Unit 7: Days 1–5, Culminating Project – Career Fair

Minds On: 30 Action: 270 Consolidate:75 Total=375 min	**Math Learning Goals:** • showcase a chosen career that makes use of the mathematics in this course	**Materials** • BLM FE.1.1-FE.1.3 • yellow pages or internet access

				Assessment Opportunities
	Minds On…	**Small Groups →Discussion** In small groups students discuss their future career choices and how they will use math on a day-to-day basis. **Mathematical Process Focus: Connecting** - Students discuss the mathematics they learned in the course and how it applies to a chosen career. **Whole Class →Activity Instructions** Hand out BLM FE.1.1 and describe to the students what will be expected of them for the culminating project. If possible show students exemplars from previous years. Refer to BLM FE.1.3 for more detailed instructions. Ensure students understand that they will need to be ready to present their career project on day 5.		Students should be using the same career that they researched in Unit 4 – otherwise, they will have to do some extra work to complete this project.
	Action!	**Individual → Activity** Students complete BLM FE.1.1 individually, over a 4 day period. While students are working, circulate to assist students and ensure they are on-task. **Curriculum Expectations/Performance Task/Anecdotal Comments:** Assess overall student performance daily and give students verbal feedback on their work as you circulate.		
	Consolidate Debrief	**Whole Class → Presentations** Students display their projects for the duration of the period and assess each other's projects using BLM FE.1.2. Refer to FE.1.3 for further instructions. **Curriculum Expectations/Performance Task/Rubric:** Circulate and evaluate the student presentations using the rubric provided.		You may want to invite other classes to come and visit the career fair.
	Reflection	**Home Activity or Further Classroom Consolidation** All work not completed in class must be done at home. You are responsible for contacting someone in your chosen career to obtain information about the mathematics involved in their career.		Use the yellow pages, or yellowpages.ca to find people in your area.

FE.1.1: Final Evaluation

Day 1: Finding Math in Your Career

1) State the career that you intend on pursuing.

_____

2) Give a brief description of what you would do on a day-to-day basis in your career.

_____

_____

_____

_____

_____

_____

_____

_____

3) How will you use mathematics and the concepts you have learned in this course in your future career? The units studied in this course are listed below. Place a checkmark beside each unit that applies to your career and give a briefly describe how.

- ❑ 1-Variable Statistics
- ❑ 2-Variable Statistics
- ❑ Exponentials
- ❑ Personal Finance
- ❑ Geometry
- ❑ Trigonometry

Unit	Description

4) Contact someone who is currently working in your chosen career and ask them questions about their daily routines and in particular, to explain how they use mathematics in their career.

Contact person _____

On the back of this page write in point form what you learned.

FE.1.1: Final Evaluation (continued)

Day 2: Posing and Solving a Problem Related to Your Career

In the space below, create a mathematical problem that may arise within the context of your career (use realistic numbers), and write a clear detailed solution. Include diagrams where applicable.

Problem:
Solution:

FE.1.1: Final Evaluation (continued)

Day 3 & 4: Preparation

Create a display for the career fair taking place in this class on Day 5. Your display must include the following:

- ❑ A career title.
- ❑ A career description, including your day-to-day routines, your expected salary, the additional education or apprenticeships needed, where you plan to work, etc.
- ❑ A description of how and what mathematics is used in your career.
- ❑ The problem and full solution you created on Day 2.

Make your display professional, informative and interesting. Remember, you want others to stop and look at your work.

Day 5: Presentation Day

On the presentation day you will be the expert on your career. You will stand by your display prepared the many facets of your career, including the mathematics that is used daily. You will also be prepared to explain your problem and solution and answer any questions posed by your teacher and peers. Both your teacher and your peers will assess your work.

Presentation Rubric

	Category	Level 1	Level 2	Level 3	Level 4
Communication	Correct use of mathematical symbols, labels, units and conventions across a range of media.	Sometimes uses mathematical symbols, labels and conventions correctly.	Usually uses mathematical symbols, labels and conventions correctly	Consistently uses mathematical symbols, labels and conventions correctly.	Consistently and meticulously uses mathematical symbols, labels and conventions, recognizing novel opportunities for their use.
	Appropriate use of mathematical vocabulary.	Sometimes uses mathematical vocabulary correctly	Usually uses mathematical vocabulary correctly when expected.	Consistently uses mathematical vocabulary correctly when expected.	Consistently uses mathematical vocabulary correctly, recognizing novel opportunities for its use.
	Degree of clarity in explanations and justifications in reporting.	Explanations are unclear or difficult to follow.	Explanations are somewhat clear but lack organization.	Explanations are clear and organized.	Explanations are particularly clear and detailed.
	Presentation and organization of display.	Display shows a limited attempt at organization.	Displays is somewhat organized. Student has attempted to make display visually appealing.	Display is organized and visually appealing.	Display exceeds expectations.

FE.1.1: Final Evaluation (continued)

	Category	Level 1	Level 2	Level 3	Level 4
Application	Written explanations in presentation.	Explanation of problem and solution on display are partially understandable.	Explanation of problem and solution on display are understandable by me, but would likely be unclear to others.	Explanation of problem and solution on display are clear for a range of audiences.	Explanation of problem and solution on display are particularly clear and detailed.
	Verbal explanations and responses.	Shows limited understanding of career and related math.	Shows some understanding of career and related math.	Shows a good understanding of career and related math.	Shows a thorough understanding of career and related math.

	Category	Level 1	Level 2	Level 3	Level 4
Thinking	Carry out a plan (eg. questioning, collecting data, modelling, solving, forming conclusions)	Uses planning skills with limited effectiveness.	Uses planning skills with some effectiveness.	Uses planning skills with considerable effectiveness.	Uses planning skills with a high degree of effectiveness.
	Uses of creative thinking processes	Used a previously presented example from the course/textbook.	Developed an example and solution with some help.	Developed a unique example and solution independently.	Developed an interesting and unique example and solution that exceeds expectations.

FE.1.2: Peer Assessment

Name: _____

Assess 3 different presentations, as assigned by your teacher, by circling the level that best describes their presentation from 1 (needs improvement) to 5 (excellent) for each category given below.

Presenter's Name: _____ **Career Choice:** _____

Overall aesthetics of display (is it pleasing to the eye?)	**1**	**2**	**3**	**4**	**5**
Overall clarity of display (is it easy to understand?)	**1**	**2**	**3**	**4**	**5**
Problem is interesting and makes sense.	**1**	**2**	**3**	**4**	**5**
Solution to problem is clear and thorough.	**1**	**2**	**3**	**4**	**5**
Presenter is able to answer questions with insight.	**1**	**2**	**3**	**4**	**5**
Overall Presentation	**1**	**2**	**3**	**4**	**5**

Additional Comments:

Presenter's Name: _____ **Career Choice:** _____

Overall aesthetics of display (is it pleasing to the eye?)	**1**	**2**	**3**	**4**	**5**
Overall clarity of display (is it easy to understand?)	**1**	**2**	**3**	**4**	**5**
Problem is interesting and makes sense.	**1**	**2**	**3**	**4**	**5**
Solution to problem is clear and thorough.	**1**	**2**	**3**	**4**	**5**
Presenter is able to answer questions with insight.	**1**	**2**	**3**	**4**	**5**
Overall Presentation	**1**	**2**	**3**	**4**	**5**

Additional Comments:

Presenter's Name: _____ **Career Choice:** _____

Overall aesthetics of display (is it pleasing to the eye?)	**1**	**2**	**3**	**4**	**5**
Overall clarity of display (is it easy to understand?)	**1**	**2**	**3**	**4**	**5**
Problem is interesting and makes sense.	**1**	**2**	**3**	**4**	**5**
Solution to problem is clear and thorough.	**1**	**2**	**3**	**4**	**5**
Presenter is able to answer questions with insight.	**1**	**2**	**3**	**4**	**5**
Overall Presentation	**1**	**2**	**3**	**4**	**5**

Additional Comments:

FE.1.3: Final Evaluation (Teacher Notes)

Day 1 – Finding Math in Your Career

Walk through BLM FE.1.1 with the students and ensure that they understand what is expected of them for the next 5 days, paying close attention to the rubrics you will be using to evaluate their work.

They will be expected to make contact with someone working in their chosen career to find out what the job entails on a day-to-day basis. The yellow pages or yellowpages.ca may be helpful to find a contact within the community.

Home activity:
Students should complete Day 1 of BLM FE.1.1. You may wish to have them submit that page for you to asses at the beginning or end of the next period.

Day 2 – Posing and Solving a Problem Related to Your Career

Point out the rubric to the students and indicate how they will be assessed on their career related problem. Remind them that the solution to this problem should include mathematics they have learned in this course. Weaker students may need guidance with creating appropriate problems related to their career.

By the end of day 2 students should complete and hand in Day 2 of BLM FE.1.1 for you to assess and return the next day.

Home activity:
Remind the students that they will need to bring materials to class in order to prepare their presentation (i.e. a display board, Bristol board or something to put everything together on) during the next two periods.



Day 3 and 4 – Planning and Completing your Presentation

The students should be planning and organizing their presentation. Circulate and provide feedback to students throughout the process.

Day 5 – Career Fair Presentations

Students set up their displays are the classroom, or somewhere else in the school.

Divide the students into two groups. Group 1 stays with their presentation to answer questions and show off. Assign each student in Group 2 three different projects to assess using the provided Peer Assessment sheet (BLM FE.1.3). Halfway through the class switch the roles for the groups.

Evaluate the student presentations using the provided rubrics.

Save some student work to use as exemplars for next year.

Unit 7: Days 6 & 7 or Exam Day, Final Summative Evaluation

Rationale

The following summative evaluation is to be given in addition to the summative described in the course outline. It has been written so that it can either be given during an exam time slot at the end of the course, or over 2 days at the end of the semester during class time.

The entire summative goes through a few years of a guy named Joe's life – you may want to do a 'find and replace' with some other name that fits your class/school. The summative is similar to the grade 9 EQAO format.

The first part – warm-up really – are miscellaneous multiple choice questions hopefully to give the students confidence. It's based on Joe wanting to win some contests and having trouble finding the answers to skill testing questions☺

The second part is a task which combines expectations from 2-var stats, exponential functions and financial math. Joe is trying to convince his mom that he could buy a Porsche when he's 35 – the student is doing all the calculations to determine how much this will cost. In the end, the student will decide if this dream of Joe's is attainable.

The 3rd part consists of short-answer questions. These questions cover expectations that were not included in the summatives given throughout the course. This section has Joe trying to solve miscellaneous problems in his senior year.

The 4th part consists of another task, relating to expectations from the geometry unit not revolving around optimization (as this has been covered in depth in that unit's summative). Here Joe has to determine how much paint is needed to paint the siding of a house.

While this summative can be modified and edited as needed to suit your class' individual needs, open distribution to students for other purposes (e.g., review) is discouraged.

MAP 4C
Summative Evaluation

The Many Adventures of Joe

Part I ..... Multiple Choice

Part II ..... Task

Part III ..... Short Answer

Part IV ..... Task

7.6.1: The Many Adventures of Joe

Part I: Joe's calculations and miscalculations (Multiple Choice)

Joe is 14 years old and very ambitious; he really wants to win his family a trip to Disney Planet. To do this, he has entered numerous contests that require that he correctly answer a skill testing question in order to qualify. Below are some of the questions he had difficulty with and the answers that he got.

Help Joe out by **circling the letter that corresponds to the <u>most</u> correct answer for each**.

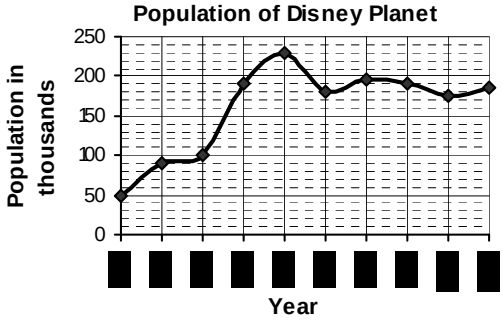
1. Simplify: $\frac{(a^3b^2)^4}{ab^6}$
   a. a^6
   b. $a^{11}b^2$
   c. a^2b^2
   d. $a^{12}b^2$

2. Evaluate: $(-27)^{\frac{2}{3}}$
   a. -81
   b. 81
   c. 9
   d. -9

3. Evaluate: $\left(\frac{1}{8}\right)^{-\frac{1}{3}}$
   a. 2
   b. $\frac{1}{2}$
   c. $\frac{1}{512}$
   d. 512

4. Solve for x: $4^x = 8^{x-1}$
   a. 4
   b. 3
   c. 2
   d. 1

Use the following graph to answer questions 5 and 6.

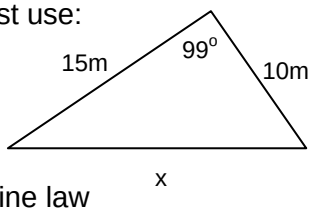


5. When did the population of Disney Planet reach a maximum?
   a. 1960
   b. 1980
   c. 1990
   d. 2005

6. Between what years did the population of Disney Planet increase the fastest?
   a. 1960-1965
   b. 1970-1975
   c. 1975-1985
   d. 1980-1985

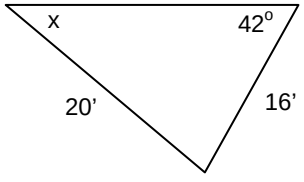
7. To minimize the surface area of a rectangular prism whose volume must be $1000m^3$ would have dimensions:
   a. $5m \times 20m \times 10m$
   b. $25m \times 20m \times 2m$
   c. $10m \times 10m \times 10m$
   d. $25m \times 8m \times 5m$

8. To solve the following for x you must use:



   a. The sine law
   b. The cosine law
   c. The primary trig ratios
   d. Pythagorean Theorem

9. The measure of the angle x shown here is:



   a. 32°
   b. 34°
   c. 39°
   d. 82°

7.6.1: The Many Adventures of Joe (Continued)

Part II: Joe and his Dream Porsche

Joe is 16 years old and has decided that he wants a brand-spankin' new Porsche Boxter Convertible, but his mom says there's no way that he could ever afford it! So, Joe has decided to show his mom that he will be able to purchase his dream car at the age of 35 if he plans his finances just right. He's asked you to help him plan.



A. How much will his car cost in 19 years?

The following table shows the approximate MSRP (manufacturers suggested retail price) of a Porsche Boxter Convertible from 2004 to 2008. Using your graphing calculator, create a scatter plot of the data and determine the line of best fit.

Year	MSRP
2004	$57 510
2005	$59 130
2006	$60 750
2007	$61 965
2008	$63 600

a) Why is a linear model the best model for this data?

b) What is the equation of the line of best fit?

c) Draw a sketch of the scatter plot with the line of best fit.

d) Use your results to determine the MSRP of a new Porsche Boxter Convertible in the year that Joe turns 35.

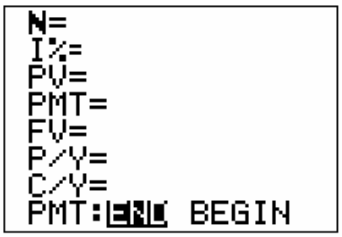
7.6.1: The Many Adventures of Joe (Continued)

B. Financing Joe's new Porsche

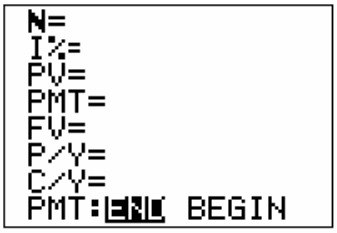
Joe knows that he will have to put 10% down on his car. To save up for this down payment, he plans on investing a set amount monthly, starting now, into Teen's Choice Financial's Interest Plus Savings Account which pays 4% compounded monthly.

a) How much will Joe have to put down on his Porsche?

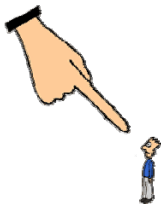
b) Using the TVM solver, determine how much Joe must deposit monthly into his savings account to have his down payment by the time he turns 35?



c) After his down payment, Joe hopes to finance the rest of the purchase price at 8.2% compounded monthly over 84 months. Using the TVM solver determine Joe's monthly payments.



C. Mom says: Don't forget Insurance!



Joe's mom says that he'll have to pay outrageous insurance rates on a Porsche. Joe has been told that insurance rates are dependant upon the driver's age. His driver's training instructor gave Joe the following table to help him out. It shows insurance rates for a male Porsche driver with a perfect driving record based on different ages.

Driver's Age	Annual Insurance Rate
18	$5 575.30
19	$5 296.54
20	$5 031.71
21	$4 780.12
22	$4 541.12
23	$4 314.06

7.6.1: The Many Adventures of Joe (Continued)

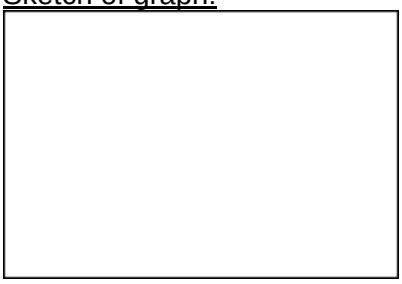
a) From the table, determine if the data represents a linear, quadratic or exponential relationship. Justify your answer.

b) Joe's grandfather's 65 year old friend drives a Porsche. His insurance rate is only $500.35 per year. Does this information fit the model you chose above? Explain.

c) Graph the data using the graphing calculator (remember to include Joe's grandfather's friend's insurance rate). Determine the equation of best fit.

Equation of best fit:

Sketch of graph:



d) Use your results to determine Joe's annual insurance rate when he purchases his Porsche.

e) If Joe decides to pay his insurance monthly instead of yearly, what will be his total monthly costs for his car payments and insurance? Should Joe rethink his Porsche dream? Explain your thinking.

7.6.1: The Many Adventures of Joe (Continued)

Part III – A collection of Dilemmas from Joe's Senior Year (Short Answer)

1. It is Joe's final year at Periwinkle Heights and he is running for student council leader. His friends are planning to give out a survey to help with his campaign. Their teacher advisor said that the following two questions contained *major biases*. Explain why they are biased questions and rewrite the question to eliminate bias.

QUESTON 1: **What is the one most important thing would you like to see Joe do this year if he becomes leader of school council?**

(a) Find a sponsor to allow us to purchase new basketball uniforms

(b) Bring back intramurals at lunch time

(c) Raise money for a new score board for the gymnasium

QUESTON 2: Overall who are you most likely to vote for?

(a) The amazing Joe

(b) Smelly Melly

(c) Overly excitable Olivia

(d) Boring Bob

2. Joe's little sister Jen has an ant farm. The population appears to be doubling every week. Joe determined the equation of the growth of the ant farm population to be $P=25(2)^n$, P is the population and n is the number of weeks since she got the farm. Jen's ant farm is only big enough to hold 51 200 ants. Joe wants to know how long it will take for her ant population to exceed the farms maximum so that he can buy her a new farm.

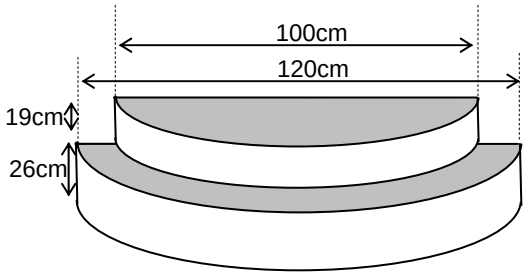
7.6.1: The Many Adventures of Joe (Continued)

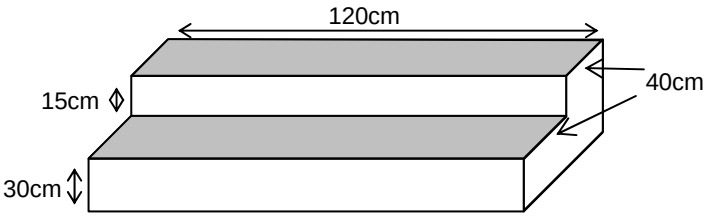
3. Joe wants to prove that his girlfriend, Moe, is the best soccer player in the league. Mary Lou is her only competition. The following stats show the number of goals scored per game for the two girls.

Moe:	2	3	0	1	2	4	2
Mary Lou:	3	0	0	4	3	2	

Determine who the better player is by finding the 1-variable statistics (measures of central tendency). Explain your reasoning.

4. Joe's mom needs new front steps on her house. He thinks she should get fancy circular steps, she wants normal rectangular steps, his dad said to get whichever one requires less concrete poured into it. Here are the designs. Which steps should they get? Justify your answer mathematically.





7.6.1: The Many Adventures of Joe (Continued)

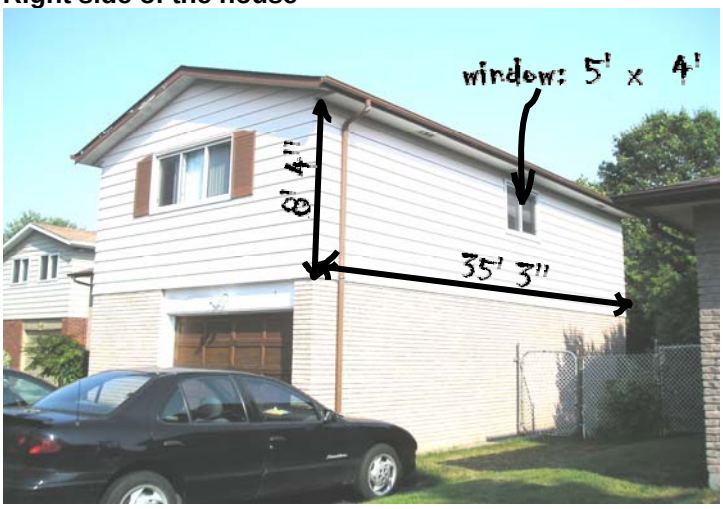
Part IV: Joe's Summer Job

Joe just turned 19 years old. He has a summer job working for ASSP (*Aspiring Struggling Student Painters)*. He and his partner Norm have been hired to paint the siding of a two story house. Norm is more of a hands-on kind of guy and it is his job to take all of the measurements so that Joe, the brains of the operation, can determine how much paint will be needed to complete the job and how much it will cost.

a) It was a very hot day when Norm went to the house to take the measurements. He suffered from a bit of heat stroke and as a result, forgot to complete his measurements. The pictures below show the house that must be painted and include the measurements, in feet, that Norm took.

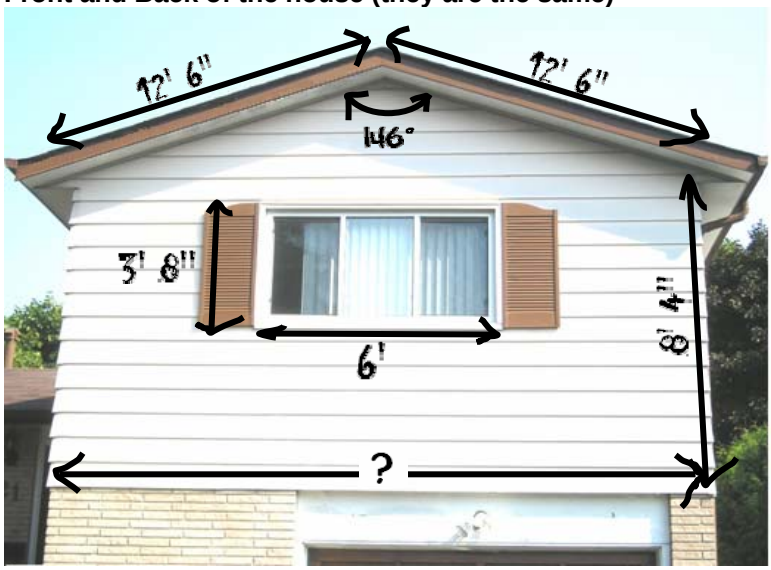
Joe has added in some angles he measured from the pictures and marked the sides that need to be calculated. Determine the measure of any missing sides and calculate the area of the siding needing to be painted in each picture.

Right side of the house



7.6.1: The Many Adventures of Joe (Continued)

Front and Back of the house (they are the same)



7.6.1: The Many Adventures of Joe (Continued)

Left side of the house



b) Determine the Total Area needing to be painted, in imperial measure

7.6.1: The Many Adventures of Joe (Continued)

c) Pete's Paint supplies the paint and primer for ASSP. This house will need 1 coat of primer and 2 coats of paint. When they are finished they will leave the remaining paint and primer behind with the homeowner. The following are the prices for the primer and the paint.



Pete's Cover Primer
$138.00 per 18.9 L



Pete's Exterior Paint
$38.77 per 1 Gallon

NOTE: 1L of paint/primer covers 9m^2 of surface.

Determine how many buckets of primer they will need to purchase. Remember to make the appropriate conversions.

Determine how many cans of paint they will need to purchase. Remember to make the appropriate conversions.

Determine the total cost of the paint and primer.