

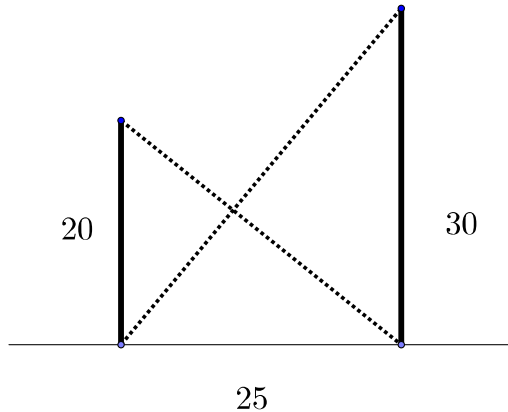
# U.C. MATH BOWL 2018

LEVEL II — Session 1

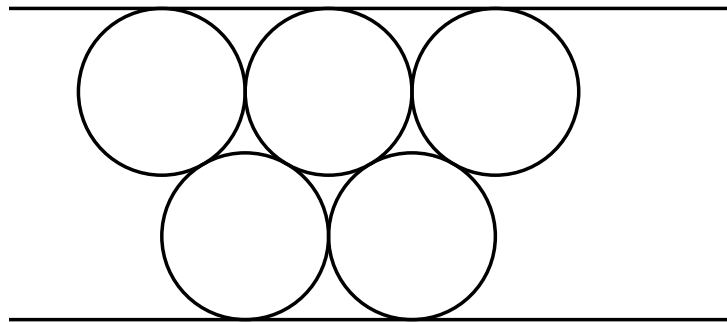
Instructions: Write your answers in the blue book provided. Remember that even correct answers without explanation may not receive much credit and that partially correct answers that show careful thinking and are well explained may receive many points.

Have Fun!

- Two vertical poles with heights 20 and 30 feet are installed with their bases 25 feet apart. Chains are connected from the top of each pole to the base of the other pole. How high above the ground do the chains cross?



- How many times in a 12 hour period do the hour and minute hands of a clock form a right angle?
- In the figure circles with diameter 2 are packed together in the pattern shown so that they just touch each other.



How far apart are the parallel lines that just touch the circles?

- These statements were all made on the same day:
  - Yesterday was Monday
  - Tomorrow is Friday
  - The day after tomorrow will be Friday
  - Tomorrow will be Saturday
  - The day before yesterday was Tuesday

An additional interesting fact is this: *If you knew how many of the statements were correct, you could determine on which day of the week the statements were made.*

On what day of the week were the statements made?

- What is the last (right most) digit of the sum  $2^{2018} + 3^{2018} + 7^{2018}$ ?

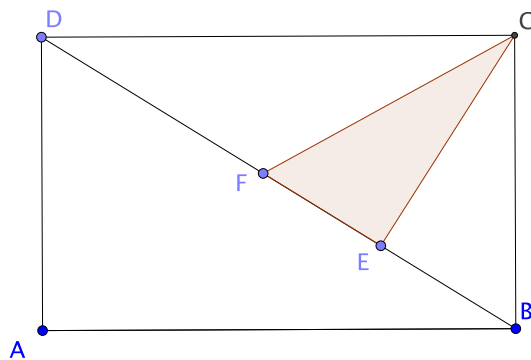
# U.C. MATH BOWL 2018

LEVEL II — Session 2

Instructions: Write your answers in the blue book provided. Remember that even correct answers without explanation may not receive much credit and that partially correct answers that show careful thinking and are well explained may receive many points.

Have Fun!

1. Four numbers are written in a row. The average of the first two numbers is 5. The average of the middle two numbers is 4 and the average of the last two numbers is 8. What is the average of the first and last numbers?
2. Xavier is three times as old now as Yolanda was at a certain time in the past. At that time, Xavier was four times as old as Yolanda was 6 years earlier than that. How old is Yolanda?
3. In the figure, the area of rectangle  $ABCD$  is 100 square units.



Arranged as shown, points  $E$  and  $F$  are selected on  $BD$  so that  $2(|BE| + |FD|) = 3|EF|$ . What is the area of triangle  $\triangle CEF$ ?

4. Suppose that  $a, b, c$ , and  $d$  are positive integers such that  $a^3 = b^2$ ,  $c^3 = d^2$ , and  $c - a = 9$ . Find  $a + b + c + d$ .
5. In a jar containing a large number of M & Ms,  $1/6$  of the red M & Ms are peanut M & Ms, and  $1/9$  of the peanut M & Ms are red M & Ms. If  $1/8$  of the M & Ms in the jar are red, what fraction of the M & Ms in the jar are neither red nor peanut M & Ms?

What is the fewest number of M & M's there could be in the jar?