Journals Gr 12 - MCV

Name: _____

How Journals will be marked:

NAME:	Unit :	Question chosen:	Questions to finish/see note
Neat? Creative? Colourful subheadings? Numbered? Few pages only?	Definitions and/or diagrams? Example? Explanation? Correct? Answered one ✸ question?		

What I will look for in a Journal

- use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Ask yourself: "Will someone who wasn't in class be able to read your journal and understand the topic studied?" Can use point form.
- incorporate an answer to at least one of the following questions. Use a star ✸ to help me find you did so.

  Problem Solving
  - What were the advantages and disadvantages of the problem solving strategies you tried?
  - What factors make this a difficult problem?

  Reasoning and Proving
  - How can we verify this answer?
  - Why does this work?
  - What other situations need to be considered?

  Reflecting
  - How does this problem remind you of a problem you have solved before?
  - Does this problem/answer make sense to you?
  - How can this topic be used in real life? What career would use these type of skills and why?

  Connecting
  - Is an exact answer necessary for this question? Would estimation be adequate? OR Why was a calculator necessary (or helpful) for this problem? Explain.
  - Think of a different way to do the calculation that may be more efficient.

  Representing
  - How do these different representations connect to one another?
  - When could this mathematical concept or procedure be used in daily life?

  Communicating
  - How could you represent this idea algebraically? OR graphically? OR What properties would you have to use to construct a dynamic representation of this situation? OR In what way would a scale model help you solve this problem?
  - What would different representations of this problem demonstrate?
- be creative, use different colours, number each question, create a design/cartoon theme
- do not take up too much space, you are only given one booklet! Write small, think of this as your 'cheatsheet'.

Each Journal will be due the DAY BEFORE the TEST. After that, every day you'll lose 5% per day, and get a zero once the journals are returned.

Remember it is in your best interest to do ALL the Journal questions well because

- you don't know which question will be chosen or if ALL of it will be looked at
- it will be marked as Communication Part of the TEST – which is 10% of your final mark
- it helps you study
- you can keep it for future math courses as a reference

UNIT 1

INTRO to VECTORS – journal NAME:_____

1. GEOMETRIC VECTOR
    a. Distinguish between vector and scalar
    b. Find magnitude
    c. Find direction angle (math way ie. relative to the positive x-axis, counterclockwise)
2. PROPERTIES of geometric vectors
    a. "Opposite vectors RULE"
    b. Describe how to add vectors, include the "Adding vectors RULE"
    c. Describe how to subtract vectors
    d. Unit vectors
3. EXAMPLE of using TRIG to find resultant vector (cosine law AND sine law ex.)
   Include reasons for the need to draw a picture 'to scale' and what to do to resolve the problem of ambiguous case.
4. ALGEBRAIC VECTORS
    a. Formulas for 2D and 3D
    b. Example that shows how a 2D vector in GEOMETRIC form can be rewritten in ALGEBRAIC forms.
    c. Example that shows how a 3D vector in ALGEBRAIC form can be rewritten in GEOMETRIC form.
    d. Discuss how to adjust the algebraic vector from c. to be a unit vector.
5. PROPERTIES of algebraic vectors
    a. Clarify for yourself when position vetors must be added or subtracted (use the following ex and explain)
        - Given pt A and pt B, find $\overrightarrow{AB}$
        - Given parallelogram OAPB and points A and B, find point P
    b. Collinear, coplanar, spanning sets summary (ex and explain)
6. Show an example of a formal proof (prove on your own something from text or a question like it)

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.

UNIT 2

APPLICATION of VECTORS – journal NAME:_____

1. FORCES
    a. Resultant
    b. Equilibrant
    c. Real life example calculation
2. VELOCITY – real life example showing:
    a. Resultant magnitude
    b. Resultant direction
    c. Distantce/Speed/Time calculation
3. DOT PRODUCT
    a. Geometric (ex and explain)
    b. Algebraic (ex and explain)
    c. Properties
4. PROJECTIONS
    a. Scalar projection definition and picture with example
    b. Vector projection definition and picture with example
    c. Properties
5. CROSS PRODUCT
    a. Geometric (ex and explain)
    b. Algebraic (ex and explain)
    c. Properties
6. APPLICATIONS
    a. Work example
    b. Torque example
    c. Area of a shape example(parallelogram or triangle or parallelepiped) – Do an example if given vertex points (too easy if given vectors)
    d. Find angle beween two algebraic vectors3w

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.

UNIT 3

LINES and PLANES – journal NAME:_____

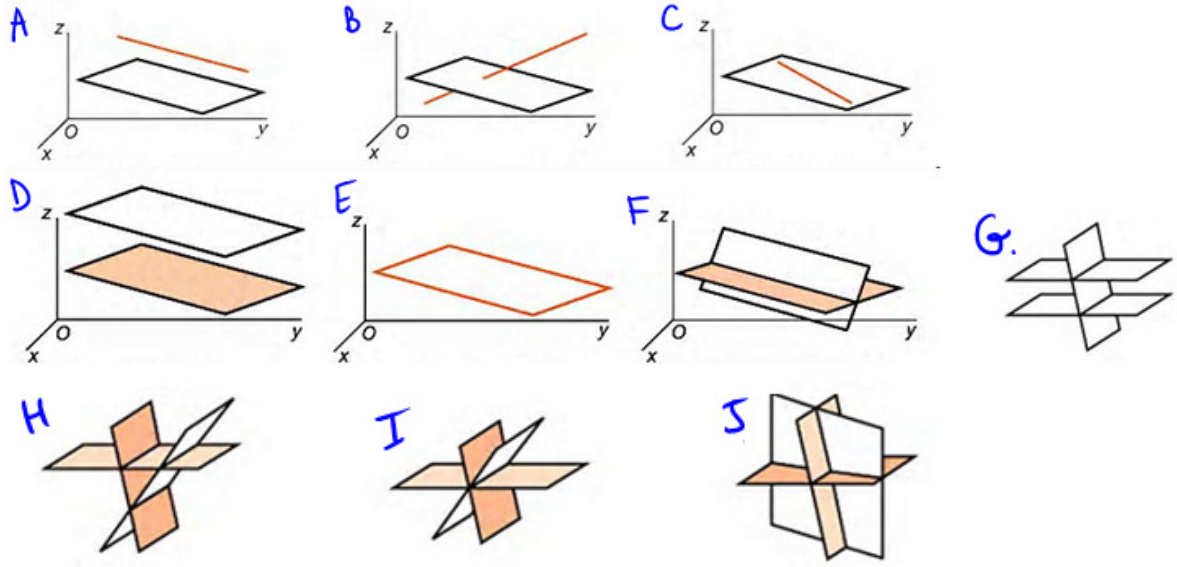
1. LINES IN 2-DIMENSIONS (ex and explain)
    a. Grade 9 version and how it ties to a direction vector and a normal vector (include why this concept wont work in 3 dimensions)
    b. Vector and parametric equations from gr 9 version
    c. Scalar/Cartesian equation
2. ANGLES (ex and explain)
    a. Angle of inclination of a line in 2 dimensions
    b. Angle between lines/planes either in R^2 or R^3
3. LINES IN 3-DIMENSIONS
    a. Vector and Parametric equations
    b. Symmetric equation
    c. Explain why it's not possible to do Scalar/Cartesian equation of a line in R^3
4. PLANES (ex and explain)
    a. Vector and Parametric equations
    b. Scalar/Cartesian equation
    c. Explain why it's not possible to do symmetric equation of a plane in R^3
    d. Intercept equation and describe a situation where it's impossible to find this.
    e. Parallel versus Coincident planes
5. SKETCHING
    a. Plane with all three intercepts
    b. Plane with only 2 intercepts, explain how to decide to draw it
    c. Give an example of a problem that is hard to solve without a 'rough sketch' (rough sketch means it doesn't have to be relative to the coordinate system at all, unlike the examples you put in in 5a,b) Show how a picture helps you to solve your question, or discuss the difficulities you had before you drew the picture.

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.

UNIT 4

INTERSECTIONS – journal NAME:_____

1. INTERSECTIONS
    For each situation, give an example then solve it or discuss why there wouldn't be any solutions. If there is LOI or PlaneOI, show how to find the vector forms



2. SHORTEST DISTANCE (ex and explain)
    a. Point to a Line in R^2
    b. Point to a Line in R^3
    c. Point to a Plane
    d. Between skew lines

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.

UNIT 5

INTRODUCTION to CALCULUS – journal NAME:_____

1. LIMITS
    a. What it means and the requirements to exist
    b. Describe how to find limits from graphs
    c. Explain, with the use of example, why the direct substitution works. Add a note of when it wouldn't work.
    d. Explain how to do a limit with x approaching infinity, since you can't plug in infinity (pick an example with HA)-

For questions 2-3
STRATEGIES for limits if direct substitution doesn't work:

2. GRAPHICALLY or by subbing in close numbers from both sides (informal)
    a. Square root at the point where graph begins
    b. Rational example at the VA
    c. Piecewise example
3. ALGEBRAICALLY if you get an indeterminate form 0/0
    a. Factor or expand
    b. LCD
    c. Rationalize
    d. Change of variable
    e. Absolute value (include the explanation of chosing the side)
4. CONTINUITY
    a. Definition and what can make a function not continuous, include examples
    b. Include an example that shows all three conditions
    c. How to find constants so that the function IS continuous
    d. Make a note to yourself not to confuse continuity and existence of a limit! Whats the difference?
5. SLOPES or RATES of CHANGE
    a. Slope of Secant(average rate of change) example
    b. Slope of Tangent(instantaneous rate of change)
        i. Usual h-->0 example
        ii. With alternate definition example

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.

UNIT 6

DERIVATIVES – journal NAME:_____

1. DERIVATIVE
    a. What does the derivative represent? How is it defined?
    b. Show ONE example of proof that a function isn't differentialbe at a particular point. (ex. cusp –absolute value function, vertical tangent – odd root type function, VA – rational function, discontinuity – piecewise function)
    c. SKETCHING derivative graphs from f(x) graph, include examples of polynomial, as well as functions with VA, HA, sharp points
2. RULES: explain in words and show at least 1 example for each:
    a. Polynomial derivative (power rule)
    b. Product rule
    c. Quotient rule
    d. Power of each factor in a product together AND explain how to simplify
    e. Chain rule for composed functions
        i. Show how to compose functions then take the derivative
        ii. Show how to apply the Chain rule without working out the composition function first.
3. IMPLICIT
    a. What is the difference of implicit and explicit derivatives?
    b. Explain and show an example that uses power/chain rule
    c. Explain and show an example that uses product/quotient rule
4. NOTATION
    a. Ex of naming derivatives with prime notation and Leibniz notation for questions written explicitly (show how to record evaluation)
    b. Ex of naming derivatives with prime notation and Leibniz notation for questions written implicitly (show how to record evaluation)

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.

UNIT 7

CURVE SKETCHING – journal NAME:_____

1. Distinguish between Positive/Negative intervals and Increasing/Decreasing intervals and Concave up/Concave down intervals
2. SKETCHING the graph from its derivative graph (ex and explain)
3. 1st way of identifying LOCAL MAX/MIN – USING F'(X) (ex and explain)
4. 2nd way of identifying LOCAL MAX/MIN – USING F"(X) (ex and explain)
5. Identify the conditions that would tell you that you have
    a. Saddle point
    b. Vertical tangent
    c. Cusp
6. ASYMPTOTES Explain how to find each type and use examples
7. One fully sketched example of your own showing all steps and details.

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.

UNIT 8

APPLICATION of DERIVATIVES – journal NAME:_____

1. VELOCITY & ACCELERATION
    a. Relate discplacement/velocity/acceleration to the function and its derivatives
    b. Relate direction of travel to the sign of velocity
    c. Relate concavity to what is occurring with displacement (Explain why an increasing interval may not mean necessarily speeding up - include a sketch)
2. 3rd way of identifying LOCAL MAX/MIN – USING F(X) (ex of both closed interval and open interval explanations)
3. OPTIMIZATION
    a. Explain the process in detail
    b. Two different examples that you had to solve on your own.

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.

UNIT 9

EXP and TRIG DERIVATIVES – journal NAME:_____

1. List all the derivative rules of trig, exponentials and logarithms. Include explanations of what you would 'say to yourself'.
2. Show 3 examples (with explanations!) of the above derivatives. Please make it complicated by combining the above rules with chain/product/quotient/power rules
3. RELATED RATES
    a. Explain the process in detail
    b. Two different examples that you had to solve on your own.

Use your own (not copied from notes or internet) examples and concise (not long – but with enough detail) explanations. Include definitions and diagrams if necessary and don't forget to include at least one star ✸ question.