MATH 139
FINAL EXAM REVIEW PROBLEMS
ANSWERS

1. Area of non-shaded region in (a) is $2^2 - \pi(1)^2 = 4 - \pi \approx 0.86$

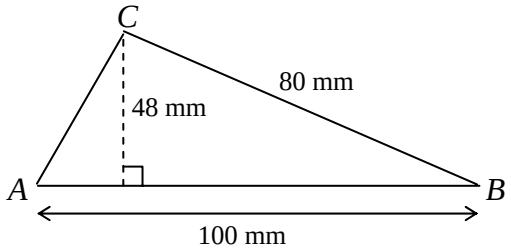
   Area of non-shaded region in (b) is $\pi(1)^2 - \left(\sqrt{2}\right)^2 = \pi - 2 \approx 1.14$

2.
   a. The base is an equilateral triangle with area of 27.72 sq. meters.

   b. 24 meters.

   c. 41.04 sq. meters.

3. Perimeter = 240 mm. Area = 2400 mm^2.



4. Determine for each of the following the smallest number of **faces** possible:
   a. Prism: 5
   b. Pyramid: 4
   c. Polyhedron: 4

5. A prism whose bases are 11-gons has 33 edges. A pyramid cannot have exactly 33 edges because the number edges is twice the number of vertexes in the base.

6. $e =$ 30 $z = 4\sqrt{5} \approx 8.94$

7. Perimeter = $12 + \sqrt{2} + \sqrt{5} + \sqrt{13}$.

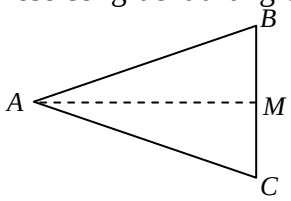
8. Area = 12.5 sq. units.

9. Fill in the blank with "All," "Some," or "No."
   a. some rectangles are squares.
   b. no parallelograms are trapezoids.
   c. all rhombuses are quadrilaterals.

10. Joe is not right. He had drawn a square with area of 9 sq. cm.

11. One square mile is 5280^2 sq ft = 27878400 sq ft
One acre = 43560 sq ft
One square mile = $27878400 / 43560$ acres = 640 acres

12. We are told that $\overline{AB} \cong \overline{AC}$. Since M is the midpoint of $\overline{BC}$ then $\overline{BM} \cong \overline{CM}$. Since $\overline{AM}$ is a common side, then $\triangle AMB \cong \triangle AMC$ by SSS congruence. Angle B and angle C are corresponding angles in these congruent triangles, which means the two angles are congruent.



13. It is possible to construct the triangle described.

14. It is not possible to construct the triangle described. Side *AP*is too short.

15. Determine whether a pair of congruent triangles is present in each diagram. Explain in detail how you know the triangles are congruent.

a. $\Delta ABC \cong \Delta EDF$ by SAS or by ASA (we know angle *C*is congruent to angle *F* because the three angles must sum to 180 degrees).

b. $\Delta WUV \cong \Delta YZX$ by SAS or SSS (we know the third sides are congruent because of the Pythagorean theorem).

c. The triangles are not congruent.

16. Determine the measure of the following angles:
a. Vertex angle of a regular decagon (ten sides): 144°
b. Central angle of a regular pentagon: 72°
c. Exterior angle of a regular heptagon: 51.43°

17. 1260°

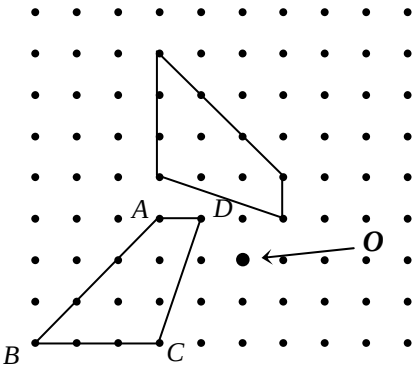
18. $x = 20°$.

19. $\angle e \cong \angle c$ (why?) and $\angle d \cong \angle b$ (why?). $d + a + e = 180°$ because they form a straight angle at *A*. But because of the congruent angles, $d + a + e = b + a + c = 180°$.

20. Imagine a pyramid whose base is a 100-gon. Fill in the blanks: the pyramid has 101 faces, 101 vertices, and 200 edges.

21. Imagine a prism whose base is a 51-gon. Fill in the blanks: the prism has 53 faces, 102 vertices, and 153 edges.

22. Sketch the image of *ABCD* for a clockwise rotation of 90° about the point marked *O*.



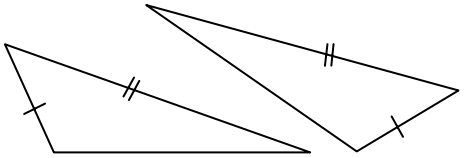
23. There is a difference between the following two statements: (i.) "These triangles are not necessarily congruent." (ii.) "These triangles are not congruent."

a. Explain the difference.

"Not necessarily congruent" means the triangles *might* be congruent, but we can't prove nor disprove the congruence. "Not congruent" means we can be sure the triangles are in fact *not* congruent.

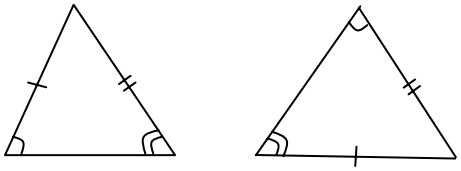
b. Determine if the following pairs of triangles are congruent. If not, determine which statement is best for the situation, and explain why it is best.

i.



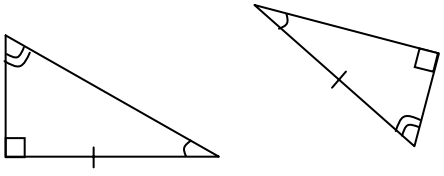
Not necessarily congruent.

ii.



Not congruent

iii.



Not congruent