

# Shortest Path on a Regular Pyramid

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**Abstract**—This problem, seen on Mind Your Decisions channel [1] on YouTube, concerns finding the shortest distance to a particular point on a regular pyramid, starting from a particular vertex.

**Index Terms**—Geometry, TikZ

## I. INTRODUCTION

A regular square pyramid is not a smooth manifold. We want to find the shortest distance from a particular vertex of this pyramid to the midpoint of one of its edges. During the course of this quest, we will also identify the shortest path.

## II. PROBLEM STATEMENT

In addition to the problem statement given in the caption of Figure 1, we will also seek to find the path that yields the shortest distance from the vertex  $P$  to the point  $T$ , which lies in the middle of the vertices  $O$  and  $R$ .

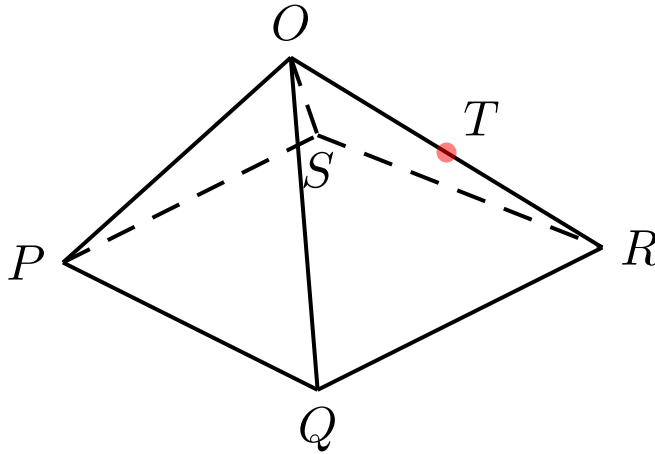


Fig. 1: Shown above is a regular square pyramid all of whose sides have length of  $2\ell$ . We seek to find the shortest distance from the vertex  $P$  to the midpoint  $T$  of points  $O$  and  $R$ .

## III. PROBLEM SOLUTION

Shown in Figure 2, we show the regular pyramid of Figure 1 unfolded in a particular manner.

## IV. CONCLUSION

## REFERENCES

- [1] P. Talwalker, “Mind your decisions.” [https://youtu.be/qo\\_wZ1zjh\\_Q](https://youtu.be/qo_wZ1zjh_Q). Accessed: 2022-09-17.

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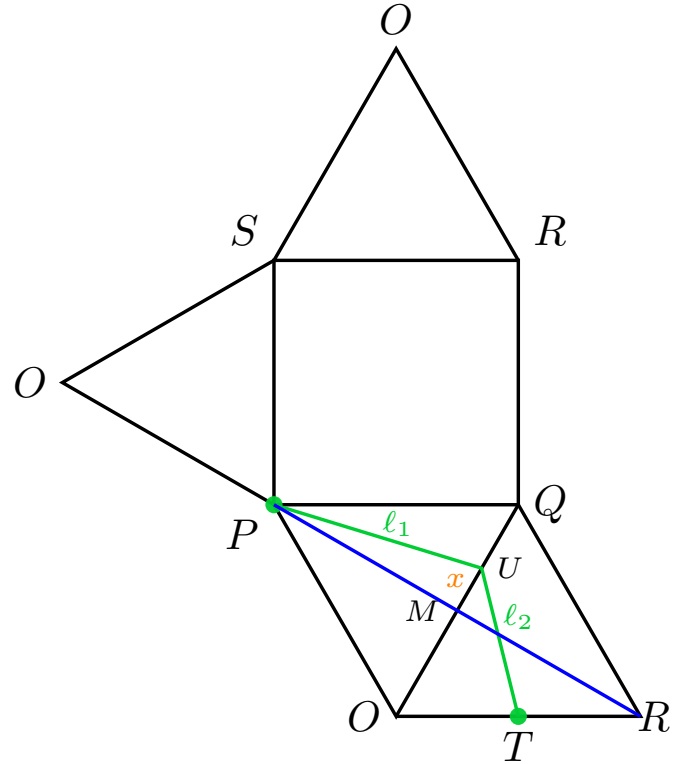


Fig. 2: The regular pyramid unfolded.