ANSWERS TO PRACTICE FOR FINAL MA13900

1. b) 9
c) 9
d) 16

2. b)12
c) 8
d) 18

3. a) The base of the pyramid is a dodecagon.
b) 24
c) 13

4. a) The base of the prism is a heptagon
b) 14
c) 9

5. Drawing

6. Drawing

7. a) 46 faces
b) No. If that were the case because of Euler's Formula it would have 4 vertices. In which case it would HAVE to be a Tetrahedron, but this does not have 71 faces.

8.
Tetrahedron (Four TRIANGULAR faces)
Octahedron (Eight TRIANGULAR faces)
Icosahedron (Twenty TRIANGULAR faces)

Cube (Six SQUARE faces)

Dodecahedron (Twelve PENTAGONAL faces)

9. a) Two
b) Seven

10. 900^o.

11. a) 1260^o
b) 140^o
c) 27 diagonals

12. a) 1440^o
b) 144^o
c) 35 diagonals
d) 10 lines of symmetry.

e) 10 rotational symmetries. 36^o , 72^o , 108^o , 144^o , 180^o , 216^o , 252^o , 288^o , 324^o , 360^o.

13. a) 4 planes of symmetry
b) One, line through the apex and the center of the square in the base.
c) Four rotational symmetries.

14. a) 6 planes of symmetry
b) 4 axis of rotation
c) 9 rotational symmetries.

15. a) 7 planes of symmetry.
b) 7 axis of rotation. One through the center of both hexagonal bases. Three through the centers of opposite lateral rectangular faces. Three through the midpoints of opposite lateral edges
c) 12 rotational symmetries

16. a) 50,000 cm^3.
b) 4%

17. a) larger than
b) as large as
c) as large as
d) as large as
e) larger than

18. a) 108
b) 2/3
c) 70
d) 155
e) 40

19. Drawing.

20. Drawing.

21. a) Rotation and Translation
b) Reflection and Glide-Reflection.

22. a) Same Orientation.
b) Different Orientation
c) Same Orientation.
d) Same Orientation.
e) Different Orientation.
f) Same Orientation.

23. Drawing

24. Drawing

25. Drawing

26. Drawing.

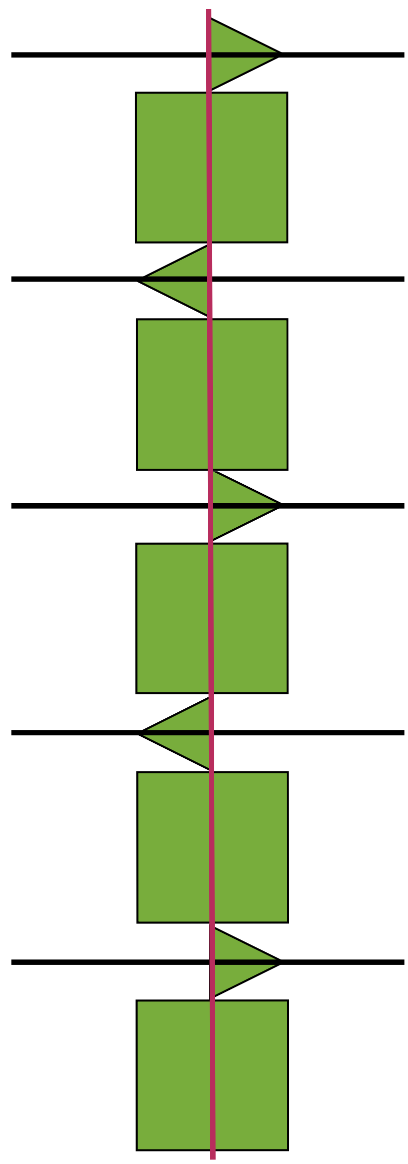
27.

Rotational symmetries: 180º around the center of any square.

Reflection symmetries: The horizontal lines of symmetries for the triangles. (In black)

Translation symmetries: Move any triangle an even number of triangles up or down.

Glide-Reflection symmetries: Move any square an odd number of triangles up or down, then reflect on red line.



28. a) 1 kiki > 1 qij
b) 1 rof > 1 wak
c) 1 vay > 1 yal
d)1 gur > 1 tep

29. a) y > x
b) x > y
c) x > y
d) x > y

30. a) 9 fab
b) 48/5 pir or 1.5 arg
c) 250/24 tup
d) 64/5 pir

31. a) 23,000 m
b) 0.0250 m^2.
c) 9 yd^3.
d) 3,312 in^2.

32. a) 20.25 in , 49.5 in
b) 139.50 in
c) 20.75 in, 50.5 in
d) 1,047.875 in^2.

33. a) $\frac{2000\pi}{3}$ dm^3.
b) The cylinder has bigger surface area.

34. a) 13 cm
b) 36 cm^2.

35. a) sqrt(220) cm or 2 sqrt(55) cm
b) 3 sqrt(220) cm^2, or 6 sqrt(55) cm^2.

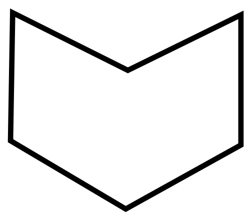
36. 18 rooms

37.
Net 1: This is not a net for any polyhedra.
Net 2: This is a net for a regular pyramid. It is also a net for a regular tetrahedron.
Net 3: This is not a net for any polyhedra.
Net 4: This is a net for a pyramid. But it is not a net for a regular pyramid.
Net 5: This is a net for a regular polyhedron (A cube)
Net 6: This is a net for a regular pyramid.
Net 7: This is not a net for any polyhedra.

Net 8: This is a net for a regular pyramid. It is also a net for a regular tetrahedron.
Net 9: This is not a net for any polyhedra.
Net 10: This is a net for a regular pyramid.

38.a) Yes, regular hexagons tessellate the plane.

b)



39. a) Tessellates
b) Tessellates.
c) Does not tessellate.
d) Tessellates.
e) Tessellates.
f) Does not tessellate.

40. a) Possible.
b) Not possible. Regular octagons are equiangular always.
c) Possible
d) Possible (this is a Rhombus)
e) Not possible. If it is a regular decagon, all interior angles are 144^o, so no angle is bigger than 180^o , hence it cannot be concave.
f) A square.
g) A rectangle
h) Impossible, the base of a cube is a square (which is also a rectangle), and a cube is a right prism. So it is a right rectangular prism.
i) See 38 b)
j) Impossible, regular tetrahedra are always regular pyramids.
k) Possible.
l) Impossible. If the base of a prism tessellates the plane (and triangles tessellate the plane), then the prism tessellates the space.

41. a) 7 lines of symmetry
b) 7 rotational symmetries.

42. I. 4 lines of symmetry. 4 rotational symmetries 90^o , 180^o , 270^o , 360^o .
II. 3 lines of symmetry. 3 rotational symmetries 120^o , 240^o , 360^o .
III. 1 line of symmetry. No rotational symmetries.
IV. 2 lines of symmetry. 2 rotational symmetries 180^o , 360^o .

43. a) DRE and EAM

b) Because their corresponding angles are congruent
c) 4 in.

44. 16cm^2.

45. a) 4m^2 .
b) 30 m.

46. a) They are parallel.
b) 24/5 or 4.8 cm.

47. a) Top sides are 5 cm each. All angles where diagonals cross are right. The shortest diagonal is bisected in two segments that are 3 cm each. The angle at the bottom is bisected in two congruent angles 40^o each.

b) All sides are 10 in. The big angles are bisected in two congruent angles 60^o each. The small angles are bisected in two congruent angles 30^o each. The smaller diagonal is bisected in two segments that are 5 in each. The longer diagonal is bisected in two segments that are sqrt(75) in or 5 sqrt(3) in each.

c) Base is 7 cm. Lower bottom angle is 40^o. top right angle is 110^o , top left angle is cut in a lower angle that is 70^o , and upper angle that is 40^o.

d) Top side is 8 cm, left and right side are both sqrt(260) cm or 2 sqrt(65) cm. All angles are right.

48. Unit I: 2.5
Unit II: 7.5

49. x = 20^o , y = 35^o , z = 55^o , v = 35^o .

50. a) 128 pi/3 cm^3.
b) 48 pi cm^2.

51. a) 6 cm
b) 10 cm
c) sqrt (91) cm
d) 54 sqrt (3) cm^2 or 18 sqrt (27) cm^2 .
e) 54 sqrt (3) + 18 sqrt (91) cm^2 or 18 sqrt (27) + 18 sqrt (91) cm^2.
f) 144 sqrt(2) cm^3 or 48 sqrt(27) cm^3 .