

**Problem 1.** (20 marks) (Text Chapter 23 #16) By the time there is concern about using up a nonrenewable resource, it may be too late. Suppose that a resource has a static reserve of 10,000 years, but consumption is growing at 3.5% per year.

- (a) How long will the resource last?
- (b) How long will it be before half the resource is gone?
- (c) How much longer will the resource last if, after half of it is gone, consumption is stabilized at the then current level?
- (d) What implications do you see for your answer?

**Problem 2.** (20 marks) Demonstrate all the rigid motion symmetries of the following objects:



(a)



(b)

**Problem 3.** (20 marks)

- (a) Draw an object that has only two lines of reflection symmetry and one rotational symmetry (exclude the stay-put symmetry). Demonstrate the symmetries of your object.
- (b) Can you draw an object that has only two rotational symmetries and only one reflection symmetry (exclude the stay-put symmetry)? Explain your answer.