       Greetings!  Michael Schermer, author and *Scientific American* columnist, says that most decisions are made under uncertainty.  In mathematics, however, there is always a correct answer.  So, the question is how can we use our math skills to improve our decision-making?

        Before you complete each problem below, ask yourself two questions:

1. How does the math work?
2. Why does it matter?

       Think hard about what you are doing.

QL-A1-A   Use variables to accurately represent quantities or attributes in a

                  variety of authentic tasks.

1. After traveling for three hours at an average speed of 65 mph,

how long,  will it take Henry, driving at the same speed,to arrive at the end of his 780 mile trip?

1. A grocer raised the price of lemons 12 cents per dozen.  After the raise

in price, three dozen lemons sold for 20 cents less than the cost of four dozen at the original price.  What was the original price per dozen?

QL-A1-B  Predict and then confirm the effect that changes in variable values

                 have in an algebraic relationship.

1. Predict the change in the slopes of lines as the x- and y- coordinates vary.

(x1, y1) and (x2, y2)

* 1. (3,6) and (4,9)
  2. (-3,6) and (4,9)
  3. (3, -6) and (-4, -9)
  4. (3, -6) and (4, -9)

QL-A1-C   Interpret parts of expressions such as terms, factors and coefficients.

         1.For each polynomial, list ;

                      a) the number of terms

                      b) the leading coefficient

                      c) the factors, if possible

1. X^2 – 9x -10
2. 5x^2 -4x -1
3. 3x^2 – 2x -16
4. 12x^3 + 28x^2 -15x – 35
5. 16x^2 + 48

QL-A3-A  Create equations and inequalities that describe numbers or relationships.

                 (Set up and then solve with technology – more than 1 relationship such as

                 a system, or equation with more than one variable…include systems with

                 lines with another function and systems of linear equations with an

                 authentic task.  Linear programming – task application (system inequalities))

1. Find the missing value in each right triangle, using:  a^2 + b^2 = c^2

* 1. a = 5,  b = 12
  2. a = 7, c = 25

1. Explain why the 3 numbers given below can or cannot be the sides of a  triangle.

* 1. 2, 1, 3
  2. 4, 5, 6
  3. 7,7, 15

QL-A3-C  Use and justify reasoning while solving equations.

1. Select from these properties to justify solving each step in the equation

or principle of algebra.

* 1. Addition Property of Equality
  2. Subtraction Property of Equality
  3. Multiplication Property of Equality
  4. Division Property of Equality
  5. Identity Property
  6. Property of 0
  7. Inverse Property

* + 1. 7x + 3 = 31

7x + 3 – 3 = 31 – 3      \_\_\_\_\_\_\_\_\_\_

  7x + 0 = 28                 \_\_\_\_\_\_\_\_\_\_

       7x = 28                  \_\_\_\_\_\_\_\_\_\_

       7x  = 28                \_\_\_\_\_\_\_\_\_\_

        7       7

       X   =  4                  \_\_\_\_\_\_\_\_\_\_

* + 1. X  +  0  =  X               \_\_\_\_\_\_\_\_\_\_

* + 1. X + (-x) = 0                \_\_\_\_\_\_\_\_\_\_

2.Choose from the list below to name the correct property.

1. Symmetric Property of Equality
2. Transitive Property of Equality
3. Reflexive Property of Equality
4. Inverse Property
5. Commutative Property
6. Associative Property

* 1. 5  =  5          \_\_\_\_\_\_\_\_\_\_\_\_
  2. 7 + 4 = 4 + 7  \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. If a = b and b = c, then a = c    \_\_\_\_\_\_\_\_\_\_\_
  4. (6 + 3) + 7 = 6 + (3 + 7)       \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  5. 9 + (-9) = 0    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  6. If 6 = 5 + 1, then 5 + 1 = 6   \_\_\_\_\_\_\_\_\_\_\_

QL-N1-A   Demonstrate operation sense and the effects of common

                  Operations on numbers in words and symbols.

1. Simplify the following expressions:

* 1. 6(5x + 3) – 4(3x + 2) – (-2x -7)

* 1. 3(4x^2 – 2y) – 9(7x^2 – 3y) + 5(-x^2 – 8)

* 1. (x + 2)(x – 2)

* 1. (x – 3)(x^2 + 3x + 9)

1. Change these English expressions/equations into Algebraic expressions and,

if possible, simplify.

* 1. Seven times three less than a number
  2. Seven times three less a number
  3. Four more than twice a number
  4. Eight less than nine times a number
  5. Eight less three times a number
  6. Eight less three times a number is eleven.

QL-N1-B  Apply mathematical properties in numeric and algebraic contexts.

       1.  a.Change 65 degrees Fahrenheit to degrees Celsius.

           b. Change 40 degrees Celsius to degrees Fahrenheit

               F = (9/5)C + 32                                C = (5/9)(F – 32)

      2.  Find the vertex of the parabola of this function:

               F(x) = 3x^2 -  18x   +   16

QL-N1-D    Read, interpret and make decisions based upon information from various

                   data displays.

1. The population of California in 1990 was 29.76 million.

The 2000 population of California was 30.19 million.  Assuming

that the state continues to gain the same number of residents

every 10 years, project the population of California in 2020.

1. In 2012 a local community college graduated 672 students.

In 2016 the college graduated 720 students.  Assuming that

the college continues to increase the number of students who

graduate at the same rate, project the student graduation rate

in 2024.

QL-N2-A    Perform arithmetic operations on whole numbers, integers, fractions and

                   decimals including basic operations without a calculator

           1.7^2 – 3^3 + 8

2.5(6^2 – 14) + ((2^3) / (4))

3.(1/2 – 1/3)^2

L

4.(7/9) / (14/3)

5. (0.14)(0.02)

6.  (0.81)/(0.3)

QL-N2-B    Apply quantitative reasoning to solve problems involving quantities or

                   rates.

           1.If Sam can pack 2 dozen candied apples in 12 minutes, how long will it

              take him to pack 108 candied apples?

        2.If Tom can travel 360 miles in 8 hours, how long will it take him if his

           rate is increased by 15 mph?

QL-N3-A    Use estimation skills.

                1.If one bag of grass seed covers 9 square yards, about how many

                   bags of grass seed would be needed to cover a lawn that is 30 feet

                  by 45 feet in dimensions?

QL-N3-B  State convincing evidence to justify estimates.

               1..Dave needs to paint a room that is 10 feet by 12 feet and 15 feet high.

                 If you did not estimate how much paint you needed, you would either buy

                too much or too little paint.   How would you decide and how much would it

               cost to paint the room if the paint costs $29.49 a gallon and a gallon of paint

               coats 45 square yards?

QL-FM1-B   Predict and then confirm the effect that changes in variable values

                     Have in an algebraic relationship

                  For a simple interest problem, the formula to use is:

                             Interest = Principal x Rate x Time

                             I  =  Prt

           a.If the Principal increases, how does the interest change?

          b. If the rate decreases, how does the interest change?

         c.If the time decreases from 10 years to 5 years, how does

            the interest change?

      Confirm your results by using this problem:  You borrow $6000 at 5% interest rate

                                                                                      10 years

QL-FM2-A  Translate problems from  variety of contexts into mathematical

                    Representations and vice versa.

                    1 m = 39.37 in.             1 ft. = 12 in.        1 mi. = 5280 ft.

                    1km = 1000 m

                1.Change 3 feet per second to miles per hour.

               2.Change 3 feet per second to kilometers per hour

               3.Change 8 cubic feet to cubic centimeters.

               4.Change 8 cubic feet to cubic meters.

QL-FM2-D  Construct and compare models such as linear and nonlinear models

                    and use them to solve problems.

           1.The cost of renting a TV from Menards is $12 plus $1 per day.

              The cost of renting a TV from Home Depot is $5 plus $2 a day.

              When will the cost of renting a TV be the same from both stores?

      2.Alice has $48 and plans to spend $8 a day.  Elsa has $64 and plans

         to spend $12 a day.  After how many days will Alice and Elsa have

        the same amount of money?

   3.How much would be accumulated if $5000 was invested for 10 years

     at 8% annual interest rate compounded monthly?

    Hint:   Use      A   =   P(1 + r/m)^n,    where n = mt

QL-FM2-E     Interpret expressions for functions in terms of the situation they

                      model.

         1,Interpret the equation:   D  = (g/2)   x   (t^2)

                       Where g is the acceleration due to gravity:  9.8 m/s^2

                       and t is the time in seconds

                              D = distance

2. Interpret the equation:  V  =  I x R

      Where I is the current in amperes

       and R is the resistance in Ohms

       V = voltage  (AC or DC)

1. Interpret this equation for a person’s BMI  (body/mass index):

       BMI  =   weight in lb  x   703

                         height^2  (in^2)

or, in SI units:     BMI   =   weight in kg

                                             height (m^2)

A normal BMI index is between 18.5 and 25

Underweight BMI index is less than 18.5

Overweight BMI index is between 25 and 30

An obese BMI index is over 30