIONS POLY WANT A NOMIAL

Translate into an expression.

- 1) 7 more than 3 times a number
- 2) 10 times a number decreased by 3

Simplify

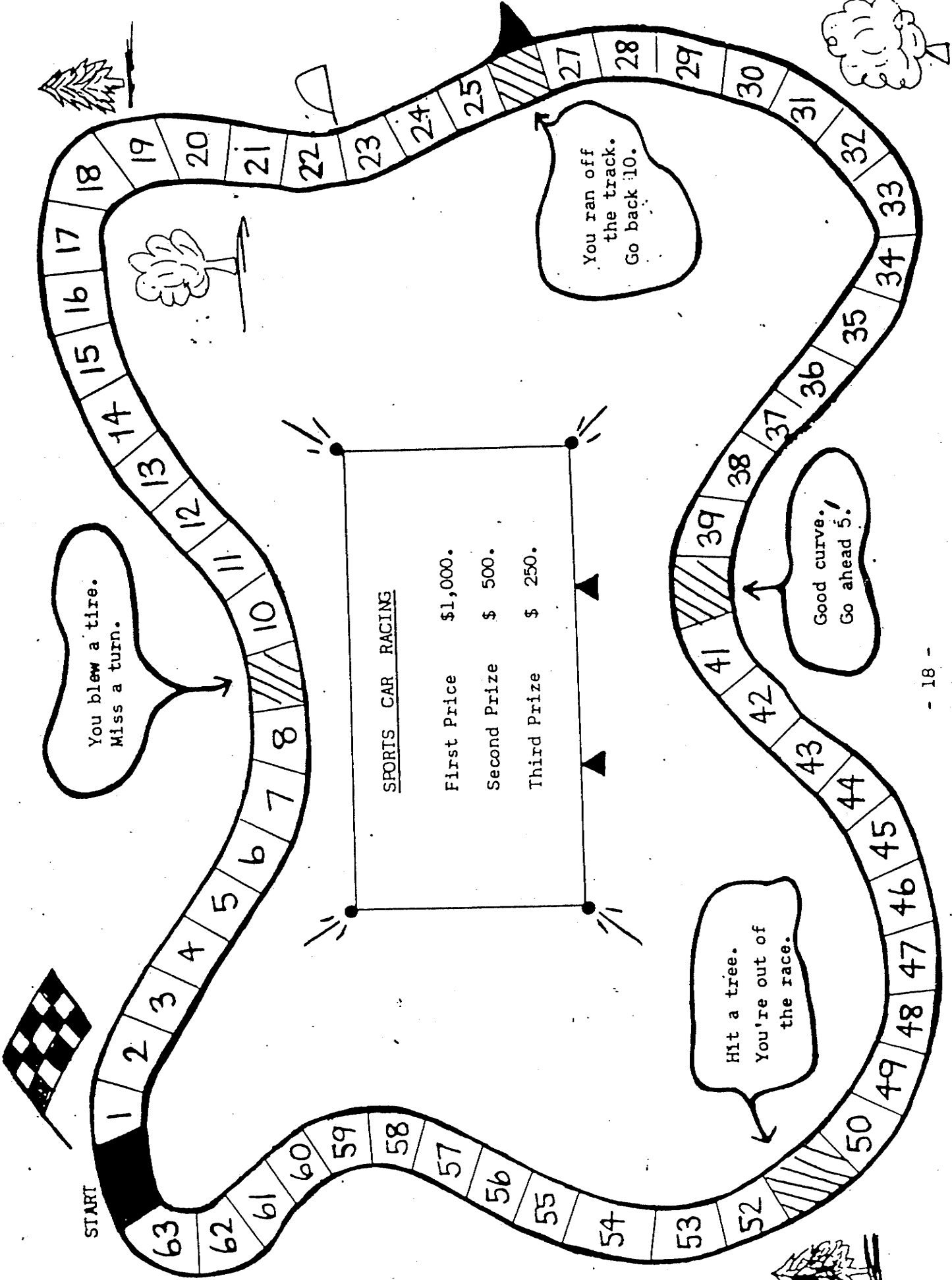
- 3)  $4a^2+2a-a^2+3a$
- 4)  $xy+3x^2y-2xy+4-2x^2y$
- 5)  $-2x^2(3x^3+2x)$
- 6)  $x^2y+2x^2-xy^2+x^2+3x^2y-xy^2$
- 7)  $\frac{(2y)(3)(y-6)}{-3y}$

Multiply

- 8)  $(m+3)(m-4)$
- 9)  $(y-2)^2-2(y+1)(y+3)$
- 10)  $3(m+1)(m-2)$

Divide

- 11)  $\frac{32x^2y^3}{-16xy^2}$
- 12)  $\frac{4y^2+5y}{y}$
- 13)  $\frac{24a^2-20ab+a}{-5a}$



You blew a tire.  
Miss a turn.

You ran off  
the track.  
Go back 10.

Hit a tree.  
You're out of  
the race.

Good curve.  
Go ahead 5!

SPORTS CAR RACING

First Price	\$1,000.
Second Prize	\$ 500.
Third Prize	\$ 250.

# ANSWERS

- 5)  $-6x^5 - 4x^3$   
8)  $m^2 - m - 12$   
10)  $3m^2 - 3m - 6$   
20)  $(x+11)(x-1)$   
15)  $5x(x+2)$   
4)  $x^2y - xy + 4$   
25)  $2(x+1)(x+3)$   
16)  $3y(4y^2 - y + 3)$   
18)  $3(x^2y^2 + 3xy - 4) = 3(xy+4)(xy-1)$   
31)  $p^2 + 6p + 9$   
6)  $4x^2y + 3x^2 - 2xy^2$   
24)  $3(x+1)(x+1)$   
7)  $-2y + 12$   
9)  $y^2 - 4y + 4 - 2y^2 - 8y - 6 = -y^2 - 12y - 2$   
19)  $(a-9)(a-2)$   
21)  $(x+6)(x-6)$   
17)  $a(b-c)$   
9)  $y^2 - 4y + 4 - 2y^2 - 8y - 6 = -y^2 - 12y - 2$   
23)  $(m-6)(m+3)$   
2)  $10n - 3$   
26)  $(x-7y)(x-4y)$   
11)  $-2xy$   
14)  $3b^2(27)$  A common factor  
29) By expanding the answer (multiplying)  
1)  $7 + 3n$   
3)  $3a^2 + 5a + 6$   
32)  $-24x^2 + 12x$   
22)  $(y+8)(y+3)$   
12)  $4y + 5$   
28)  $(m-7)(m+6)$   
13)  $\frac{-24a}{5} + 4b - \frac{1}{5}$   
30)  $6m^2 - 4m - 2$   
33)  $7x - 2$

- 14) The area of a rectangular rug is  $48a^2b^2$ . The length is  $16a^2$ . What is the width?

Factor

- 15)  $5x^2+10x$   
16)  $12y^3-3y^2+9y$   
17)  $ab-ac$   
18)  $3x^2y^2+9xy-12$   
19)  $a^2-11a+18$   
20)  $x^2+10x-11$   
21)  $x^2-36$   
22)  $y^2+11y+24$   
23)  $m^2-3m-18$   
24)  $3x^2+6x+3$   
25)  $2x^2+8x+6$   
26)  $x^2-11xy+28y^2$   
27) When factoring, what do you always look for first?  
28)  $m^2-m-42$   
29) How would you check any factoring question?

Multiply

- 30)  $(3m+1)(2m-2)$   
31)  $(p+3)^2$   
32)  $-4x^2-4x(5x-3)$   
33)  $3x+2(2x-1)$

## GAMES ASSIGNMENT: IDENTITY CRISIS

**Note:** This game was used as a review for circle definitions (Grade 12 - Circle Geometry unit)

**DESCRIPTION:** There are two versions to this game.

- a) Divide the class into two teams. Teams draw to see who goes first. One student from the team goes to the front of the class and puts on a "headband". S/he draws a card and without looking at it puts it in the headband s/he is wearing so that all the other students can see it. This student then directs questions to the teams in an attempt to figure out his/her identity. The class may only answer with a "yes" or "no", therefore the student must word his/her questions carefully. In addition, the student may not ask questions like "Am I a tangent? Am I a chord?". Questions are directed to both teams in an alternating fashion so as to eliminate as much bias as possible (i.e. the student's team being too helpful, the other team not being helpful enough). Once the student believes s/he knows his/her identity, s/he prefaces it by "I bet I know who I am! Am I \_\_\_\_\_?". A point is recorded for every question the student asks. The fewer questions the student must ask to determine his/her identity, the better the score for the team. Team with the lowest number of points wins!! Points are added to team's score if the student incorrectly identifies him/herself.
- b) A sticky label is stuck to the back of each person in the class. On each label is a different term or theorem from the circle geometry unit. Students are allowed to read everyone else's label, but cannot see their own. Make sure the student doesn't see what is written on the label while you put it on their back. At the teacher's signal, students ask each other questions to help determine their identity. Students may only answer "yes" or "no" to the questions, so students must phrase their questions carefully. Each student may not ask more than **three** questions of the same person. In addition, students may not ask questions like "Am I a tangent? Am I a chord?". Once the student believes s/he knows his/her identity, s/he approaches the teacher and says "I bet I know who I am! Am I \_\_\_\_\_?". If the student is incorrect, then s/he is disqualified. The first three people to guess their identity correctly win a prize.

### **MATERIALS:**

- headbands
- cards
- labels

Sample of terms used (circle definitions): radius, diameter, segment, arc, chord, secant, tangent etc.

### **RECOMMENDATIONS:**

Game is good for review at end of circle geometry unit  
Game can also be modified to fit many other topics/units  
Encourage students to ask as specific questions as possible

# Old Poly

**Topic:** Multiplication of polynomials or factoring of polynomials

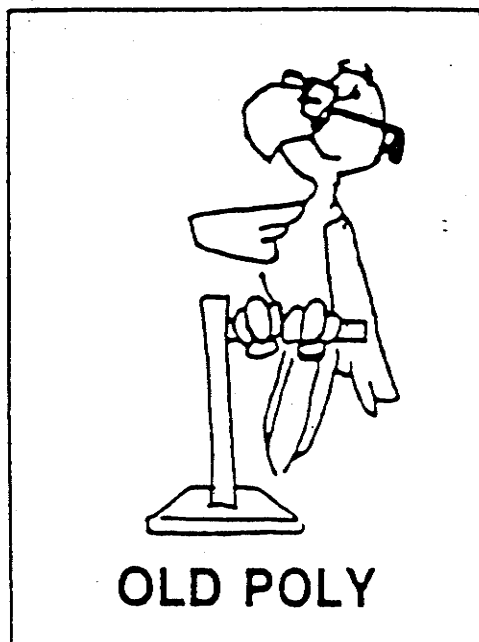
**Level:** Grades 8–10





















**Number of  
Players:** 3–4


























**Materials:** Set of "Old Poly" playing cards

- Procedure:**
1. The dealer shuffles the cards and deals them all out. All players match the polynomial with its factors for those pairs in their hand. These pairs are placed face up on the table.
  2. Players then pass 3 of the remaining cards to the player to their right. If new pairs are formed from this action, players add these to the spread in front of them.
  3. To begin the draw, the player on the left of the dealer draws a card from the hand of the player to his or her left. If the drawn card completes a pair, the player plays the pair face up with the others. Otherwise, the player keeps the card, and the next player to the left draws from the player to his or her left.
  4. Play continues until all the pairs are formed, leaving 1 player with the "Old Poly" card. This person is the loser. Players drop out of the game as their cards are depleted.

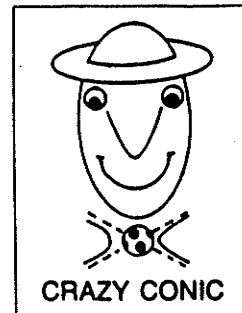
**Variation:** The player left with the "Old Poly" card is the winner!



$a^2 - 4a + 4$  $a^2 - 4a + 4$	$(2p + 5)(2p - 5)$  $(2p + 5)(2p - 5)$	$(b + 4)(b - 4)$  $(b + 4)(b - 4)$	$x^2 - 2x + 1$  $x^2 - 2x + 1$	$(x + 1)(x - 1)$  $(x + 1)(x - 1)$
$b^2 - 16$  $b^2 - 16$	$(x - 1)^2$  $(x - 1)^2$	$x^2 - 1$  $x^2 - 1$	$x^2 + 12xy + 36y^2$  $x^2 + 12xy + 36y^2$	$(x + 6y)^2$  $(x + 6y)^2$
$4p^2 - 25$  $4p^2 - 25$	$p^2 - 25$  $p^2 - 25$	$(4a - 1)^2$  $(4a - 1)^2$	$16a^2 - 8a + 1$  $16a^2 - 8a + 1$	$(3p + 5)(3p - 5)$  $(3p + 5)(3p - 5)$
$4a^2 + 4a + 1$  $4a^2 + 4a + 1$	$9x^2 - 6xy + y^2$  $9x^2 - 6xy + y^2$	$9p^2 - 25$  $9p^2 - 25$	$(2a + 1)^2$  $(2a + 1)^2$	$(3x - y)^2$  $(3x - y)^2$

$(b + c)(b - c)$  $(b - c)(b + c)$	$x^2 + 4x + 4$  $x^2 + 4x + 4$	$(2p + 3)(2p - 3)$  $(2p - 3)(2p + 3)$	$b^2 - c^2$  $b^2 - c^2$	$(x + 2)^2$  $(x + 2)^2$
$4p^2 - 9$  $4p^2 - 9$	$(p + 5)(p - 5)$  $(p + 5)(p - 5)$	$(5n + 3)^2$  $(5n + 3)^2$	$25n^2 + 30n + 9$  $25n^2 + 30n + 9$	$25n^2 - 10n + 1$  $25n^2 - 10n + 1$
$a^2 - 6a + 9$  $a^2 - 6a + 9$	$25x^2 - 16y^2$  $25x^2 - 16y^2$	 <b>OLD POLY</b>	$(5n - 1)^2$  $(5n - 1)^2$	$(a - 3)^2$  $(a - 3)^2$
$(5x + 4y)(5x - 4y)$  $(5x + 4y)(5x - 4y)$	$c^2 - 4$  $c^2 - 4$	$(c + 2)(c - 2)$  $(c + 2)(c - 2)$	$p^2 - 49$  $p^2 - 49$	$a^2 - 10a + 25$  $a^2 - 10a + 25$
$p^2 - 64$  $p^2 - 64$	$(p + 7)(p - 7)$  $(p + 7)(p - 7)$	$(a - 5)^2$  $(a - 5)^2$	$(p + 8)(p - 8)$  $(p + 8)(p - 8)$	$(a - 2)^2$  $(a - 2)^2$

# Crazy Conic



**Topic:** Origin-centred conics—algebra 2 or analytic geometry

**Level:** Grades 11-12

**Number of Players:** 3-4

**Materials:** Set of "Crazy Conic" playing cards

- Procedure:**
1. The dealer shuffles the cards and deals them all out. Players match the graph of a conic with the corresponding equation for those pairs in their hand and put the pairs face up on the table.
  2. Play begins by each player's passing 3 of the remaining cards to the player to his or her right. If new pairs are formed from this action, players add these to the spread in front of them.
  3. To begin the draw, the player to the left of the dealer draws a card from the hand of the player to his or her left. If the drawn card completes a pair, the player plays the pair face up with the others. Otherwise, the player keeps the card, and the next person to the left draws from the player to his or her left.
  4. Play continues until all the pairs are formed, leaving 1 player with the "Crazy Conic" card. This person is the loser. As players' hands are depleted, they drop out of the game.

**Variation:** The player left with the "Crazy Conic" card is the winner!

## Equation Cards

Equation cards should display the following equations, 1 per card:

$$x^2 + y^2 = 36$$

$$x^2 + y^2 = 25$$

$$(x - 4)^2 + (y - 4)^2 = 16$$

$$(x + 3)^2 + (y + 3)^2 = 9$$

$$(x - 4)^2 + (y - 6)^2 = 25$$

$$(x + 3)^2 + (y - 2)^2 = 25$$

$$y = x^2$$

$$y = \frac{1}{2}x^2$$

$$y = \pm\sqrt{x}$$

$$y = -x^2$$

$$y = x^2 - 3$$

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

$$y = (x - 2)^2 - 4$$

$$\frac{x^2}{36} + \frac{y^2}{16} = 1$$

$$\frac{x^2}{36} + \frac{y^2}{4} = 1$$

$$\frac{x^2}{16} + \frac{y^2}{4} = 1$$

$$\frac{x^2}{100} + \frac{y^2}{256} = 1$$

$$\frac{4x^2}{81} + \frac{y^2}{36} = 1$$

$$\frac{x^2}{36} + \frac{(y - 5)^2}{16} = 1$$

$$\frac{(x - 4)^2}{9} + \frac{(y - 3)^2}{25} = 1$$

$$\frac{x^2}{9} - \frac{y^2}{25} = 1$$

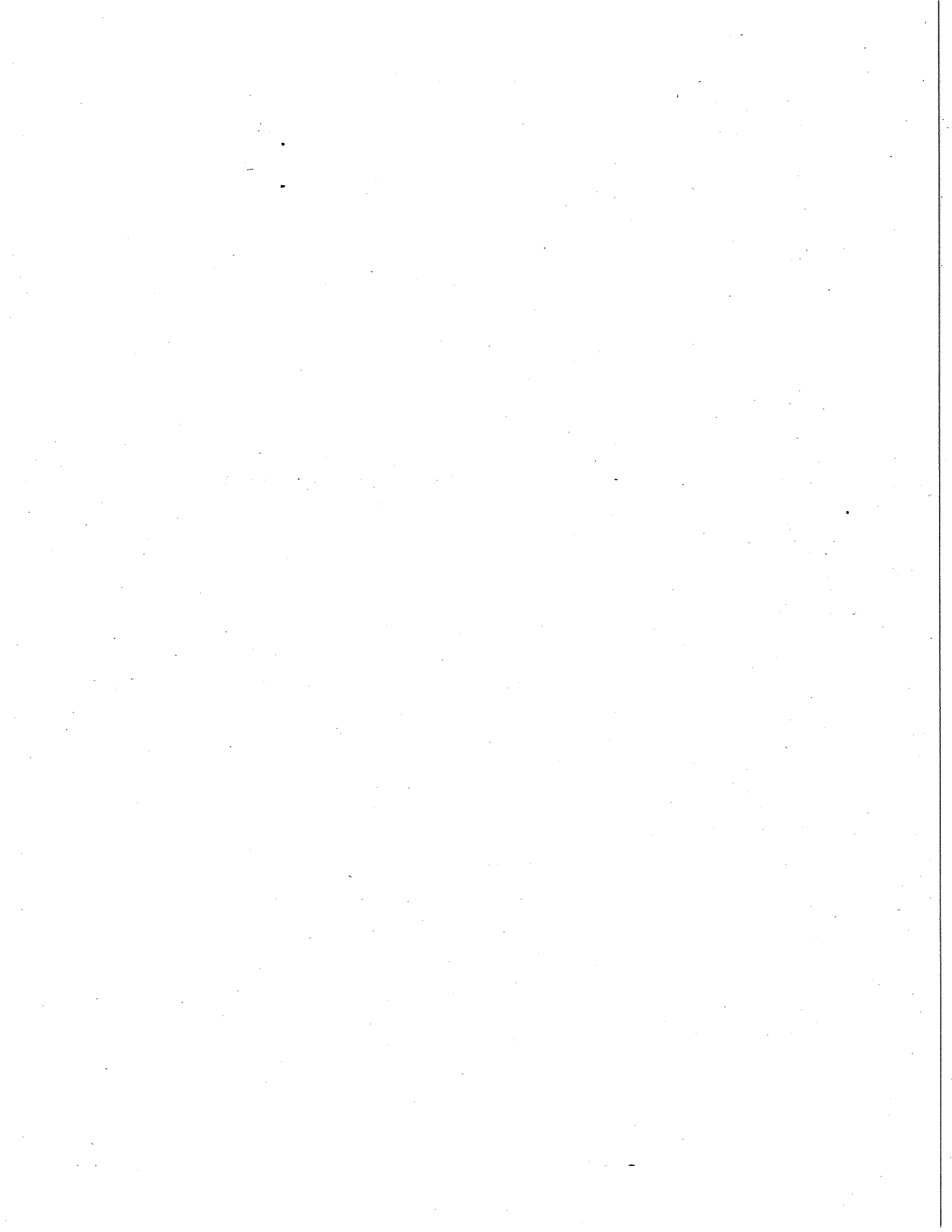
$$\frac{y^2}{16} - \frac{x^2}{9} = 1$$

$$\frac{x^2}{16} - \frac{y^2}{9} = 1$$

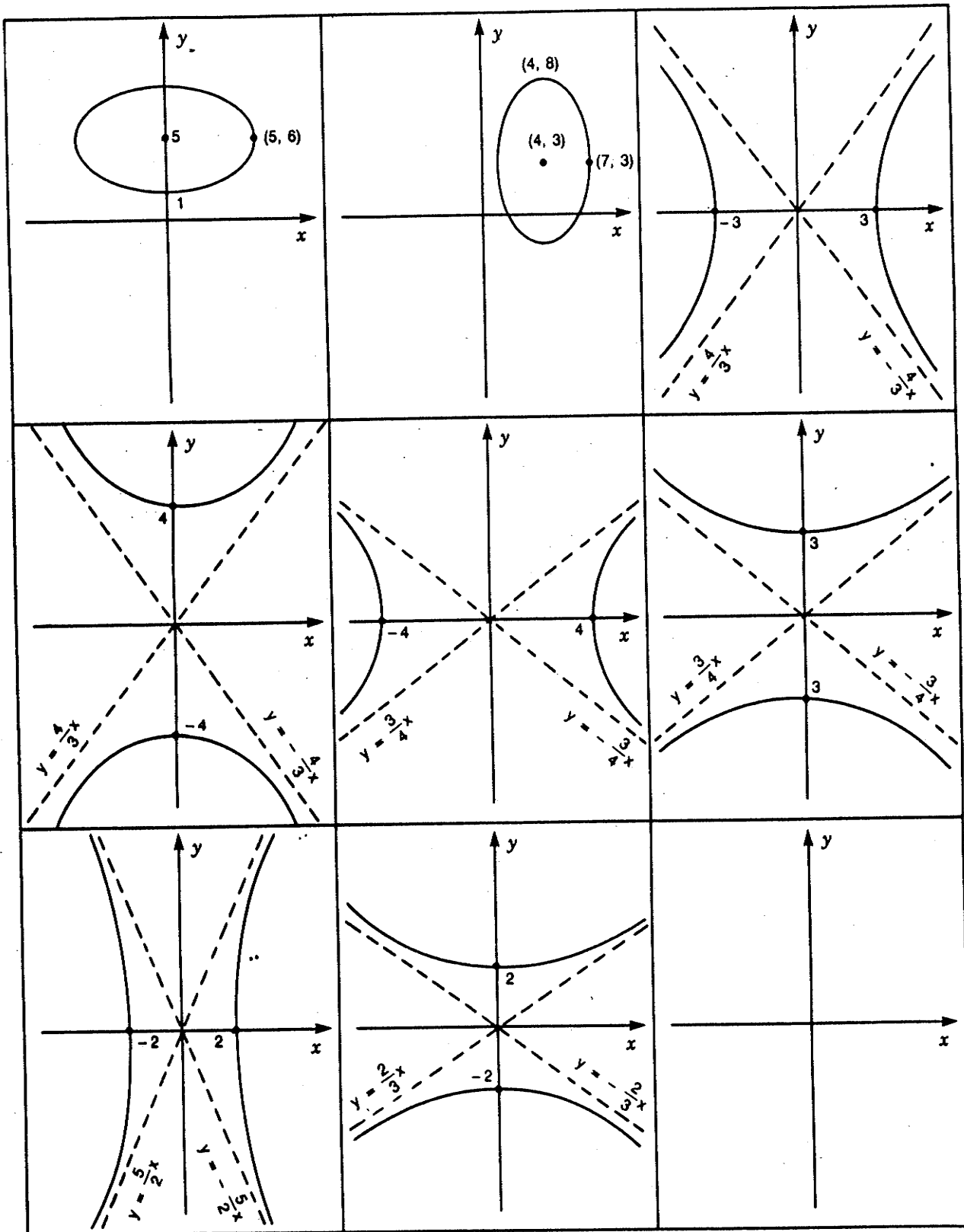
$$\frac{y^2}{9} - \frac{x^2}{16} = 1$$

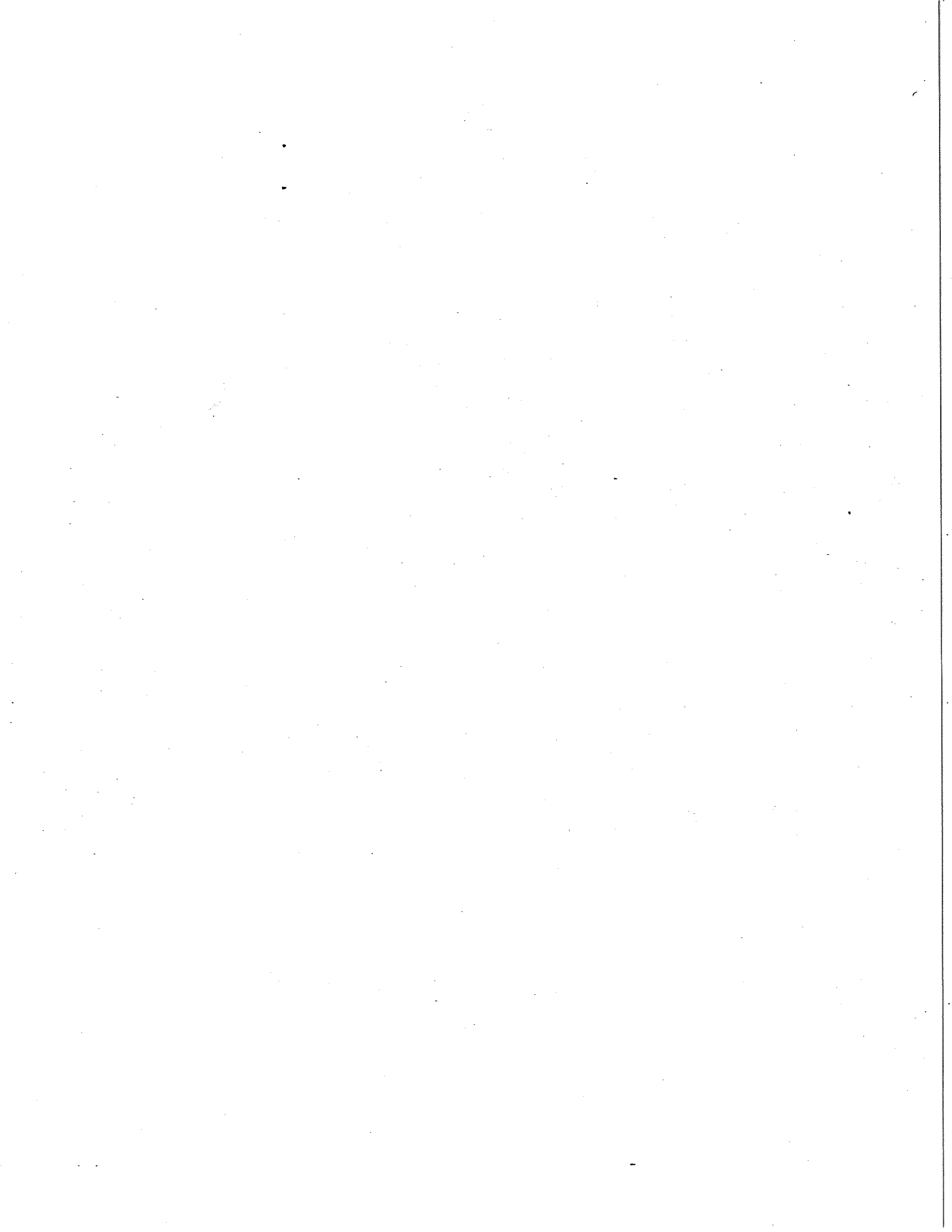
$$\frac{x^2}{4} - \frac{y^2}{25} = 1$$

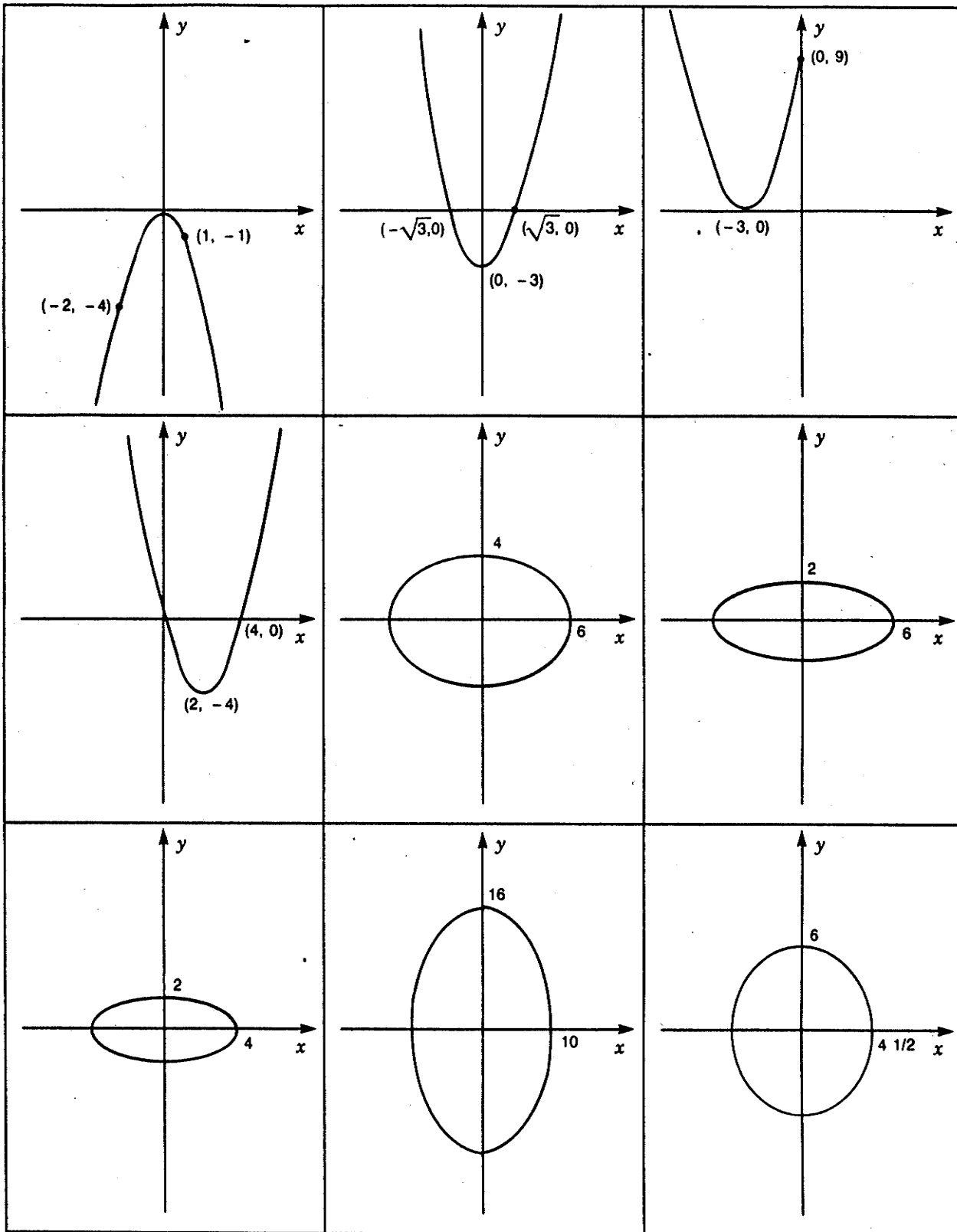
$$\frac{y^2}{4} - \frac{x^2}{9} = 1$$

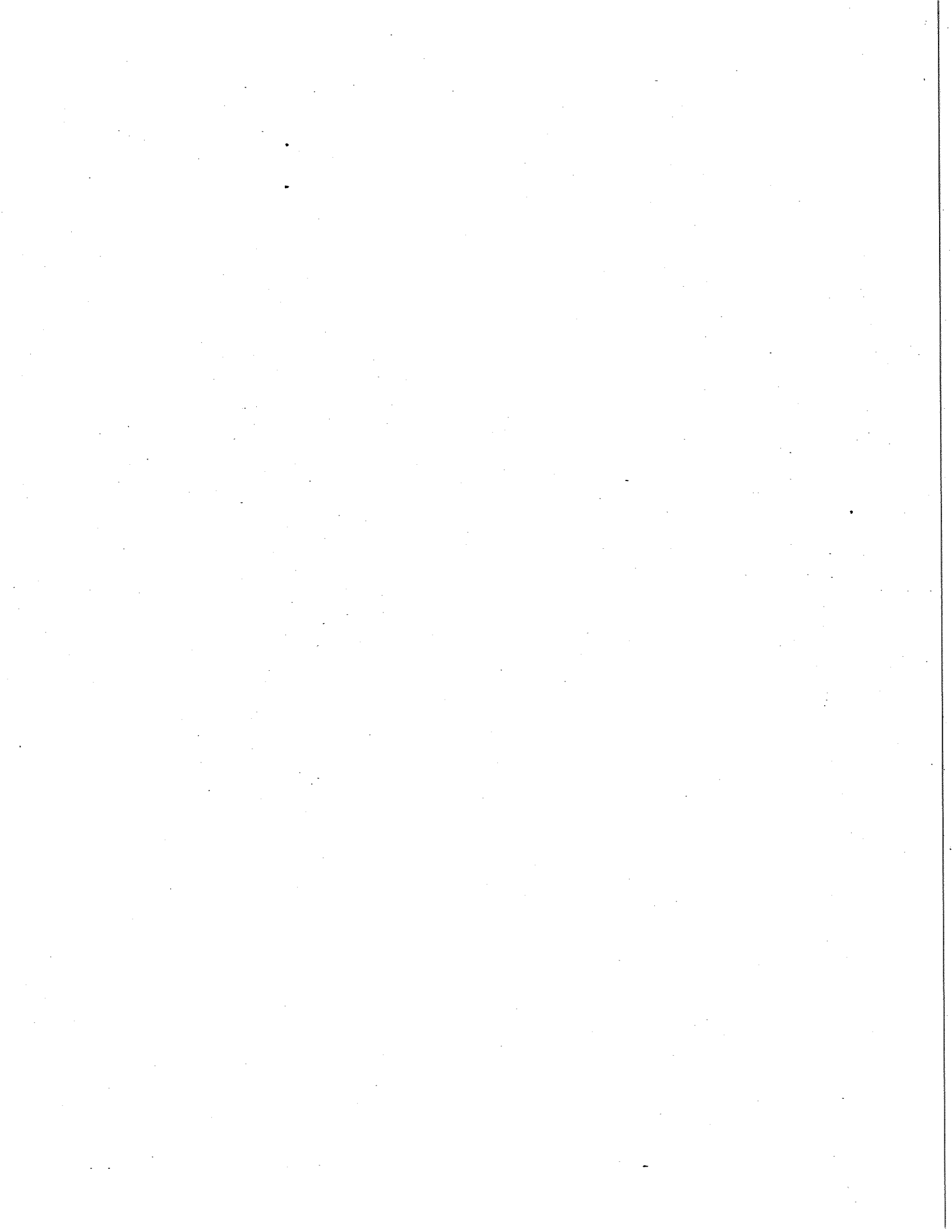


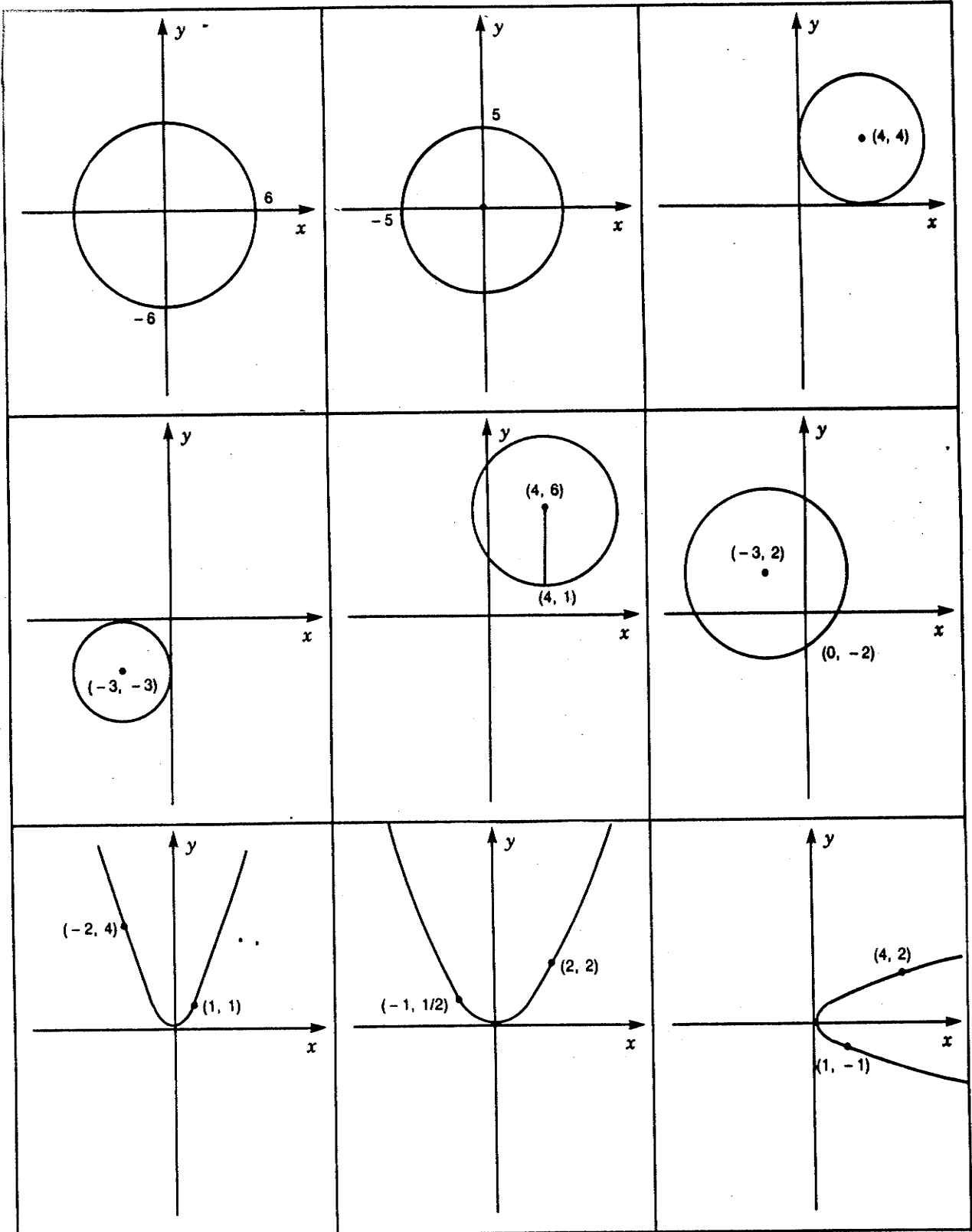
# "Crazy Conic" Playing Cards

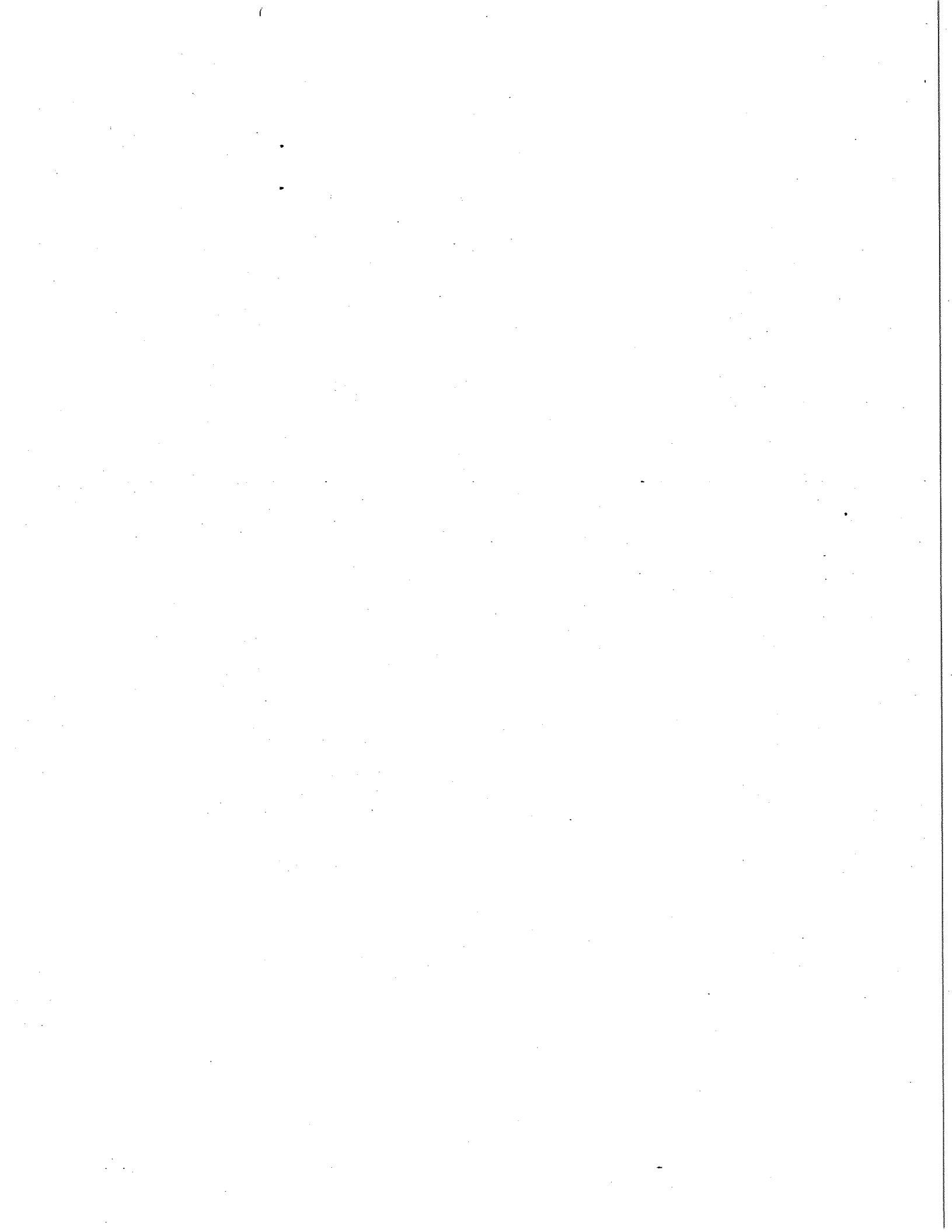




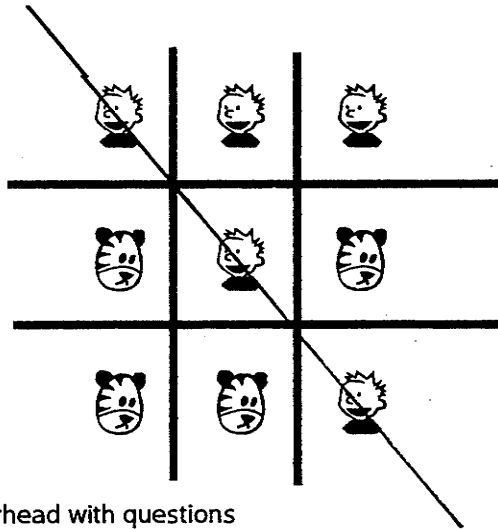








## Human Tic-Tac-Toe



**Materials:** 1 pair dice  
cue cards / overhead with questions  
9 chairs / desks  
paper & pencil (students)

**Groups:** 2 groups (max per group: 12)  
Extras: dice roller, cue card holder, score-keeper

**Instructions:** - Set up nine chairs - just like the sections on a tic-tac-toe diagram.

- Divide class into two teams. Team 'X' and Team 'O'.
- Have members of each team number themselves off. (#1 - #12)
- Each team takes turn answering question presented on cue card.
- Every student on team works out answer.
- Roll dice.
- Team member with corresponding number answers question.
- If correct, team sends member to sit in selected chair.
- If incorrect, other team can give answer and send member to sit in selected chair.
- Sitting team member uses arms to make X or O shape.
- The first team to get three in a row (down, across, diagonally) wins!

Like #'s & Heads!  
If class is 32 big  
use 2 8-sided dice.

### Recommendations:

Game is good for a review at the end of any unit.

Questions presented should test and review short-answer type questions to keep healthy pace.

To make game more exciting, establish a time limit for answers.

Prize should be awarded to winning team. (ie. all members granted special privilege)

## Sample Questions for HumanTic-Tac-Toe

**Topic:** Polynomials & Rational Expressions Review

**Level:** Grade 11 Advanced

1. *Simplify:*

a.  $4a + 7b + 3a + 10b$

b.  $4 + 2x - 5x^2 + 3 + 4x - 2x^2$

2. *Simplify:*

a.  $(x + 4)(x + 9)$

b.  $(2x + 3y)(x - y)$

3. *Factor:*

a.  $x^2 + 7x + 12$

b.  $x^2 - 8x + 12$

4. *Factor:*

a.  $4x^2 + 24x + 20$

b.  $2x^3 - 8x^2 + 6x$

5. *Factor:*

a.  $8x^2 + 26xy - 7y^2$

b.  $4y^2 + 7y - 15$

6. *Factor:*

a.  $a^2 - b^2$

b.  $m^4 - n^4$

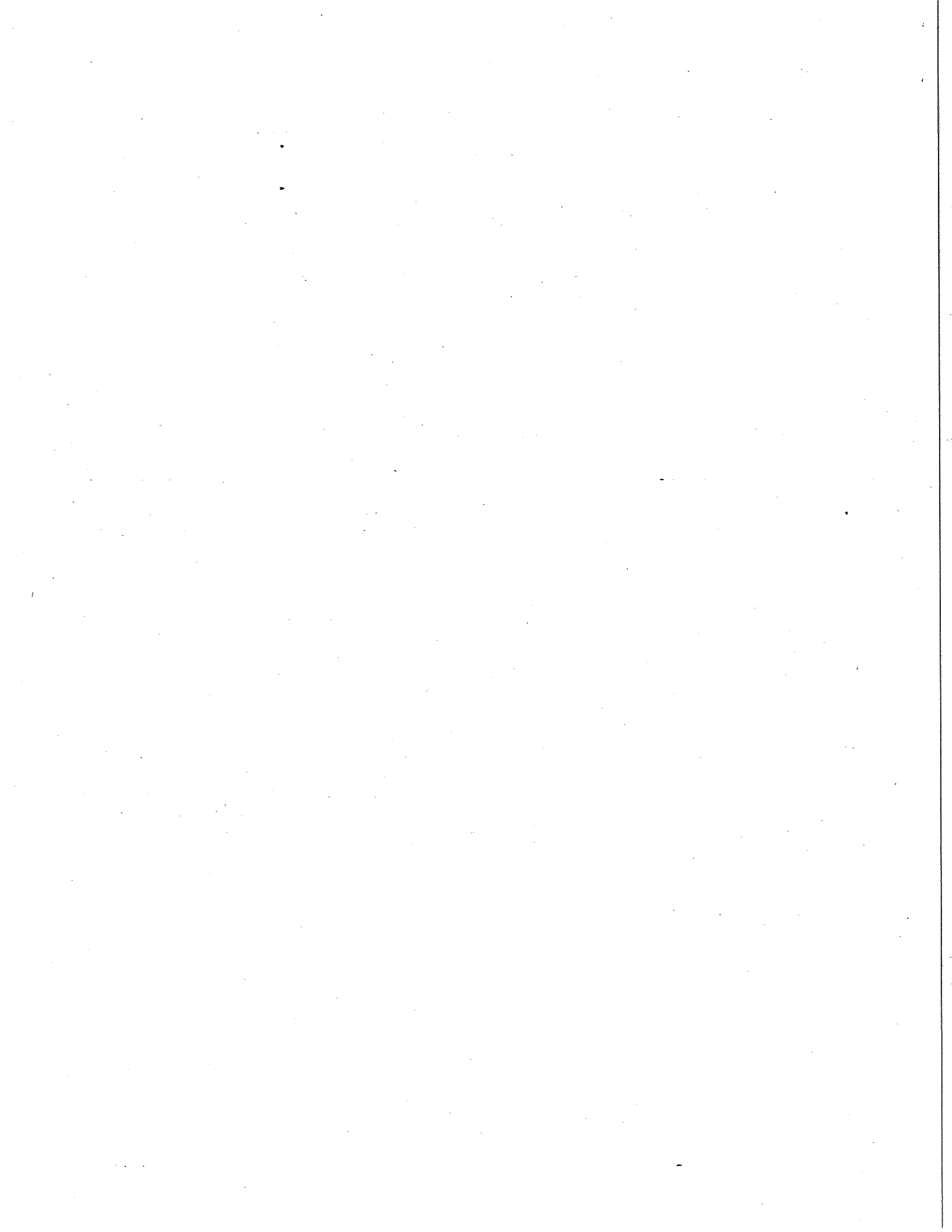
7. *Solve the following equations:*

a.  $(x - 3)(x + 2)(x - 7) = 0$

b.  $9x^2 - 25 = 0$

## **FACTOR FEUD - HOW TO PLAY!!!!**

Factor Feud is played in the same style as Family Feud. This game was developed for grade nine destreamed but could be changed to suit other grade levels using different questions. There are two teams of 5 - 6 players. You will have to have two games going at the same time. This will require the assistance of an OAC student or mature grade nine student. The players are numbered. For the first set player one from each team comes forward. The set of questions is displayed on the overhead and the first of the two students to ring the bell and identify what type of factoring is required for the five questions wins the first chance at the set for their team. The team that has won first chance has each player complete a question from the set without discussing with each other their answers. The teams will have thirty seconds to complete their respective questions. While the first team is doing this the other team will be doing the same thing since they will have a chance to steal the set if the first team makes a mistake. The teacher will ask player one for their answer. If correct the team scores 10 points. If incorrect the second team has a chance to steal if the person assigned that question can answer it correctly. Once the second team has stolen they also steal all of the points accumulated for that set of question. This continues for the remainder of the game, while the teacher changes the person who comes forward to determine the type of factoring required. You will notice that there are five sets with mixed questions. The two players that come forward must identify what type of factoring is required for each of the questions in the set within 10 seconds to win first chance at the set of questions.



# FACTOR FEUD

## SET ONE

- |                         |                     |
|-------------------------|---------------------|
| 1) $14x^2 + 35x - 7$    | $7(2x^2 + 5x - 1)$  |
| 2) $-10a - 25a + 30a^2$ | $5a(-5 - 5 + 6a)$   |
| 3) $20n^2 - 30n + 80$   | $10(2n^2 - 3n + 8)$ |
| 4) $5x + 10x^2 + 15x^3$ | $5x(1 + 2x + 3x^2)$ |
| 5) $9c^3 + 15c$         | $3c(3c^2 + 5)$      |

## SET TWO

- |                      |                    |
|----------------------|--------------------|
| 1) $x^2 + 12x + 36$  | $(x + 6)(x + 6)$   |
| 2) $a^2 + 4a + 4$    | $(a + 2)(a + 2)$   |
| 3) $p^2 + 14p + 49$  | $(p + 7)(p + 7)$   |
| 4) $x^2 - 8x + 16$   | $(x - 4)(x - 4)$   |
| 5) $x^2 + 20x + 100$ | $(x + 10)(x + 10)$ |

## SET THREE

- |                           |                       |
|---------------------------|-----------------------|
| 1) $-x^3 + x^2$           | $x^2(-x + 1)$         |
| 2) $4x - 8x^2 + 12x^3$    | $4x(1 - 2x + 3x^2)$   |
| 3) $-6y^2 - 3y^3 - 12y^4$ | $-3y^2(2 + y + 4y^2)$ |
| 4) $12m + 16m^2 - 4m^3$   | $4m(3 + 4m - m^2)$    |
| 5) $16x + 40$             | $4(4x + 10)$          |

## SET FOUR

- |                |                    |
|----------------|--------------------|
| 1) $x^2 - 25$  | $(x - 5)(x + 5)$   |
| 2) $z^2 - 49$  | $(z - 7)(z + 7)$   |
| 3) $x^2 - 36$  | $(x - 6)(x + 6)$   |
| 4) $y^2 - 100$ | $(y - 10)(y + 10)$ |
| 5) $x^2 - 1$   | $(x - 1)(x + 1)$   |

## SET FIVE

- |                     |                  |
|---------------------|------------------|
| 1) $x^2 + 9x + 18$  | $(x + 6)(x + 3)$ |
| 2) $n^2 - 10n + 25$ | $(n - 5)(n + 5)$ |
| 3) $y^2 - 13y + 42$ | $(y - 6)(y + 7)$ |
| 4) $x^2 + 15x + 56$ | $(x + 7)(x + 8)$ |
| 5) $r^2 - 5r - 36$  | $(r - 9)(r + 4)$ |

## SET SIX

- |                      |                     |
|----------------------|---------------------|
| 1) $15n - 24$        | $3(5n - 8)$         |
| 2) $-2a^2 - 6a$      | $-2a(a + 3)$        |
| 3) $a^3 - 9a^2 + 3a$ | $a(a^2 - 9a + 3)$   |
| 4) $-27x^2 - 9x + 3$ | $3(-9x^2 - 3x + 1)$ |
| 5) $5x^3 + 3x^2 - x$ | $x(5x^2 + 3x - 1)$  |

## SET SEVEN

- |                |                    |
|----------------|--------------------|
| 1) $x^2 - 4$   | $(x - 2)(x + 2)$   |
| 2) $m^2 - 64$  | $(m - 8)(m + 8)$   |
| 3) $n^2 - 144$ | $(n - 12)(n + 12)$ |
| 4) $x^2 - 16$  | $(x - 4)(x + 4)$   |
| 5) $y^2 - 121$ | $(y - 11)(y + 11)$ |

## SET EIGHT

- |                    |                   |
|--------------------|-------------------|
| 1) $a^2 - 4a - 45$ | $(a - 9)(a + 4)$  |
| 2) $n^2 - 3n - 54$ | $(n - 9)(n + 6)$  |
| 3) $m^2 - 2m - 48$ | $(m - 8)(m + 6)$  |
| 4) $k^2 - 2k - 63$ | $(k - 9)(k + 7)$  |
| 5) $x^2 - 7x - 30$ | $(x - 10)(x + 3)$ |

## SET NINE

- |                   |                        |
|-------------------|------------------------|
| 1) $9a^2 - 4$     | $(3a - 2)(3a + 2)$     |
| 2) $25x^2 - 9$    | $(5x - 3)(5x + 3)$     |
| 3) $16s^2 - 1$    | $(4s - 1)(4s + 1)$     |
| 4) $36 - 100n^2$  | $(6 - 10n)(6 + 10n)$   |
| 5) $100x^2 - 121$ | $(10x - 11)(10x + 11)$ |

## SET TEN

- |                           |                        |
|---------------------------|------------------------|
| 1) $9a^3 + 7a^2 + 18a$    | $a(9a^2 + 7a + 18)$    |
| 2) $-8d - 24d^2 - 8d^3$   | $-8d(1 + 3d + d^2)$    |
| 3) $17k - 85k^2 - 51k^3$  | $17k(1 - 5k - 3k^2)$   |
| 4) $6c^3 + 12c^4 - 16c^5$ | $c^3(6 + 12c - 16c^2)$ |
| 5) $5x^3 + 15x^2 - 25x$   | $5x^2(x + 3 - 5x^3)$   |

## SET ELEVEN

- |                  |                      |
|------------------|----------------------|
| 1) $144p^2 - 49$ | $(12p - 7)(12p + 7)$ |
| 2) $49a^2 - 1$   | $(7a - 1)(7a + 1)$   |
| 3) $4 - 36x^2$   | $(2 - 6x)(2 + 6x)$   |
| 4) $9 - 64x^2$   | $(3 - 8x)(3 + 8x)$   |
| 5) $81y^2 - 49$  | $(9y - 7)(9y + 7)$   |

## SET TWELVE

- |                     |                  |
|---------------------|------------------|
| 1) $x^2 + 7x - 8$   | $(x + 8)(x - 1)$ |
| 2) $n^2 + 13n + 42$ | $(n + 6)(n + 7)$ |
| 3) $a^2 + 5a - 14$  | $(a + 7)(a - 2)$ |
| 4) $t^2 - 2t - 3$   | $(t - 3)(t + 1)$ |
| 5) $15 - 8y + y^2$  | $(y - 5)(y + 3)$ |

## SET THIRTEEN

- |                                     |                         |
|-------------------------------------|-------------------------|
| 1) $18a - 6ab^2$                    | $6a(3 - b^2)$           |
| 2) $a^2 + 2a + ab + 2b$             | $a(a + 2) + b(a + 2)$   |
| 3) $12x^2y + 16xy$                  | $4xy(3x + 4)$           |
| 4) $3x - xy + 3y - y^2$             | $x(3 - y) + y(3 - y)$   |
| 5) $-12p^2q^3 - 20p^3q^3 + 8p^2q^4$ | $4p^2q^3(-3 - 5p + 2q)$ |

## SET FOURTEEN

- |                      |                            |
|----------------------|----------------------------|
| 1) $a^2 - b^2$       | $(a - b)(a + b)$           |
| 2) $x^2 - 4y^2$      | $(x - 2y)(x + 2y)$         |
| 3) $9m^2 - 16n^2$    | $(3m - 4n)(3m + 4n)$       |
| 4) $36x^2 - 49y^2$   | $(6x - 7y)(6x + 7y)$       |
| 5) $4c^4 - 81c^2d^2$ | $(2c^2 - 9cd)(2c^2 + 9cd)$ |

## SET FIVETEEN

- |                    |                   |
|--------------------|-------------------|
| 1) $c^2 + 9c - 36$ | $(c + 12)(c - 3)$ |
| 2) $12 + 4m - m^2$ | $(6 - m)(2 + m)$  |
| 3) $s^2 + s - 20$  | $(s + 5)(s - 4)$  |
| 4) $8 - 7x - x^2$  | $(8 + x)(1 - x)$  |
| 5) $n^2 - 4n + 4$  | $(n - 2)(n - 2)$  |

## MIXED SETS

### SET ONE

- 1)  $6y + 18y^2$
- 2)  $x^2 - 7x + 10$
- 3)  $b^2 - 25$
- 4)  $-3a + 12a^4$
- 5)  $x^2 - 6x + 9$

- 1)  $6y(1 + 3y)$
- 2)  $(x - 5)(x - 2)$
- 3)  $(b - 5)(b + 5)$
- 4)  $-3a(1 - 4a^3)$
- 5)  $(x - 3)(x - 3)$

### SET TWO

- 1)  $x^2 - 81$
- 2)  $5a^2 - 25a^3$
- 3)  $x^2 + 6x + 5$
- 4)  $y^2 - 121$
- 5)  $3a^3 + 4a^2 + 7a$

- 1)  $(x - 9)(x + 9)$
- 2)  $5a^2(1 - 5a)$
- 3)  $(x + 5)(x + 1)$
- 4)  $(y - 11)(y + 11)$
- 5)  $a(3a^2 + 4a + 7)$

### SET THREE

- 1)  $a^2 - 4a - 12$
- 2)  $9x^2 - 16$
- 3)  $6x^2y - 3xy + 9xy^2$
- 4)  $x^2 - x + 12$
- 5)  $25 - 4y^2$

- 1)  $(a - 6)(a + 2)$
- 2)  $(3x - 4)(3x + 4)$
- 3)  $3xy(2x - 1 + 3y)$
- 4)  $(x - 4)(x + 3)$
- 5)  $(5 - 2y)(5 + 2y)$

## SET FOUR

1)  $8ab - 4a^2b^2 + 6ab^2$

2)  $15 + 2x - x^2$

3)  $2x^2 - 32$

4)  $12m + 16m^2 - 4m^4$

5)  $y^2 - y - 72$

$2ab(4 - 2ab + 3b)$

$(5 - x)(3 + x)$

$2(x^2 - 16)$

$4m(3 + 4m - m^2)$

$(y - 9)(y + 8)$

## SET FIVE

1)  $n^2 + 3n - 40$

2)  $64m - 4m^3$

3)  $8 + 7x - x^2$

4)  $6x^3 + 12x^2 - 3x$

5)  $x^4 - 100$

$(n + 8)(n - 5)$

$4m(16 - 4m^2)$

$(8 - x)(1 + x)$

$3x(2x^2 + 4x - 1)$

$(x^2 - 10)(x^2 + 10)$

# BOWLING


- seatwork during unit
- review
- each frame consists of completing several easy questions or one difficult question

Teams of 5 to 8 players

Team with perfect score	STRIKE!!	25 points
Team with 1 mistake	SPARE!	20 points
Team with 2 mistakes		10 points
Team with 3 or more mistakes	GUTTER BALL!	0 points

Ask "How many had a perfect answer?" A perfect answer includes perfect form. Calculate how many in the team made a mistake.

## HIGH SCORE WINS!

