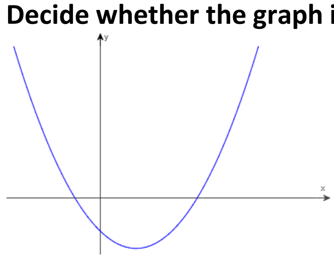
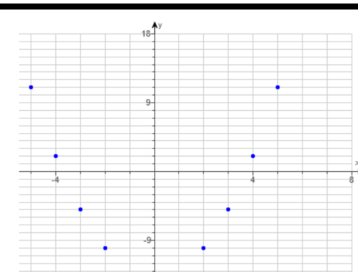
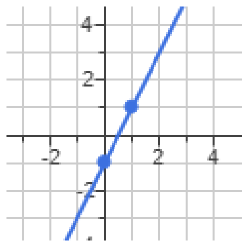
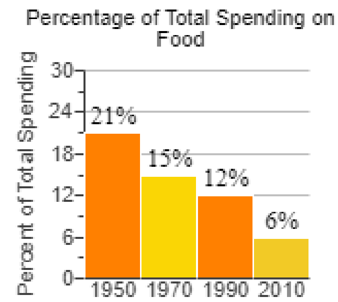
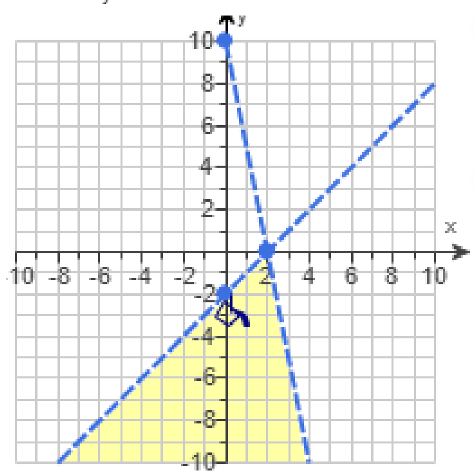
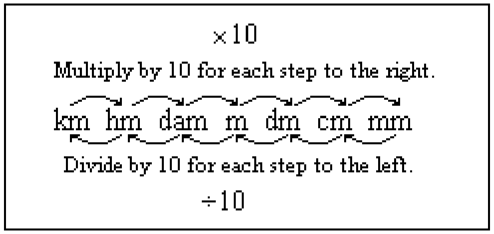
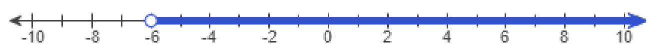
MAT118 Learning Outcome EXAMPLES		
(Application Level) Apply technology to assist in solving mathematical applications involving linear Equations, inequalities, and systems of linear equations.	**Find the proportion and use a calculator to find solution of the following:** A new car worth \$25,000 is depreciating in value by \$5,000 per year. After how many years will the car's value be \$10,000? **Solution: 3 years**	**Find the inequality and use a graphing calculator to find the solution.** A car can be rented for \$60 per week plus \$0.10 per mile. How many miles can be driven if you have at most \$140 to spend for weekly transformation? **Solution: 800 miles**
(Analysis Level) Apply the techniques of rounding to estimate the solutions to problems.	**Obtain an estimate for the following computation by rounding the numbers so that the resulting arithmetic can easily be performed by hand or in your head. Then, use a calculator to perform the computation.** How reasonable is your estimate when compared to the actualanswer? 9.94 + 3.14 + 19.35 Solution: Estimate 32 Actual sum 32.43 Estimate is reasonable	Ten people ordered calculators. The least expensive was \$39.95 and the most expensive was \$99.95. Half of them ordered a \$79.95 calculator. Select the best estimate of the amount spent on calculators. a. \$650 b. \$905 **c. \$760 Solution** d. \$590
(Synthesis Level) Represent a given problem with an appropriate geometric figure (circle, rectangle, sphere, etc.), identify the appropriate quantity (perimeter, area, volume etc.) and apply the appropriate formula to solve the problem.	**What will it cost to carpet a rectangular floor measuring 18 ft by 21 ft if the carpet costs \$16.68 per square yard?** **Solution:** It will cost \$700.56	**How many flowers, spaced every 6 inches, are needed to surround a circular garden with a 30-foot radius?** **Solution:** 377 flowers
(Knowledge Level) Define when a relation is a function and discuss the domain and range relative to a Function.	**Decide whether the graph is a function:**  **a. Yes** **b. No** **Solution:** Yes	 **Find the domain and range of the graph:** **Solution:** Domain{-5,-4,-3,-2,2,3,4,5} Range: {11,2,-5,-10}

MAT118 Outcome Examples

(Synthesis Level) Construct linear models and graphs given different representations of the function.	**Graph the equation** **y = 2x – 1** **Solution:** 	The bar graph below shows that as costs changed over the decades, a grou people devoted less of their budget to groceries.  In 1950, the group spent 21% of their budget on food. This has decreased a average rate of approximately 0.25% per year since then. Find a linear func slope-intercept form that models the percentage of total spending, p(x), by t group x years after 1950. **Solution:** $p(x) = -.25x + 21$
(Application Level) Solve systems of linear equations and systems of inequalities in two variables.	Solve the system of equations by the substitution method. $\begin{cases} x + 3y = 5 \\ 3x + 8y = 13 \end{cases}$ **Solution:** {(-1,2)}	Graph the solution set of the given system of linear inequalities. $5x + y < 10$ $x - y > 2$ 

MAT118 Outcome Examples

(Synthesis Level) Solve problems using the basic terms, meter, liter, gram, and demonstrate conversions, kilo, deci, milli, etc., within the Metric System, and perform conversions to and from the Metric System and the U.S. System for problems involving weight, length, and volume.	**Use the diagram in the box to convert the given measurement to the unit indicated.** **16.2 hm to m**  **Solution:** 1620 m	**Use the English and metric equivalents given, along with dimensional analysis, to convert the given measurement to the unit indicated.** **276 mi to km** 1 in. = 2.54 cm 1 ft = 30.48 cm 1 yd = 0.9 m 1 mi = 1.6 km **Solution:** 441.60 km
(Application Level) Apply terms such as set, intersection, union, disjoint, and empty to assist in solving inequalities.	**Solve the inequality and graph the solution set on a number line.** $\frac{x}{6} > -1$ **The solution set is** $\{x \mid x > -6\}$  	
(Application Level) Use measures of Mass and Temperature, such as gram and pound, and Celsius and Fahrenheit, in solving problems.	**The weight of a pencil is about how much?** **a. 50g Solution** b. 50mg **c.** 50kg	From 15°C, 35°C, 50°C, and 70°C, select the best estimate of the Celsius temperature of a warm winter day in Washington, D.C.. The average temperature in Washington, D.C. during the winter is about 40°F. *a.* 15℃ *b.* 35℃ *c.* 70℃ *d.* 50℃ **Solution:** 15℃

MAT118 Outcome Examples

(Application Level) Define and use the basics of Problem Solving Techniques based on Polya's Four-Step Model.	**BY paying $100 cash up front and the balance at $20 a week, how long will it take to pay for a bicycle costing $680?** **Solution:** **Step 1 Understand the problem.** Here's what is given: Cost of the bicycle: $680 Amount paid in cash: $100 Weekly payments: $20. If necessary, consult a dictionary to look up any unfamiliar words. The word *balance* means the amount still to be paid. We must find the balance to determine the number of weeks required to pay off the bicycle. **Step 2 Devise a plan.** Subtract the amount paid in cash from the cost of the bicycle. This results in the amount still to be paid. Because weekly payments are $20, divide the amount still to be paid by 20. This will give the number of weeks required to pay for the bicycle. **Step 3 Carry out the plan and solve the problem.** Begin by finding the balance, the amount still to be paid for the bicycle. $\$680 - \$100 = \$580$ It will take 29 weeks to pay for the bicycle. **Step 4 Look back and check the answer.** We can certainly double-check the arithmetic either by hand or with a calculator. We can also see if the answer, 29 weeks to pay for the bicycle, satisfies the condition that the bicycle costs $680. $\$20 \times 29 + \$100 = \$680$	
(Application Level) Demonstrate the rules and uses of Exponents and Scientific Notation in solving problems.	**Perform the following operation and express the answer in decimal notation using exponent rules.** $\dfrac{8.7 \times 10^{-4}}{3 \times 10^{-2}}$ **Solution:** 0.029	**Perform the following operation and express the answer in decimal notation using exponent rules.** $(2.7 \times 10^{8})(3 \times 10^{-4})$ **Solution:** 81,000

MAT118 Outcome Examples

(Analysis Level) Use Dimensional Analysis or unit ratios in solving applied problems.	**Use dimensional analysis to convert the quantity to the indicated units.** $9\ in\ to\ \_\_yd$ **Solution:** $.25\ yds$	**A baseball diamond measures 26 meters along each side. If a batter hit** **1 triple in a game, how many kilometers did the batter run?** **Solution:** The batter ran 0.078 kilometers
(Application Level) Apply the principles of Direct and Inverse Variation in solving problems.	**The weight W that a horizontal beam can support varies inversely as the length L of the beam. Suppose that a 12-m beam can support 1400 kg. How many kilograms can a 19-m beam support?** **Solution:** 884.211 kg	**The maximum number of grams of fat (F) that should be in a diet varies directly as a person's weight (W). A person weighing 102 lb should have no more than 68 g of fat per day. What is the maximum daily fat intake for a person weighing 84 lb?** **Solution:** 56 g of fat intake

MAT118 Outcome Examples

1. (Application Level) Apply technology to assist in solving mathematical applications involving linear equations, inequalities, and systems of linear equations.

2. (Analysis Level) Apply the techniques of rounding to estimate the solutions to problems.

3. (Synthesis Level) Represent a given problem with an appropriate geometric figure (circle, rectangle, sphere, etc.), identify the appropriate quantity (perimeter, area, volume etc.) and apply the appropriate formula to solve the problem.

4. (Knowledge Level) Define when a relation is a function and discuss the domain and range relative to a function.

5. (Synthesis Level) Construct linear models and graphs given different representations of the function.

6. (Application Level) Solve systems of linear equations and systems of inequalities in two variables.

7. (Synthesis Level) Solve problems using the basic terms, meter, liter, gram, and demonstrate conversions, kilo, deci, milli, etc., within the Metric System, and perform conversions to and from the Metric System and the U.S. System for problems involving weight, length, and volume.

8. (Application Level) Apply terms such as set, intersection, union, disjoint, and empty to assist in solving inequalities.

9. (Application Level) Use measures of Mass and Temperature, such as gram and pound, and Celsius and Fahrenheit, in solving problems.

10. (Application Level) Define and use the basics of Problem Solving Techniques based on Polya's Four-Step Model.

MAT118 Outcome Examples

11. (Application Level) Demonstrate the rules and uses of Exponents and Scientific Notation in solving problems.

12. (Analysis Level) Use Dimensional Analysis or unit ratios in solving applied problems.

13. (Application Level) Apply the principles of Direct and Inverse Variation in solving problems.