**Math 3305 Midsemester ONLINE Fall 2020**

**Name:**

5 points off for anonymous tests

Upload to CourseWare well before the late night of the due date please and double check to make sure it uploaded also.

No pencil, please. Word processed or ink. Pencil is too hard to read.

Open notes, open book, open internet. No visiting with another human about your answers or material. Be sure to cite any media or internet resources used.

Question 1 12 points

Given a regular tetrahedron:

Sketch it’s net.

Find it’s Euler number using F + V – E.

If the edge length is 3 cm, find the surface area.

Show all your work!

Question 2 10 points

Given triangle *ABC* with the measure of angle *A* = 30 degrees and the measure of angle *B* = 45 degrees, what is the measure of angle *C*? Is side AC the longest side at cm? If it is, tell how you know. If it’s not, use the Law of Sines to find the length of the shortest side. In case you need it: sin*C*  .97 and cos*C*  .82. hint: draw the picture!

Question 3 16 points

State the definition of an Equivalence Relation with Set *S =* {−1,−2, 2, 1,  } and relation ~.

If we define ~ to mean *a* ~ *b* whenever , do we have an equivalence relation or not?

Be very specific in your answer, list the elements and show all 3 criteria and whether it is successful or fails explicitly.

Question 4 12 points

Given the line segment with endpoints *A* = (1, 1) and *B* = (3, −4) graph and describe the two following transformations using vocabulary from the class. Use the same line segment; the second transformation is on the next page.

1.  sketch the result and compare it to the original segment



2.  sketch the result and compare it to the original segment



Question 5 8 points

Given a 30-60-90 triangle with the side across from the 30 degree angle having length 2 cm, what is the length of the hypotenuse?

Question 6 Short answers A: 6; B: 4; C:10; D: 4; E: 6 total: 30 points

1. Given the statement:

If a Euclidean triangle is equilateral, then it is equiangular.

1. Give the converse and state whether or not it’s true.
2. Give the inverse and state whether or not it’s true.
3. Give the contrapositive and state whether or not it’s true.

B. Find the distance between these 2 points in *x-y-z* space. Leave your answer as an irrational number. *A* = (1, 3, 5) and *B* = (1, −3, 10)

C.

Given with angle C the right angle. The length of side CB is 5 inches and the length of side AB is 7 inches. Find the length of side AC. Find the sin(*A*), the cos(*A*), and the tan(*A*). Do not rationalize the fractions.

D. Calculate the radius of the base of a right circular cone with volume 15 cubic units and height 3 units. The formula for volume is . Leave your answer in simplest irrational form.

E. Convert 20 degrees to radian measure. Convert  to degrees.

Extra Credit: 10 points

The sine of angle A is .35. What is the sine of angle B and how do you know?

