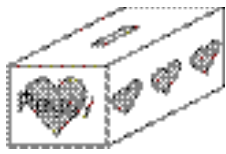




Valentine's Day Problem Set



1. Sherry is making valentines for her classmates. Each valentine is one color (red, pink or white) and has one message written on it ("Be Mine," "Awesome," "Cutie" or "Luv Ya"). How many distinct valentines can she make?



2. Peggy must make a rectangular box in which she can put the valentines she receives. Her box has a bottom base that is 5 inches by 7 inches, and the box is 4 inches tall. What is the volume of this box, in cubic inches?

3. The math club has a fundraiser where students send carnations to other students for Valentine's Day. The students purchase white carnations for \$1 each, pink carnations for \$2 each and red carnations for \$3 each from the math club. The math club purchases each carnation for 69 cents from the florist. If Tracy ordered 7 white, 2 pink and 1 red carnation, how much profit will the math club make off her order?

4. Jaime's sweetie went a little overboard and bought her a bag of candy hearts, a box of chocolates, a teddy bear, a bouquet of balloons and a card. He spent a total of \$28 on these items. The balloon bouquet cost the same as the teddy bear, but it cost five times the amount of the card. The ratio of the price of the chocolates to the price of the card was 9:4, and the ratio of the candy hearts' price to the chocolates' price was 1:3. How much did the box of chocolates cost?



5. Diane's bag of candy hearts has 7 candy hearts in it. Three of them are green, two are pink and two are yellow. If she will pull each heart out one at a time and eat them as she pulls them out, what is the probability that she will select the two yellow hearts first? Express your answer as a common fraction.

6. On some graph paper, graph the following segments:

$$y = x \text{ for } 0 \leq x \leq 2$$

$$y = 2x - 2 \text{ for } 2 \leq x \leq 3$$

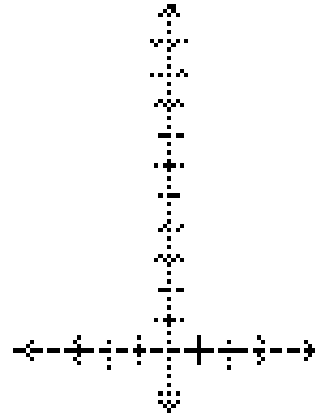
$$x = 3 \text{ for } 4 \leq y \leq 6$$

$$y = -x + 9 \text{ for } 2 \leq x \leq 3$$

$$y = 7 \text{ for } 1 \leq x \leq 2$$

$$y = x + 6 \text{ for } 0 \leq x \leq 1$$

Now reflect each segment over the y -axis. What popular shape have you drawn?



7. What is the area, in square units, of the region you have enclosed with this Valentine's Day shape?





Valentine's Day Meeting (Multiple Topics)



Topic

There are a variety of math topics covered in the problems used for this meeting.

Materials Needed

- ◆ Copies of the Valentine's Day problem set (available for download from www.mathcounts.org/MCP0708Resources)
- ◆ Valentine's Day treat for your students - Optional

If creating Valentine's Day Thank You cards, your students may wish to use the following:

- ◆ Graph paper
- ◆ Paper
- ◆ Red markers
- ◆ Rulers
- ◆ Scissors

Meeting Plan

This meeting idea is for use around the time of Valentine's Day. Students can work together in groups on the Valentine's Day problem set provided. You can download a more student-friendly copy of these problems in larger font from www.mathcounts.org/MCP0708Resources. Please feel encouraged to add problems, delete problems or change any of the problems to accommodate your students' abilities.

1. Sherry is making valentines for her classmates. Each valentine is one color (red, pink or white) and has one message written on it ("Be Mine," "Awesome," "Cutie" or "Luv Ya"). How many distinct valentines can she make?
2. Peggy must make a rectangular box in which she can put the valentines she receives. Her box has a bottom base that is 5 inches by 7 inches, and the box is 4 inches tall. What is the volume of this box, in cubic inches?
3. The math club has a fundraiser where students send carnations to other students for Valentine's Day. The students purchase white carnations for \$1 each, pink carnations for \$2 each and red carnations for \$3 each from the math club. The math club purchases each carnation for 69 cents from the florist. If Tracy ordered 7 white, 2 pink and 1 red carnation, how much profit will the math club make off her order?
4. Jaime's sweetie went a little overboard and bought her a bag of candy hearts, a box of chocolates, a teddy bear, a bouquet of balloons and a card. He spent a total of \$28 on these items. The balloon bouquet cost the same as the teddy bear, but it cost five times the amount of the card. The ratio of the price of the chocolates to the price of the card was 9:4, and the ratio of the candy hearts' price to the chocolates' price was 1:3. How much did the box of chocolates cost?
5. Diane's bag of candy hearts has 7 candy hearts in it. Three of them are green, two are pink and two are yellow. If she will pull each heart out one at a time and eat them as she pulls them out, what is the probability that she will select the two yellow hearts first? Express your answer as a common fraction.

6. On some graph paper, graph the following segments:

$$y = x \text{ for } 0 \leq x \leq 2$$

$$y = 2x - 2 \text{ for } 2 \leq x \leq 3$$

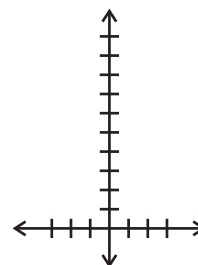
$$x = 3 \text{ for } 4 \leq y \leq 6$$

$$y = -x + 9 \text{ for } 2 \leq x \leq 3$$

$$y = 7 \text{ for } 1 \leq x \leq 2$$

$$y = x + 6 \text{ for } 0 \leq x \leq 1$$

Now reflect each segment over the y -axis. What popular shape have you drawn?



7. What is the area, in square units, of the region you have enclosed with this Valentine's Day shape?

Answers: 12 valentines; 140 cubic inches; \$7.10; \$4.50; 1/21; heart; 30 square units

Once students finish working on these problems, they should be encouraged to present their solutions to the group. Additionally, students can be asked to come up with some of their own Valentine's Day-related problems for either your future use with clubs or that can be sent to the elementary school teachers in your district to be used by their students.

Possible Next Step

Your students also may like to create a math Valentine similar to the one shown here (using #6 of the problem set) to thank special sponsors of the math club or key supporters of the math club or the teacher who lets you hold meetings in his room! A special thank-you signed by your club members will go a long way in keeping your supporters excited about the program.

