
Math 131

FINAL EXAM

Monday, May 14, 2007

Name: _____

Lecture: _____

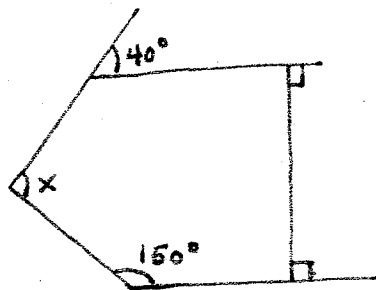
Section 1: Midterm 1 Material

1. Explain what it means for two polygons to be **similar**. Give an example (include a picture).

If two parallelograms are similar, do their diagonals scale with the same ratio as their sides?

2. Give a *Teacher's Solution* to the following problem.

In the diagram below, find x :



3. Two angles in a polygon are 80° and the rest are 20° larger. Find the number of sides of the polygon.

Draw a picture of the polygon. What kind of polygon is it?

Section 2: Midterm 2 Material

1. If the area of an equilateral triangle is $4\sqrt{3}$, what is the height?

2. In a given parallelogram, the base is twice as long as the shorter side, and the height is 2 units. If the larger interior angle of the parallelogram is 135° , find the area of the parallelogram. (In this problem, you will get an exact numerical answer.)

3. *Prove:* Given that the diagonals of a rhombus bisect each other, prove that they intersect perpendicularly.

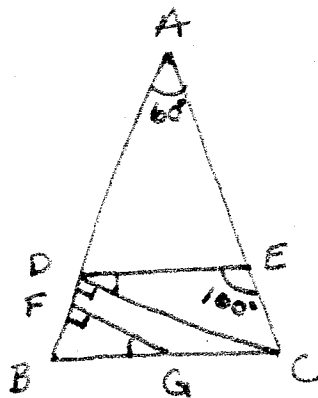
Section 3

1. (a) What ratio do the sides of a (45-45-90) triangle satisfy?

(b) Show why this is true.

2. In the figure below, find \hat{B} .

(Given: $\angle EDC = \angle FGB$)

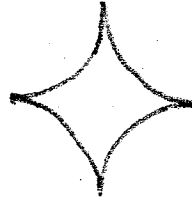


3. A rectangular fish tank is 100cm long, 50cm wide, and 50cm tall. The water level is 40cm . After a new coral castle is added, the water level rose to 42cm . What is the volume *in liters* of the castle?

4. (a) The area of a square is 400 cm^2 . Find the length of a side.

- (b) If the length is now increased by 15% , find the area of the new square.

5. The diagram below shows a flower bed formed by four quarter circles, each with radius r .



- (a) Express the perimeter of the flower bed in terms of r .

- (b) Show that the area of the flower bed is given by $A = (4 - \pi)r^2$. (Be sure to draw the picture that corresponds to the area.)

(c) Assume the radius is 100 cm^2 . Using the approximation $\pi \approx 3.14$, find the area of the flower bed correct to one decimal place. (Express your answer in square meters.)

6. A right pyramid has a square base with sides 5 cm. If the height of the pyramid is 10 cm, what is its volume?

7. **Extra Credit** Derive the formula for the surface area of a right circular cylinder. (Be sure to include a diagram.)