

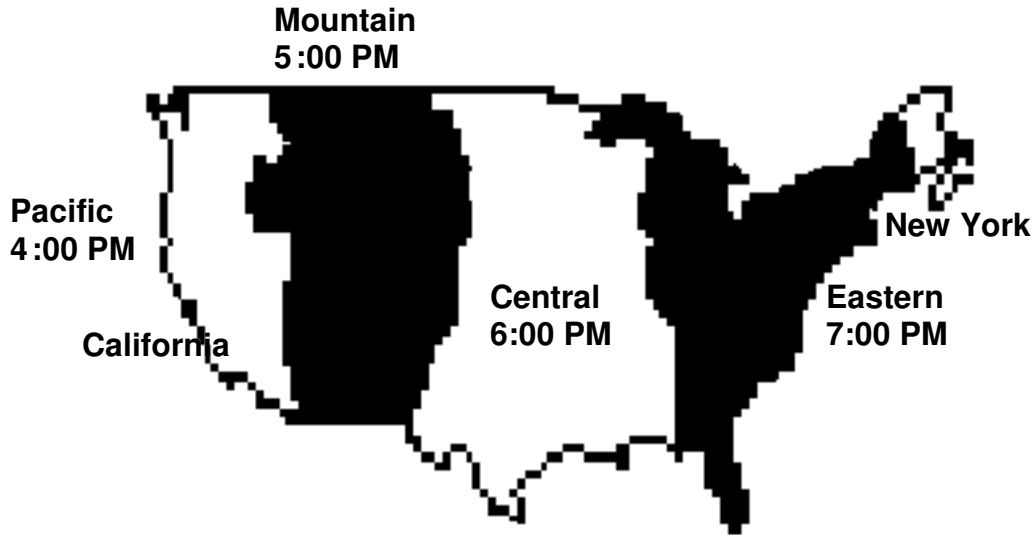
# SUPERSTARS III

*Uranus, I*

Name: \_\_\_\_\_

*(This shows my own thinking.)*

- ★★1. The map below shows the four time zones in the United States. Use the map to help you answer the following questions.



- a. If it is 11:00 A.M. in California, what time is it in New York? Answer: \_\_\_\_\_
- b. If you left San Francisco, California, at 10:30 P.M. on a six-hour flight to Miami, what time would it be in Miami when you landed?

Answer: \_\_\_\_\_

- ★2. Rusty can cut a log into 3 pieces in 20 minutes. At that rate, how long will it take him to cut another such log into 6 pieces?

Answer: \_\_\_\_\_

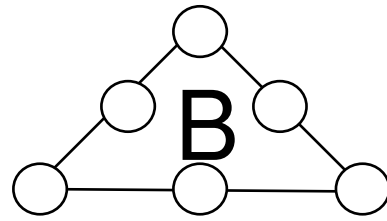
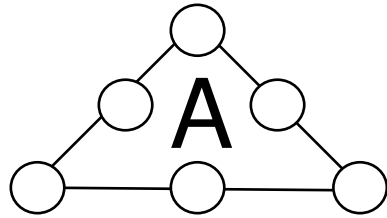
- ★★★3. Find three prime numbers, all less than 30, whose product is 1955.

Answer: \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_

- ★★4. One way to write 99 using four nines is  $(9 \times 9) + (9 + 9)$ ; another way is  $99 \div (9 \div 9)$ . Write 100 using four nines.

Answer: \_\_\_\_\_

★★★5. Put the numbers 1, 2, 3, 4, 5, and 6 in the circles below so that the sum "along a line" is 11 in figure A, and 12 in figure B.



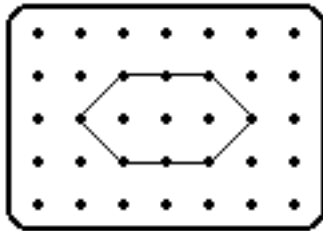
★★★★6. A train that is 1 mile long starts through a tunnel that is also 1 mile long. The train is traveling 15 miles per hour. How long does it take for the train to get completely out of the tunnel?

Answer: \_\_\_\_\_



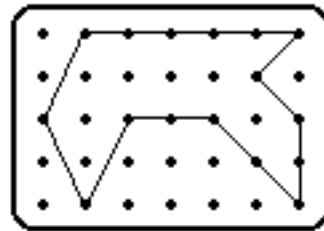
★★★7. Find the area of each polygon.

a.



Answer: \_\_\_\_\_ square units

b.



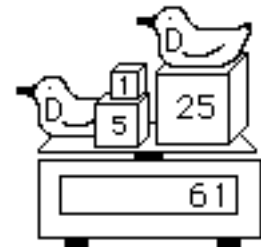
Answer: \_\_\_\_\_ square units

★★8. An equation for the situation to the right is:

$$2D + 25 + 5 + 1 = 61.$$

Solve the equation by finding how much one duck weighs.

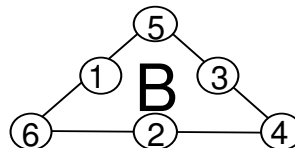
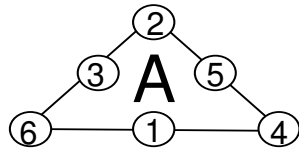
Answer:  $D =$  \_\_\_\_\_



# Commentary

## *Uranus, I*

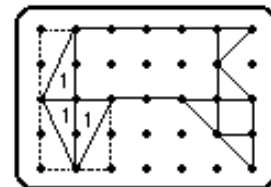
- (2:00 P.M.)** P.M. must be included.
  - (7:30 A.M.)** A.M. must be included. The time of flight as well as the time differential between time zones is considered in solving the problem.
- (50 minutes)** Drawing a picture helps in solving this problem. Students then see that only 2 cuts are needed to cut the log into 3 pieces, so it takes 10 minutes to saw through the log. It always takes one less cut than the number of pieces needed. To get 6 pieces you will make 5 cuts at 10 minutes each.
- (5, 17, 23)** *Guess, check, and revise* is a suggested strategy. Students should recognize that the number is divisible by 5 since 1955 ends in 5.  $5 \times 391 = 1955$ . They can then choose prime factors to multiply that might equal 391.
- ( $99\frac{9}{9}$ ; or  $99 + (9 \div 9)$ ; other answers possible)** Students will probably realize that they can put two nines together to get 99, which is 1 away from the goal of 100. Therefore they need to find a way to put the other two nines together, to get 1.  $9 \div 9$  works.
- (The triangles can be turned to suggest other solutions.)



- (8 minutes)** Drawing a diagram helps students see that the train will have to travel 2 miles from the point that the engine is just entering the tunnel to the point that its caboose is out of the tunnel. 15 mph means the train is going  $\frac{1}{4}$  mile per minute. So it would take 8 minutes to travel 2 miles.

This problem may also be solved with a proportion:  $\frac{2}{x} = \frac{15}{60}$

- (a. 6; b. 14)** It is helpful to draw in the lines connecting the dots and count the squares and half-squares for part a. For part b, draw in rectangles whose diagonals are the sides of the figure on the left end -- the area of the end triangles is then half of the surrounding rectangle.



- (15)** This problem is a concrete example related to algebraic thinking. Students intuitively know that they can find the weight of 2 ducks by taking the known weights off the scale, and the display will show  $61 - 31$  or 30. So they divide that result by 2 to obtain the weight of one duck. These steps give concrete meaning to solving this sort of linear equation.