# P.S. #8.1 - Understanding Relations and Functions

Name: _____ Class: _____

Given the relation described, identify the input and the output.

| Relation | Input | Output |
|---|---|---|
| 1.) Aidan wants to find out the price charged for the same stereo speaker at different stores. | | |
| 2.) Five students, Allison, Sabrina, Adam, Kevin, and Alexis, have different heights. Their teacher wants to know their heights. | | |
| 3.) Gabby wants to know what after-school activities each of her friends signed up for so she knows whether she shares the same interests. | | |

Draw a mapping to represent each relation. Then, tell whether the relation is a function.

4.) Mrs. Manuel carried out a survey to find out the favorite colors of her students so that she could hand make some personalized-colored bookmarks as student gifts. The table shows the color preference of each student in her class.

| Input, Favourite Colors | Red | Blue | Yellow | Violet | Green |
|---|---|---|---|---|---|
| Output, Number of Students | 6 | 10 | 3 | 3 | 3 |

5.) The table shows the number of signatures collected each day for seven days by a citizen wanting to run for town council.

| Input, Number of Signatures | 55 | 43 | 55 | 30 | 75 | 55 | 62 |
|---|---|---|---|---|---|---|---|
| Output, Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Determine whether each statement is True or False. Explain.

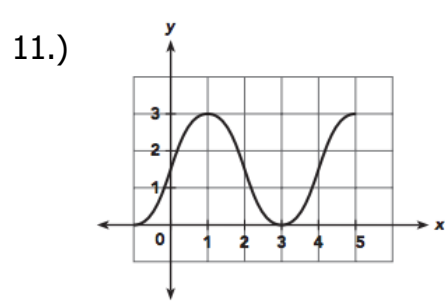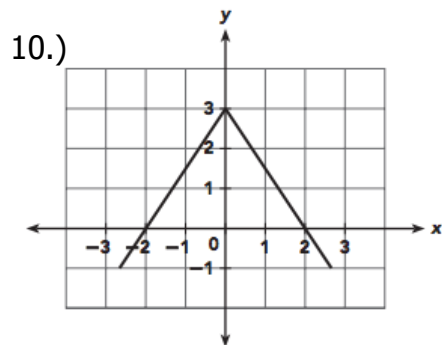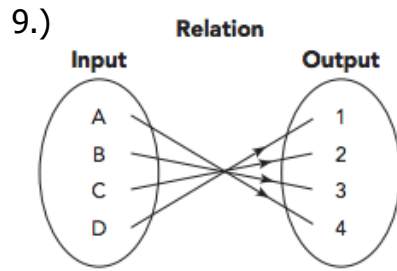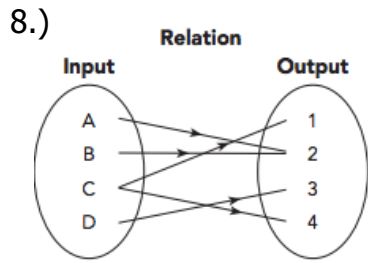6.) A function is a type of relation.    **T** or **F**       7.) All relations are functions.                **T** or **F**

**Explanation:**                                                         **Explanation:**

Identify whether the relation represented by each mapping or graph is a function.

8.)

**Relation**

| Input | Output |
|-------|--------|
| A | 1 |
| B | 2 |
| C | 3 |
| D | 4 |

9.)

**Relation**

| Input | Output |
|-------|--------|
| A | 1 |
| B | 2 |
| C | 3 |
| D | 4 |

10.)

11.)

12.) Hope plans to save a quarter every day. Draw a graph to represent this situation.

Is the relation a function? Explain your answer.

**Savings**

(y-axis: Savings (¢); x-axis: Number of Days)
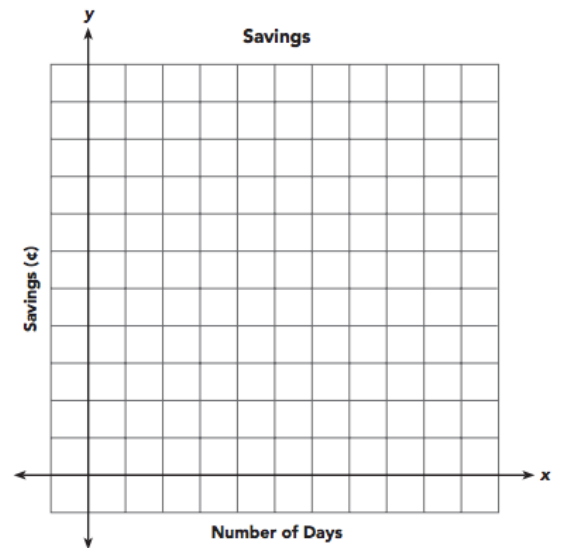
13.) Simplify: $\dfrac{6^{16}}{6^{-4}}$

(A) $6^{-64}$    (B) $6^{-4}$    (C) $6^{12}$    (D) $6^{20}$

14.) A lab has two bacteria cultures. Culture A contains $8 \times 10^4$ bacteria and culture B contains $4 \times 10^6$ bacteria. How do the two cultures compare in size?

(A) Culture A contains twice as many bacteria as culture B.

(B) Culture A contains ½ as many bacteria as culture B.

(C) Culture A contains $\dfrac{1}{25}$ as many bacteria as culture B.

(D) Culture A contains $\dfrac{1}{50}$ as many bacteria as culture B.

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Write an algebraic equation for the function.

15.) Bruno is traveling at a constant speed of 80 kilometers per hour. The distance he travels, *d* kilometers, is a function of the amount of time he takes to travel *t* hours.

16.) Mr. Henderson pays a monthly charge of $40 for a family cell phone plan. Each additional family member pays $10 every month. The total amount Mr. Henderson and his family members pay each month, *y* dollars, is a function of the number of the additional family members who use the plan, *x*.

Write an algebraic equation for each function. Then construct a table of x and y values for the function.

17.) The students from the Robotics Club are making model windmills for a workshop. Each windmill has three blades. The total number of blades needed, *y*, is a function of the number of windmills they make, *x*.

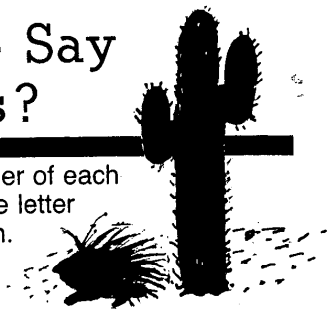**Function:** _____    **Table:**

| x | | | |
|---|---|---|---|
| y | | | |

18.) A newly made glass vase has a temperature of 580°C. Its temperature then decreases at an average rate of 56°C per minute. The temperature of the glass vase, *y*° C, is a function of the number of minutes its temperature has been decreasing, *x*.

**Function:** _____

**Table:**

| x | | | |
|---|---|---|---|

# What Did the Baby Porcupine Say When It Backed Into a Cactus?

Determine which of the relations below are functions. Find the number of each relation that *is* a function at the bottom of the page and cross out the letter below it. When you finish, the answer to the title question will remain.

① $\{(-2, 7), (-1, 5), (0, 3), (1, 1), (2, 1)\}$

② $\{(-7, 20), (3, 5), (0, 5), (-2, 0), (6, -4), (-6, -9), (4, 4)\}$
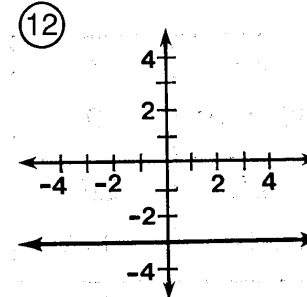
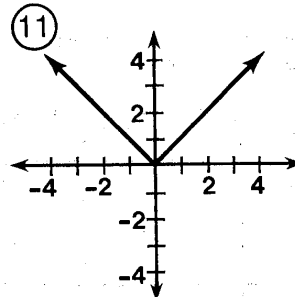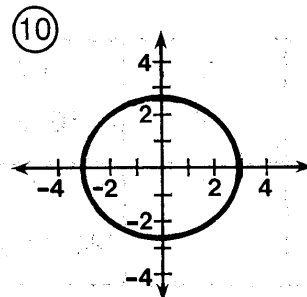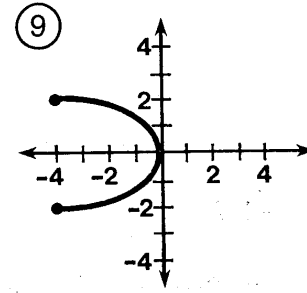③ $\{(4, 8), (-3, -2), (9, 6), (2, -1), (-4, -5), (2, 7), (-8, 0)\}$

④

| x | y |
|---|---|
| 0 | −19 |
| 1 | −12 |
| 2 | −4 |
| 3 | 3 |
| 4 | 13 |
| 5 | 27 |

⑤

| x | y |
|---|---|
| −5 | 8 |
| −3 | 8 |
| −1 | −2 |
| 1 | −2 |
| 3 | 11 |
| 5 | 23 |

⑥

| x | y |
|---|---|
| −2 | −7 |
| −2 | 5 |
| 0 | −16 |
| 2 | 0 |
| 2 | 6 |

⑦ 

⑧ 

⑨ 

⑩ 

⑪ 

⑫ 
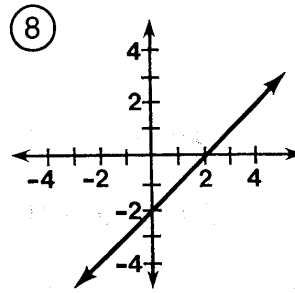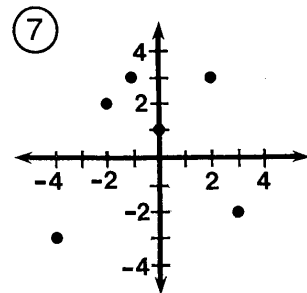
| 5 | 12 | 10 | 7 | 1 | 3 | 9 | 11 | 2 | 4 | 6 | 8 |
|---|----|----|---|---|---|---|----|---|---|---|---|
| F | O | H | A | S | I | M | T | O | P | A | D |

OBJECTIVE 1−a: To determine whether or not a relation is a function.

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