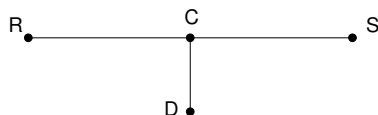


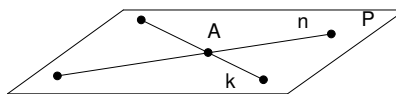
1. a) F.
- b) T.
- c) T.
- d) F.

2. No.

3. It is a good habit to follow the general convention in labeling. For example, in (b), we should use capital P for plane, lower case n and k for the line, and capital A for the intersection point.



Problem 1.1.3a



Problem 1.1.3b

4. a) $RS = \boxed{1}$
- b) $RQ = \boxed{1}$
- c) $PT = \boxed{4}$

5. The diagonal of $ABCD$ is $\sqrt{2}$. Thus, the area of the square $ACEF$ is 2.

6. a) $x = 6$
- b) $x = 3$

7. 4. A space diagonal is a line from one corner to its opposite corner through the center of the cube. We have 8 corners, but 2 corners uniquely define one space diagonal.
8. 4. There are one diagonal length on each of the three surface areas plus one space diagonal.
9. 21. There are several ways to approach this problem. Five points between AB plus points A and B give you a total of 7 points.

Solution One: We start from the first point and build a triangular number sequence: $1 + 2 + 3 + 4 + 5 + 6 = 21$.

Solution Two: Use combinatorics, we select two points to form a line: $C_2^7 = \frac{7!}{2!(7-2)!} = 21$.

10. 20. The maximum number of ways to intersect a circle with a triangle is 6. The maximum number of ways to intersect a circle with a rectangle is 8. The maximum number of ways to intersect a triangle with a rectangle is 6.