September 1977

Solve this sum:

$$
\begin{array}{r}
\text{DONALD} \\
+ \text{GERALD} \\
\hline
\text{ROBERT}
\end{array}
$$

(Hints: Each letter is a unique number from 0 to 9 and D = 5.)

Solve this sum:

$$
\begin{array}{r}
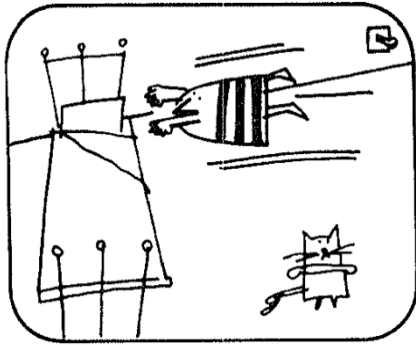\text{BEST} \\
+ \text{MADE} \\
\hline
\text{MASER}
\end{array}
$$

(Hint: Each letter is a unique number from 0 to 9.)

April 1978
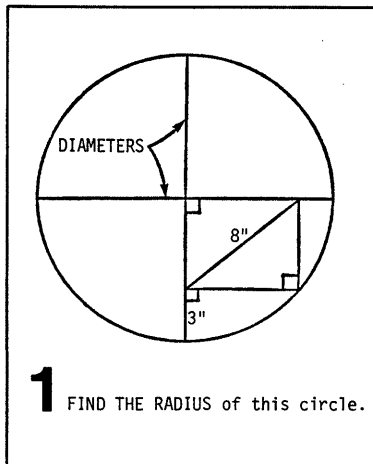
Tricky phrases … what are they?

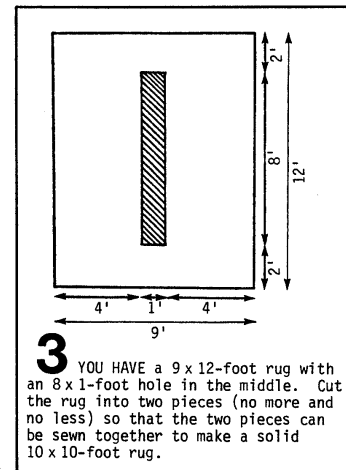| STAND / I	DICE DICE	ECNALG	C A L M	R O A D A D
CHAIR	LE VEL	MAN / BOARD	R|E|A|D|I|N|G	AGES

January 1979

Solve this riddle: Last week I turned off the light in my bedroom and managed to get to bed before the room was dark. If the bed was 10 feet from the light switch, how did I do it?

June 1981

DIAMETERS

8"

3"

1 FIND THE RADIUS of this circle.

2 THREE BOXES are labeled "Apples," "Oranges," and "Apples and Oranges." But someone got the labels mixed up, and each box is labeled incorrectly. You may select only <u>one</u> fruit from <u>one</u> box. (No feeling around or peeking permitted.) How can you label each box correctly?

3 YOU HAVE a 9 x 12-foot rug with an 8 x 1-foot hole in the middle. Cut the rug into two pieces (no more and no less) so that the two pieces can be sewn together to make a solid 10 x 10-foot rug.

2'
8'
12'
2'
4' 1' 4'
9'

September 1981

Two coyotes from different packs were loping toward each other, each at 15 mph. When they were exactly one mile apart, the first coyote happened to stir up a roadrunner, who in his haste to flee ran directly toward the second coyote. No sooner there, though, he panicked and turned back toward the first, and thus back and forth he ran, until the last split second, when the coyotes, each intent on catching a morsel of roadrunner, crashed head-on into each other and the bird flew up and escaped.

Assuming the roadrunner maintained a constant speed of 20 mph, in whichever direction he was running, what was the total distance he ran before he escaped?

October 1981

A rope over the top of a fence has the same length on each side. It weighs one-third of a pound per foot. On one end hangs a monkey holding a banana, and on the other end a weight equal to the weight of the monkey. The banana weighs two ounces per inch. The rope is as long (in feet) as the age of the monkey (in years), and the weight of the monkey (in ounces) is the same as the age of the monkey's mother.

The combined ages of the monkey and his mother are 30 years. One-half the weight of the monkey, plus the weight of the banana, is one-fourth as much as the weight of the weight plus the weight of the rope. The monkey's mother is one-half as old as the monkey will be when he is three times as old as his mother was when she was one-half as old as the monkey will be when he is as old as his mother will be when she is four times as old as the monkey was when he was twice as old as his mother was when she was one-third as old as the monkey was when he was as old as his mother was when she was three times as old as the monkey was when he was one-fourth as old as he is now.

How long is the banana (in inches)?

December 1981 (Santa)

On a train at the end of a Christmas day run, Santa Claus comes walking through the cars. He is actually one of three crew members, Smith, Jones or Robinson, who in turn are (NOT necessarily respectively) the fireman, engineer and brakeman. Aboard the train are three businessmen who have the same last names as the crew: Mr. Smith, Mr. Jones and Mr. Robinson.

The passenger whose name is the same as the brakeman's lives in Chicago.
The brakeman and fireman refused to be Santa Claus this year.
Mr. Robinson lives in Detroit.
The brakeman lives exactly halfway between Chicago and Detroit.
Mr. Jones earns exactly $40,000 per year.
The brakeman's nearest neighbor, one of the passengers, earns exactly three times as much as the brakeman.
Smith beats the fireman at billiards.

What is the name of the man who is dressed as Santa Claus?

December 1981 (Gift Exchange)

Four men (John, Jim, Arthur and Bruce) and four women (Ellen, Mary, Hazel and Gloria) have a holiday gift exchange. Each man draws a woman's name; each woman draws a man's name.

John drew the name of the woman who drew Jim's name.
Arthur drew the name of the woman who drew the name of the man who drew Ellen's name.
Bruce drew the name of the woman who drew the name of the man who drew Mary's name.
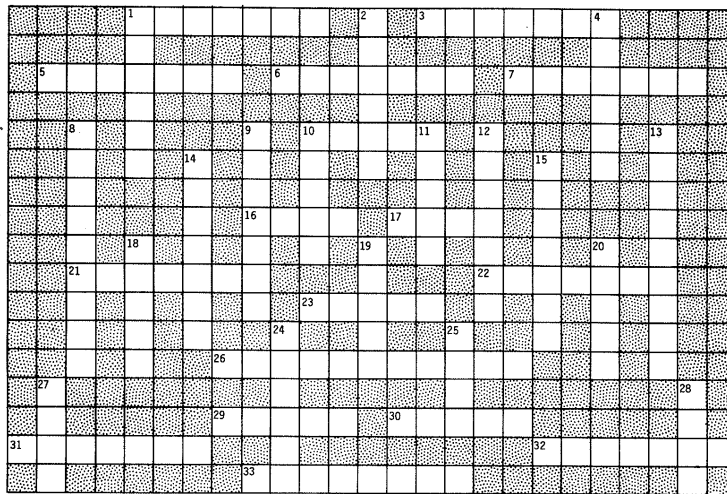The man whose name Hazel drew did not draw Gloria's name.
Gloria did not draw Bruce's name.

Who drew Arthur's name?

OPTICISTS

mws

ACROSS

1. Lived in Alexandria about AD 150. His five-part volume on optics was the first serious attempt at a study of the law of refraction.

3. President of the Optical Society of America, 1976-77.

5. English chemist and physicist (1791-1867) who in 1840's proved a relationship between optical and magnetic phenomena.

6. Dutch mathematician, physicist, and astronomer (1629-1695). Set forth the principle that "the product of lateral magnification and angular magnification is constant in an optical system, and equal to the ratio of the refractive indices"--a starting point from which all laws of Gaussian optics can be derived for lens systems with finite thicknesses.

7. Scottish physicist (1831-1879). Revolutionized physics in the areas of electromagnetism and kinetic theory. His electromagnetic theory states that light consists of electric and magnetic fields propagating through space as transverse waves.

10. American (1824-1896), head of longitude department of Coast Survey. With Agassiz, Bache, Davis, and Peirce founded the National Academy of Sciences in 1863.

16. German (1840-1896). In collaboration with Carl Zeiss, introduced more efficient procedures for manufacturing component parts of optical instruments; invented the focimeter, refractometer, apertometer, spherometer, comparometer, and a type of spectrometer named after him. Developed mathematical formulas to predetermine optical behavior of lenses. Developed theory of image formation. In cooperation with Otto F. Schott, developed new types of glass.

17. American astronomer (1868-1938) and telescope designer. Founded Yerkes, Mt. Wilson, and Palomar observatories.

21. Scottish physicist (1820-1878). His research provided the foundation for the field of thermodynamics. He correlated temperature with molecular kinetic energy and introduced the concept of absolute zero. The absolute Fahrenheit temperature scale is named after him.

22. British physicist (1820-1893). Between 1850 and 1883 published 145 papers chiefly on light and heat, and particularly on the scattering of light by the atmosphere (a type of scattering named after him), and on the transmission of ir radiation through gases.

23. German astronomer and physicist (1777-1855), known chiefly for his contributions in the mathematical theory of magnetism. In 1841, in his paper "Dioptrische Untersuchungen," he published the first general treatment of the first-order theory of lenses.

26. Dutch naturalist (1632-1723) who improved the quality of simple lenses used for simple microscopes and made important discoveries using the microscope.

29-30 (two words). Italian (ca 1538-1615). In his Magia naturalis he set forth the first exact theory of multiple mirrors, the first complete description of the camera obscura, with pinhole or lens, and a discussion of positive and negative lenses to improve vision.

31. Most notable French contributor (1788-1827) to the theory of light. Extended Young's principle of interference to complicated cases of diffraction. Many optical terms incorporate his name--for example a type of lens consisting of many refracting zones.

32. Polish mathematician (about 1270) who lived and studied in Italy. His ten-part book is probably the most voluminous optical work ever written. It included an explanation of the colors of the rainbow as originating from refraction and reflection by water drops, and a proposal for collecting sunlight into a point using parabolic mirrors.

33. Scotsman (1781-1868). Originated the kaleidoscope and developed the present form of the stereoscope. His scientific contributions were chiefly in optics, particularly in the field of polarized light; the law governing polarization by reflection is named after him.

DOWN

1. German quantum theorist (1858-1947). Developed the blackbody radiation curve, for which he was awarded the Nobel prize in 1918.

2. German physicist (1802-1870). Taught at University of Berlin; his research was on properties of ir radiation and its transmission through gases and vapors. Germany's adoption of the metric system in 1865 was due in large measure to his efforts.

4. English mathematician and natural philosopher (1642-1727), generally considered to have established the science of optics, with publication of his Opticks in 1704. The "rings" that bear his name were actually discovered by Robert Hooke.

8. French mathematician and philosopher (1596-1650). One of the discoverers (see 18 down) of the correct law of refraction; published his sine law in his Dioptrique in 1637; in France the law is generally known by his name.

9. Egyptian whose works (about AD 1100) were of enormous influence in the development of optics. For example, in his work Optics he gave the first known description of the camera obscura; studied the eye and named the liquids of that organ; and studied in great detail the problem (since named after him) of finding the point on a mirror where incident and reflected rays meet.

10. Chemist (1822-1908) who served as president of the National Academy of Sciences, 1895-1900.

11. English physicist (born in 1902); quantum theorist whose name is applied to a function $\delta(t)$.

12. Dutch physicist (1853-1928) whose research was directed toward providing a consistent theory for electricity, magnetism, and light. In 1902 shared the Nobel prize with Pieter Zeeman for the theory of the effect of a magnetic field on the emission of light.

13. American physicist (1852-1931) of great genius, best known, perhaps, for his experiment with E. W. Morley showing that the two parts of a divided ray of light travel at the same speed over paths perpendicular to each other. Awarded the Nobel prize in 1907.

14. Frenchman (1768-1830) famous chiefly as originator of mathematical analysis and series called after him. Also developed the theory of dimensions, as applied to physical equations. His work on thermal conductivity led Ohm to the corresponding electrical law.

15 (two words). Italian (1452-1519). Studied anatomy of the eye and made a model of it; described the camera obscura; described a Rumford-type photometer and a machine for grinding concave mirrors. Though known for his genius in many areas, is not generally thought of as an opticist, as he never published his notes on optics.

18. Dutchman (1591-1626) who independently (but concurrently with 8 down) discovered the law of refraction, since named after him.

19. English physicist (1818-1889) who provided quantitative proof that energy is conserved when converted from one form to another; is honored by the use of his name as the MKS unit for work.

20. French physicist (1867-1945) and developer of optical instruments. A founder of the Institut d'Optique. Developed and constructed an interferometer, named after him and his collaborator.

24. German astronomer (1571-1630). In his Dioptrice (1611) he developed the laws of first-order optics for thin lenses and systems of thin lenses with finite separations.

25. Danish physicist (1885-1962). In 1928, stated the principle of complementarity--that the wave and corpuscular descriptions of light are merely complementary ways of regarding the same phenomenon.

27. In his Catoptrics (betw. 150 BC and AD 250) derived the assumption that light chooses the shortest possible path between two points.

28. Current president of Optical Society of America. | OSA President 1978 |