1. State the quadratic formula that is used to solve equations of the form.
   \[ ax^2 + bx + c = 0 \]

2. Solve by completing the square.
   \[ 2x^2 + 6x - 3 = 0 \]

3. Solve by any method.
   a) \[ 3x^4 = 12x^2 \]
   b) \[ -2x^2 + 5 = 0 \]

4. Find the solution of each of the following systems of equations.
   a) by graphing:
   \[
   \begin{align*}
   2x - y &= 3 \\
   x &= y 
   \end{align*}
   \]
   b) by graphing:
   \[
   \begin{align*}
   x + y &= 4 \\
   x &= 2 
   \end{align*}
   \]
   c) by substitution
   \[
   \begin{align*}
   x^2 + 2y &= 3 \\
   x - y &= 6 
   \end{align*}
   \]
   d) by substitution
   \[
   \begin{align*}
   3x + 6y &= 1 \\
   2x + 4y &= 6 
   \end{align*}
   \]
4e. by elimination

\begin{align*}
3x + 5y &= 1 \\
2x - 3y &= 7
\end{align*}

4f) by elimination

\begin{align*}
x + 5y + z &= 8 \\
x - 3y - z &= -4 \\
2x + 2y - z &= 2
\end{align*}

5. A coat is being sold at a 12 ½ % reduction from its original price. It originally sold for $240. What is its current price?

6. Three out of a class of 25 students were absent on Thursday. What percent of the students were absent on Thursday?

7. It is advertised that 24 % of all students on campus during the summer session are from outside Tom Green County. If there 520 students that are classified as being from outside of Tom Green County, then how many students are enrolled during the summer.

8. When I leave a tip at a restaurant I normally take 10 % of the total bill (including tax - which is 8 ½ %) and add another 5 % (half of the 10 % I already calculated). What percent of the food bill am I leaving as a tip?

9. Projected profits of a company is given by \( P(x) = -4x^2 + 120x - 200 \) (when \( 0 < x < 50 \))

What will be the projected profits at \( x = 30 \)? Explain your answer. 

At what production will you reach your maximum profit?

10. If the cost function is represented by \( C(x) = -24x + 3 \), then what is the marginal cost. What does this value represent?

11. If you are given the cost function \( C(x) = a_1x^2 + b_1x + c_1 \) and the revenue function \( R(x) = a_2x^2 + b_2x + c_2 \) Does the maximum profit occur at the same place as the maximum revenue? (HINT: need profit and \( -b/2a \))
12. You invest $1200 at 4 1/3 % simple interest for 18 months. What will be the value of this investment after 18 months?

13. You take out a $4000 simple interest loan at 6 % per year and hold on for 36 months at which time – you make a payment of $2500. The remaining amount continues earning the same interest rate. 30 months after your payment you decide to pay it off. How much interest did you pay for the entire 66 months?

14. Your grandparents provided you with a $5000 at birth to start your college savings. At age 18 you will be allowed to take out the investment. If it earned 4 % simple interest for the first 10 years and then 6 ½ % simple interest for the remaining 8 years, then how much will the original gift be worth.

15. An unusual credit card charges 14 % simple interest over the length of the account. If your initial balance is $2500, how long will it be before the balance on your account will double ( no payment is made throughout this time period ).

16. At what simple interest rate must $6400 be invested so that in five years you will have a total of $8000.
14. At what value of \( x \) – production level will you reach
   
   a) a break-even point(s) for 
   \[ C(x) = 2000 + 40x + x^2 \], and \( R(x) = 130x \)
   
   b) at what level will the profit be a maximum.
   
   c) What will be the profit when 50 items are produced?

15. What are the x-intercepts of \( C(x) = x^2 + 90x + 200 \)? ______________________

16. You invest into an account that pays \( 6 \frac{1}{8} \% \) per year compounded semiannually. How much will be in the account after 30 months?

17. You borrow $2800 at \( 12 \frac{3}{4} \% \) per year compounded quarterly for 27 months. At the end of 27 months how much will you owe in interest?

18. How long will it take an investment to double if it is earning \( 12 \frac{1}{4} \% \) per year compounded monthly? Round to the appropriate month.

19. You borrow $1800 at 8 \% per year compounded daily (assume 365 days in a year). At the end of 90 days you make a $600 payment. At the end of 24 months you will pay the remaining amount plus interest earned during the 24 month period. What is the total amount that you will pay at the end (2\textsuperscript{nd} payment)?