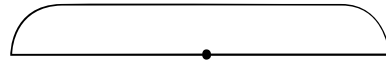


Lesson 5

1 For each of the problems below, select the appropriate diagram to use and write the expressions.

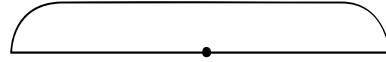
- a) A hat costs n dollars and a coat costs 9 dollars. How much do the hat and the coat cost together?



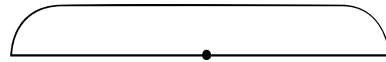
- b) A hat costs k dollars. What is the total cost of 9 hats?



- c) There are 5 apples in each fruit basket. How many apples are there in y baskets?



- d) There are 5 apples and y pears in each fruit basket. There are no other types of fruit. How many fruit are in each basket?



2 Can you find the answer without calculations?

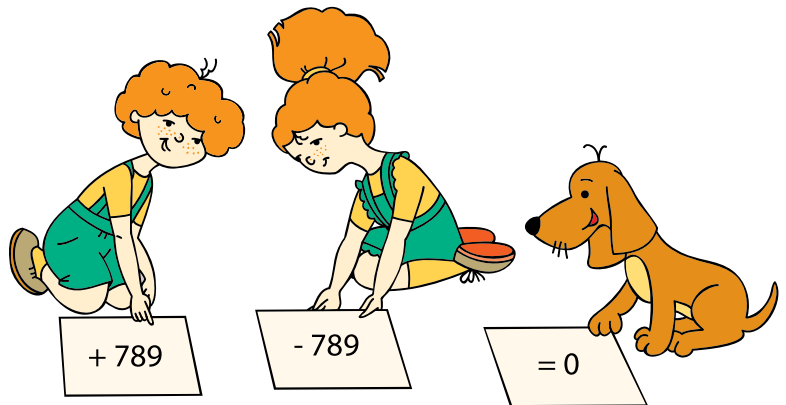
$$823 + 249 - 249 =$$

$$642 + 5 - 642 =$$

$$234 + 3 + 629 - 234 - 629 + 1 =$$

$$267 - 118 + 5 + 118 - 242 + 523 - 267 + 242 - 523 =$$

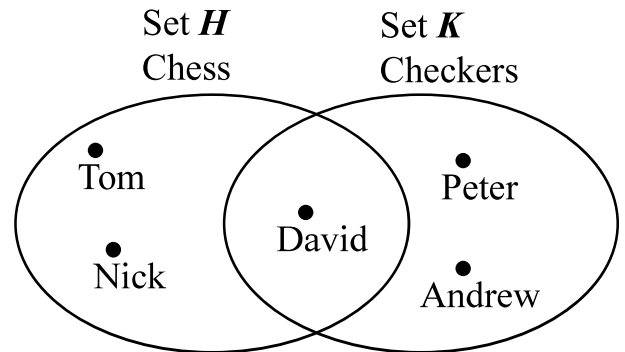
$$544 - 282 + 9 - 67 + 282 - 1 + 67 - 544 =$$



Intersecting Sets

3 There were tournaments of chess and checkers at school.

- Tom, Nick, and David were the winners in the chess tournament.
- Peter, David, and Andrew were the winners in the checkers tournament.
- David is a common winner in both tournaments.



Common elements of two sets form their **intersection**. The symbol for an intersection of two sets is \cap

$$H = \{ \text{Tom, David, Nick} \} \quad K = \{ \text{Peter, David, Andrew} \} \quad H \cap K = \{ \text{David} \}$$

4 Find the intersections of the following sets:

$$A = \{ \bullet, \blacktriangledown, \odot, \blacktriangleright \}$$

$$A \cap B = \{ \quad \quad \quad \}$$

$$B = \{ \square, \blacktriangledown, \blacklozenge, \text{—} \}$$

$$B \cap C = \{ \quad \quad \quad \}$$

$$C = \{ \odot, \blacktriangleright, \blacklozenge, \square \}$$

$$A \cap C = \{ \quad \quad \quad \}$$

$$D = \{ \bullet, \blacktriangleright, \odot, \odot \}$$

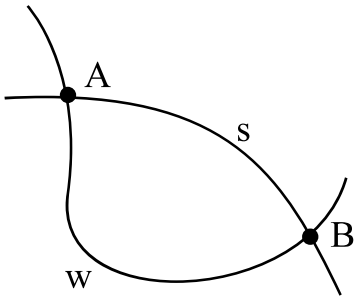
$$C \cap D = \{ \quad \quad \quad \}$$

Sets B and D have no common elements:

$$B \cap D = \emptyset$$

Two curves can cross each other sharing some points. These common points form an **intersection**.

Since lines have no thickness, an intersection of two crossing lines is a single point.



Points *A* and *B* belong to the intersection of the curves *s* and *w*:

$s \cap w = \{A, B\}$ $A \in s \cap w$ $B \in s \cap w$

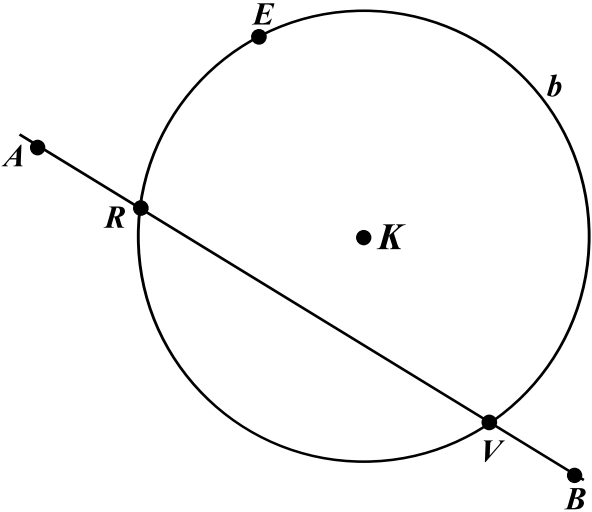
5

Curve *b* is a circle:

$b = \text{Circ}(K, 3 \text{ cm})$

$|KE| = \underline{\hspace{2cm}}$ cm

$\text{Circ}(K, 3 \text{ cm}) \cap AB = \{ \underline{\hspace{1cm}}, \underline{\hspace{1cm}} \}$



Check ✓ the TRUE statements and cross ✗ the FALSE statements:

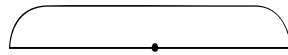
- | | | | |
|--------------------------------------|--------------------------|---|--------------------------|
| $K \in \text{Circ}(K, 3 \text{ cm})$ | <input type="checkbox"/> | $K \notin \text{Circ}(K, 3 \text{ cm})$ | <input type="checkbox"/> |
| $R \in \text{Circ}(K, 3 \text{ cm})$ | <input type="checkbox"/> | $B \notin \text{Circ}(K, 3 \text{ cm})$ | <input type="checkbox"/> |
| $R \in AB$ | <input type="checkbox"/> | $V \in AB$ | <input type="checkbox"/> |
| $V \in \text{Circ}(K, 3 \text{ cm})$ | <input type="checkbox"/> | $b \cap AB = \emptyset$ | <input type="checkbox"/> |



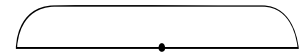
Can a circle and a straight line have 3 intersection points?

6 For each equation, choose the correct diagram, and use it to find the solution. Check your answers.

| | | | | | | |
|---|---|---|---|---|---|---|
| y | - | 1 | 2 | = | 1 | 3 |
| y | = | | | | | |
| y | = | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | ✓ |



| | | | | | |
|---|---|---|---|---|---|
| 6 | 3 | ÷ | x | = | 9 |
| x | = | | | | |
| x | = | | | | |
| | | | | | |
| | | | | | |
| | | | | | ✓ |



7 There are b apples, q pears, k lemons, and w oranges in a plate. What shall we find if we perform the following operations?

$q + b$ The total number of apples and ...

$b + q + k + w$

$k + w$

$k - w$ How many more ...

$b - q$

$k - q$

8 Who said “My brother and I always tell the truth?”: Little Joe or Foxy Tail?

Could Little Joe say:
“My brother is Foxy Tail”?

Could Foxy Tail say:
“My brother is Foxy Tail”?

Is it possible to figure out which
of the two brothers said it?



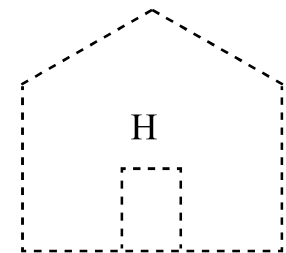
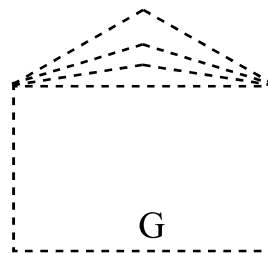
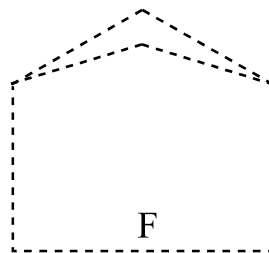
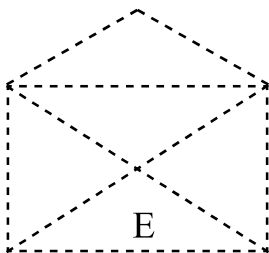
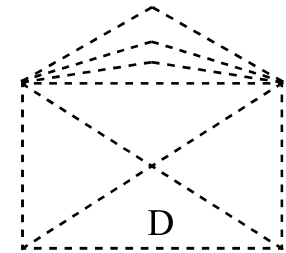
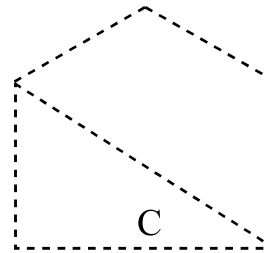
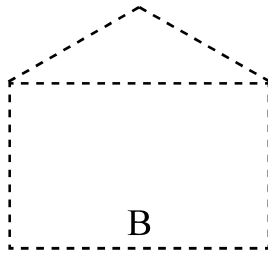
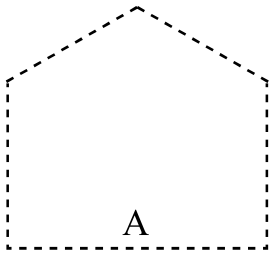
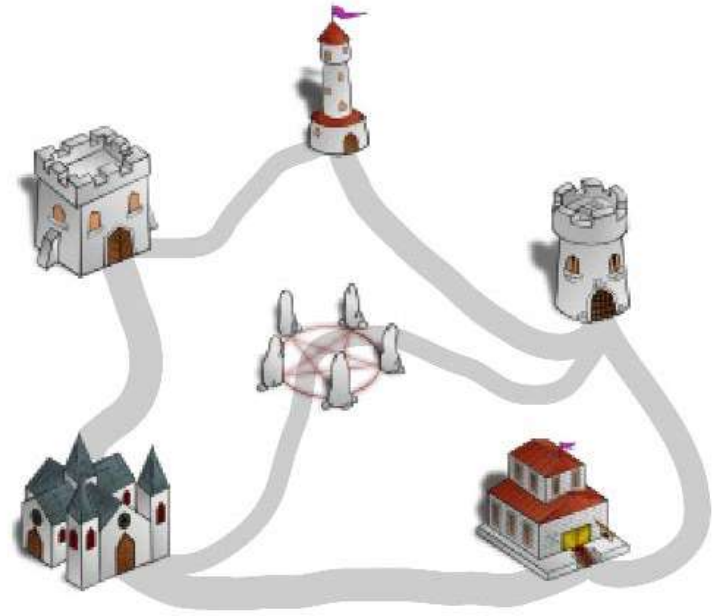
9

A guard needs to visit every building plotted on the map and inspect every road. He wants to optimize his route in order to walk the least possible distance. So he would like to not walk on the same road twice or more.

a) Would he be able to do that and return back?

b) Which shape under the map matches the set of roads on the map?

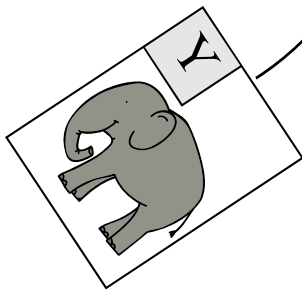
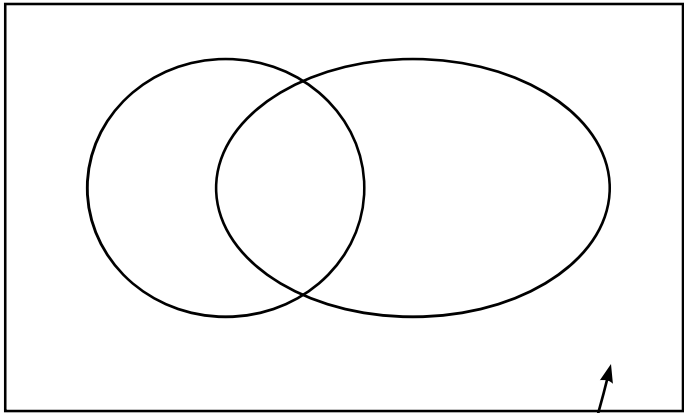
c) Which shapes can be traced without lifting a pencil and which cannot?



Could a post office be facing a similar problem?

Could garbage pickup be facing a similar problem?

10 Write the IDs of the objects into the Venn diagram following the sample. For each subset described below, count the number of elements.



| Sets | | |
|------|--|---------------------------------|
| | - Animals in the picture | <input type="text" value="13"/> |
| | - Birds | <input type="text"/> |
| | - Predators | <input type="text"/> |
| | - Predator birds | <input type="text"/> |
| | - Birds that are not ____ | <input type="text"/> |
| | - _____ that are neither _____ nor _____ | <input type="text"/> |

| | | | | |
|--------------|--------------|--------------|--------------|--------------|
| A | B | C | D | E |
| F | G | H | I | J |
| K | L | M | N | O |