

# MATH 100

## Final Exam

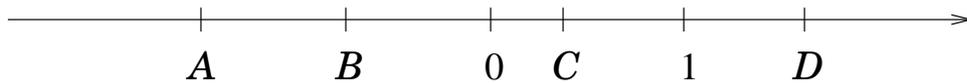
May 20, 2009

Name: \_\_\_\_\_

- No books, notes, or calculators are allowed.
- Please show all your work.
- Always explain your solutions and calculations.

1. (4 points) Calculate  $1009 + 1010 + 1011 + \dots + 2008 + 2009$ .

2. (6 points) Numbers  $A$ ,  $B$ ,  $C$ , and  $D$  are shown on the real number line below. Determine (approximately) the locations of the following numbers:

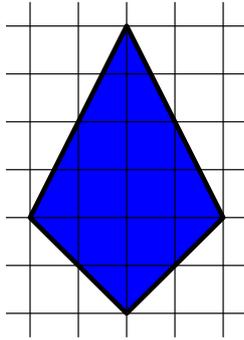


(a)  $A + C$

(b)  $C - B$

(c)  $BD$

3. (6 points) Find the area and the perimeter of the following kite:



(a) Area:

(b) Perimeter:

4. (4 points) There are four exams in Misha's class, all graded on the scale from 0 to 100 points. On her first three exams she got scores 79, 83, and 91. She needs the average score of 80% to get a B in the class. What score does she need on the last exam to get a B?

5. (4 points) What is the 100th digit after the decimal point in the decimal representation of  $1/7$ ?

6. (6 points) The base of a rectangular prism is a  $3 \text{ cm} \times 5 \text{ cm}$  rectangle. Its volume is  $30 \text{ cm}^3$ . Find its height and surface area.

(a) Height:

(b) Surface area:

7. (4 points) If  $\frac{1}{2}$  gal of paint was used to paint a  $5 \text{ ft} \times 8 \text{ ft}$  wall, estimate how much paint will be needed to paint an  $12 \text{ ft} \times 10 \text{ ft}$  wall.

8. (6 points) Which of the following polygons can be made? For those that can be made, provide a picture. For those that cannot be made, explain why not.

(a) A triangle with exactly two obtuse angles.

(b) A trapezoid with three equal sides.

(c) A parallelogram with exactly two right angles.

9. **For extra credit (5 points):**

“Here lies Diophantus”, the wonder behold.  
Through art algebraic, the stone tells how old:  
“God gave him his boyhood one-sixth of his life,  
One twelfth more as youth while whiskers grew rife;  
And then yet one-seventh ere marriage begun;  
In five years there came a bouncing new son.  
Alas, the dear child of master and sage  
After attaining half the measure of his father’s life  
chill fate took him.  
After consoling his fate by the science of numbers  
for four years, he ended his life.”

Find how long Diophantus lived.