Answers for Suggested Practice Tasks for Exam 1

Math 257: Geometry & Probability for Teachers, with Joe Champion, Fall 2013

1. An octagonal pyramid.
2. A) Octagonal
   B) 18, 12, 8
   C) 31, 31
   D) 15, 10, 7
3. A) 6, 18, 12
   B) 8, 5, 5
   C) 14, 21
   D) 17, 17
   E) 12
4. C
   Hexagonal prism
5. D
6. C
   Z only
7. Two of these…
   Regular tetrahedron, triangle, 4 vertices, 6 edges, 4 faces
   Regular hexahedron, square, 8 vertices, 12 edges, 6 faces
   Regular octahedron, triangle, 6 vertices, 12 edges, 8 faces
   Regular dodecahedron, pentagon, 20 vertices, 30 edges, 12 faces
   Regular icosahedron, triangle, 12 vertices, 30 edges, 20 faces
8. A) hexagonal pyramid
   B) right hexagonal prism
   C) right square prism
   D) (right) trapezoidal prism
   E) oblique octagonal prism
   F) (right) triangular right prism
   G) (right) regular octagonal prism
   H) (oblique) pentagonal prism
9. A) Drawing should show parallel pentagonal bases and some indication of right angles, along with hidden edges.
   B) Drawing of triangular pyramid.
10. (Correct drawings for two different nets for a cube)
11. D
   Rhombus
12. A) Sketch of right isosceles triangle or obtuse isosceles triangle
    B) Sketch of a trapezoid that is not isosceles (two right angles)
    C) Sketch of a square
    D) Sketch of a right prism with triangular bases or even of a right prism with right-triangular bases (probably acceptable, unless you have emphasized the former)
13. A) Sometimes true, when the parallelogram is a rectangle
    B) Always true, because of the hierarchical relationship
    C) Sometimes true, because a scalene triangle may be right or obtuse as well
14. A) 144 degrees
    B) 72
15. Check for the type of symmetry and the line/center specified.
16. 7 reflection symmetries; 12 rotational symmetries (the 60° ones, plus 6 from axes perpendicular to the 3 pairs of opposite lateral edges and from the 3 pairs of opposite lateral faces.
17. Check for the type of symmetry and the line/center specified.
18. A) 72°  
   B) 360°  
   C) 90°
19. A) 12  
   B) 30°
20. a. translation  b. reflection  c. reflection  d. translation  
    e. rotation  f. reflection  g. rotation  h. rotation
21. Rotation; reflection; translation
22. One of the figures is the image of the other for some rigid motion.
23. A) Every rigid motion is one of these: reflection, translation, rotation, or glide-reflection. A translation or rotation can be achieved by the composition of two reflections. A glide-reflection can by achieved by three—two for the translation, plus the reflection of the glide-reflection.  
   B)

Heavy points are mid-points, and give the line of reflection (heavy).

Join any point on the dashed figure to its corresponding point on the image, to get the vector.

Then express the translation by two reflections in lines perpendicular to line of the vector, and half the length of the vector apart (not shown in the drawing). This gives a total of three reflections.
24. Translation; glide-reflection; rotation; reflection; rotation
25. A. Join any point in the original to its corresponding in the image.  
   B. The line through the two points in which the quadrilaterals intersect.