Question 10

A pattern exists among the units digits of the powers of 7, as shown below. What is the units digit of 7^{50} ?

$7^0 = 1$ $7^3 = 343$ $7^6 = 117,649$

$7^1 = 7$ $7^4 = 2,401$ $7^7 = 823,543$

$7^2 = 49$ $7^5 = 16,807$ $7^8 = 5,764,801$

(Note. The units digit of 2,401 is 1.)

○   A.   1

○   B.   3

○   C.   4

○   D.   7

○   E.   9

Question 11

Explain why there are no solutions to the system of inequalities given below.

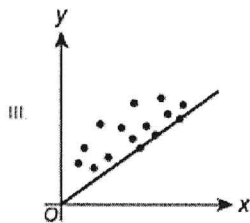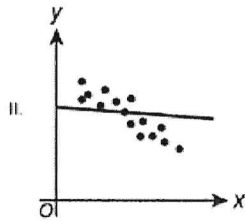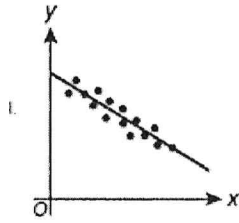$$\begin{cases} y < -\dfrac{1}{2}x - 3 \\ y > -\dfrac{1}{2}x + 2 \end{cases}$$

Question 12

A student thinks that the sum of 4.3 and 8.4 is 12.7 because 4 + 8 = 12 and 3 + 4 = 7. The student then adds 3.7 and 2.6 and gets 5.13 because 3 + 2 = 5 and 6 + 7 = 13. Identify the mistake in the student's procedure, and explain why this procedure won't always work.
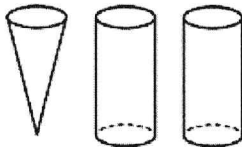
Question 13

The scatterplots below are of 3 different data sets graphed in the standard (x, y) coordinate plane. Each data set has a line of fit shown in the scatterplot. Which of the scatterplots below has(have) a line that fits the data well?

I.

II.

III.

○ A. I only

○ B. II only

○ C. III only

○ D. I and III only

○ E. I, II, and III

Question 14

A cone and 2 cylinders are shown below. The volume of the cone is 15 cubic centimeters. Each of the 2 cylinders has the same height and the same radius as the cone. What is the combined volume, in cubic centimeters, of the 2 cylinders?

○ A. 5

○ B. 10

○ C. 30

○ D. 45

○ E. 90

2/2

Living things share the following characteristics.

- Are made of 1 or more cells
- Have genetic material
- Reproduce
- Respond to change
- *Metabolize* (carry out chemical reactions to obtain and use energy)

Viruses have genetic material, and they exhibit some characteristics of life within a *host cell* (cell infected by the virus). But viruses lack many of the structures found in cells. A teacher asked 4 students to discuss whether viruses should be considered living things.

Student 1

Viruses are not cells. Viruses do have genetic material, and when in a host cell, viruses can reproduce and respond to change. However, viruses do not metabolize. The energy used to make copies of a virus is metabolized by the host cell. Because viruses are not made of cells and do not metabolize, they are not living things.

Student 2

Viruses are not cells. Viruses do have genetic material, and when in a host cell, viruses can reproduce and metabolize. However, viruses are not able to respond to change. They do not respond to changes in the environment, and they do not mutate. Because viruses are not made of cells and do not respond to change, they are not living things.

Student 3

Although viruses are not cells, they do have genetic material, and they are able to reproduce when in host cells. During reproduction, viruses respond to change and metabolize. Even though viruses are not made of cells, they can do everything a cell can do when they are inside a host cell, so viruses are living things.

Student 4

Viruses are simple cells containing genetic material but lacking organelles. Although it is correct that viruses are only able to reproduce when in a host cell, when they are within a host cell, viruses respond to change and metabolize. Viruses exhibit all of the characteristics of life, so viruses are living things.

5. **Student 1's argument differs from Student 2's argument in which of the following ways? Student 1 claims that viruses:**

   A. are cells, and Student 2 claims that viruses are not cells.
   B. are not cells, and Student 2 claims that viruses are cells.
   C. metabolize, and Student 2 claims that viruses do not metabolize.
   D. do not metabolize, and Student 2 claims that viruses metabolize.

6. **All 4 students would most likely agree with which of the following statements?**

   A. Viruses have some of the characteristics of living things.
   B. Viruses react to environmental stimuli.
   C. Viruses should be considered living things because they can reproduce.
   D. Viruses cannot reproduce in a host cell.

7. Consider the arguments given by Student 2 and Student 3. Describe TWO specific ideas on which the students *disagree*. Each of your two descriptions should clearly compare the students' arguments to each other.

8. Another student claimed that viruses do NOT contain DNA or RNA. Which of the students, if any, would be likely to agree with this claim? Explain your reasoning.

Recognizing Appropriate Sentence Construction

Directions: Read the passage below, and then choose the letter of the best way to rewrite the underlined sentences. I

> Ben Franklin is remembered for his work. He was a printer, inventor, writer, philosopher and
> (1)
> statesman. He is a symbol of American success. He created writings. In them he shares the
> (2)
> secrets of that success. For instance, he wrote *Poor Richard's Almanack*. In it Franklin coined
> (3)
> proverbs that offered practical advice for living. "A penny saved is a penny earned" is one of his
> (4)
> most famous sayings. "Early to bed and early to rise makes a man healthy, wealthy, and wise" is
> another. Franklin also revealed his secrets in his autobiography. Reflecting on his youth,
> (5)
> Franklin describes how he made a list of important virtues—like order, frugality, and industry.
> He concentrated on perfecting one virtue per week. He even kept track of the number of times
> (6)
> he failed to uphold various virtues. He did this to remind himself to do better in the future.
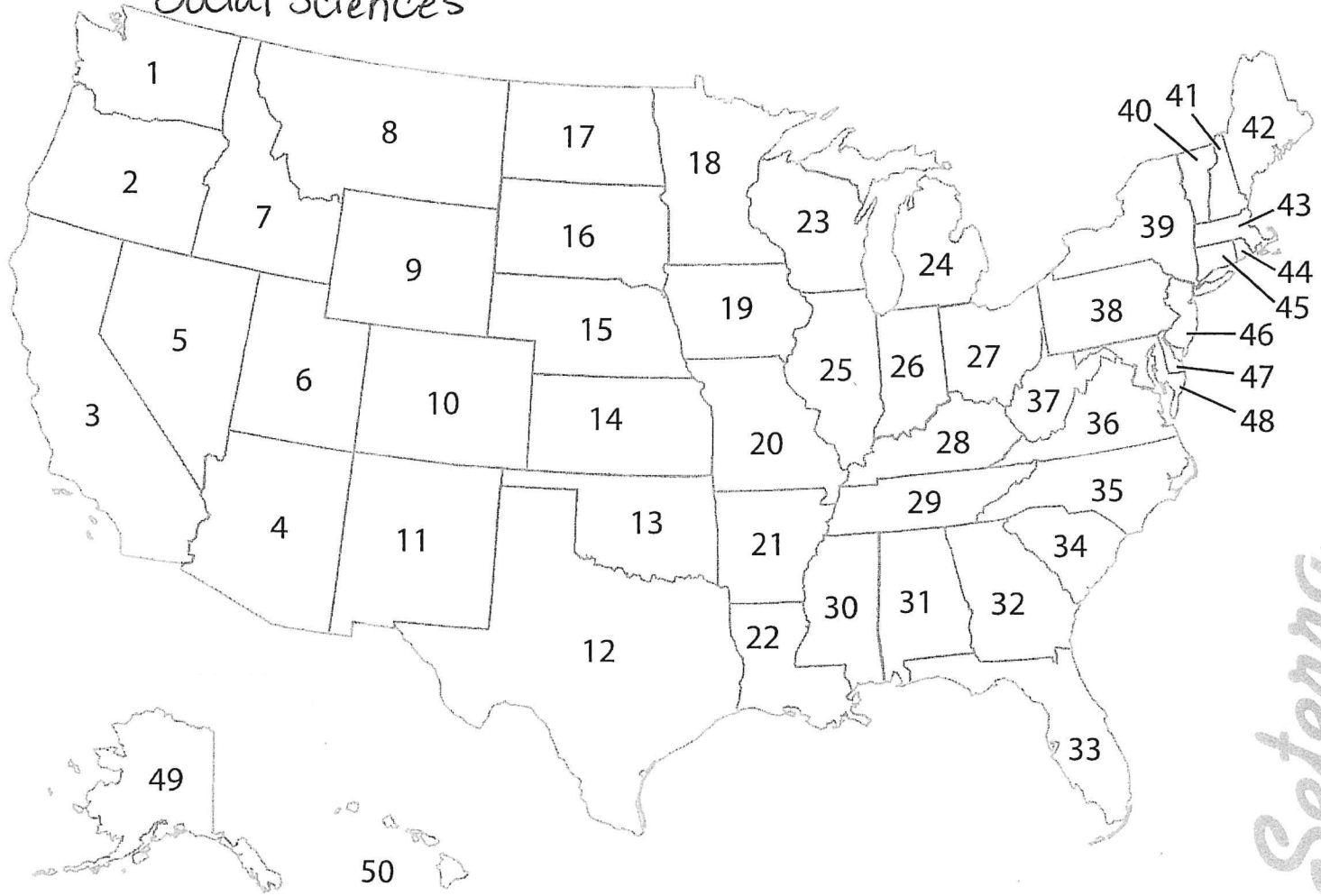
1 **A** Ben Franklin is remembered for his work. He was a printer, inventor, writer, philosopher, and statesman: a symbol of American success.
B Ben Franklin is remembered as a symbol of American success: a printer, inventor, writer, philosopher, and statesman.
C Remembered for his work as a printer, inventor, writer, philosopher, and statesman, Ben Franklin is a symbol of American success.
D A printer, inventor, writer, philosopher, and statesman, Ben Franklin is a symbol of American success. He is remembered for this.

2 **A** He shares the secrets of his success in writing.
B In his writing, he shares the secrets of that success.
C While creating writing, he shares the secrets of that success.
D His writings share the secrets of his success in them.

3 **A** For instance, in *Poor Richard's Almanack*, Franklin coined proverbs that offered practical advice for living.
B While coining proverbs that offered practical advice for living, for instance, Franklin wrote *Poor Richard's Almanack*.
C For instance, in writing *Poor Richard's Almanack*, Franklin coined proverbs. That offered practical advice for living.

D For instance, in coining proverbs that offered practical advice for living, Franklin wrote *Poor Richard's Almanack*.

4 **A** "A penny saved is a penny earned" and "Early to bed and early to rise makes a man healthy, wealthy, and wise." These are his most famous sayings.
B "A penny saved is a penny earned" is one of his most famous sayings, but "Early to bed and early to rise makes a man healthy, wealthy, and wise" is another.
C His most famous saying is "A penny saved is a penny earned."
D "A penny saved is a penny earned" and "Early to bed and early to rise makes a man healthy, wealthy, and wise" are two of his most famous sayings.

5 **A** Franklin concentrated on perfecting one virtue per week, reflecting on his youth. He made a list of important virtues, like order, frugality, and industry.
B Reflecting on his youth, Franklin made a list of important virtues. He concentrated on one per week.
C Reflecting on his youth, Franklin describes how he made a list of important virtues—like order, frugality, and industry—and concentrated on perfecting one virtue per week.
D Order, frugality, and industry are important virtues that reflect on Franklin's youth.

1/1

1	11	21	31	41
2	12	22	32	42
3	13	23	33	43
4	14	24	34	44
5	15	25	35	45
6	16	26	36	46
7	17	27	37	47
8	18	28	38	48
9	19	29	39	49
10	20	30	40	50

1/1