**ROYAL CANADIAN SEA CADETS**

**PHASE FIVE**

**INSTRUCTIONAL GUIDE**

# EO C521.01 – COMPLETE A ROPEWORK PROJECT

Total Time: 80 min

## PREPARATION

### PRE-LESSON INSTRUCTIONS

Resources needed for the completion of this self study package are listed in the lesson specification located in A-CR-CCP-605/PG-001, *Phase Five Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the self study package within the section for which they are required.

Self study packages are intended to be completed by the cadet independently. More information about self study packages can be found in the foreword and preface.

Review the lesson content and become familiar with the material prior to facilitating this lesson.

Photocopy the self study package located at Attachment A and the Prolong Mat Pattern located at Attachment B for each cadet.

### PRE-LESSON ASSIGNMENT

Nil.

### APPROACH

A self study was chosen for this lesson as it allows the cadet to complete a ropework project at their own learning pace. This encourages the cadet to become more self-reliant and independent by focusing on their own learning instead of learning directed by the instructor.

## INTRODUCTION

### REVIEW

Nil.

### OBJECTIVES

By the end of this lesson the cadet shall have completed a ropework project.

### IMPORTANCE

It is important for cadets to complete a ropework project so new concepts used in more advanced knot work are introduced in a fun and challenging way.



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## SELF STUDY PACKAGE INSTRUCTIONS

### OBJECTIVE

The objective of this self study package is to have the cadet complete a ropework project.

### RESOURCES

- Self study package located at Attachment A,
- 10 m of 4-mm (3/16-inch) diameter braided line,
- Corkboard,
- Straight pins,
- Cutting tool,
- Glue, and
- Prolong Mat Pattern located at Attachment B.

### ACTIVITY LAYOUT

Provide the cadet with a classroom or training area suitable to complete the self study package.

### ACTIVITY INSTRUCTIONS

1. Provide the cadet with a copy of the self study package located at Attachment A, 10 m of 4-mm (3/16-inch) diameter braided line, corkboard, straight pins, cutting tool, glue and a prolong mat pattern.

2. Allow the cadet 90 minutes to complete the self study package.

3. Provide assistance to the cadet as required.

4. Provide feedback to the cadet on the quality and correctness of the completed project and indicate whether or not they have completed the Enabling Objective (EO).

5. Record the result in the cadet's logbook and Cadet Training Record.

### SAFETY

Nil.

## END OF LESSON CONFIRMATION

The cadet's completion of the self study package will serve as the confirmation of this lesson.

## CONCLUSION

### HOMEWORK / READING / PRACTICE

Nil.

### METHOD OF EVALUATION

Nil.



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**CLOSING STATEMENT**

Completing a ropework project will be beneficial to the cadets so new concepts used in more advanced knot work are introduced in a fun and challenging way.

**INSTRUCTOR NOTES / REMARKS**

Cadets are required to complete only one of the two projects described in this EO to satisfy the minimum requirements for PO 521 (Complete a Ropework Project).

**REFERENCES**

C1-064 ISBN 1-55267-986-1 Budworth, G. (2001). *The ultimate encyclopedia of knots & ropework*. London, England: Anness Publishing Limited.

C1-102 Fukuhara, D. (2002). *Fancy knotting: An introduction*. Vancouver, BC: David Fukuhara.

C1-234 ISBN 0-07-059218-7 Smith, H. (1993). *The marlinspike sailor*. Camden, ME: International Marine



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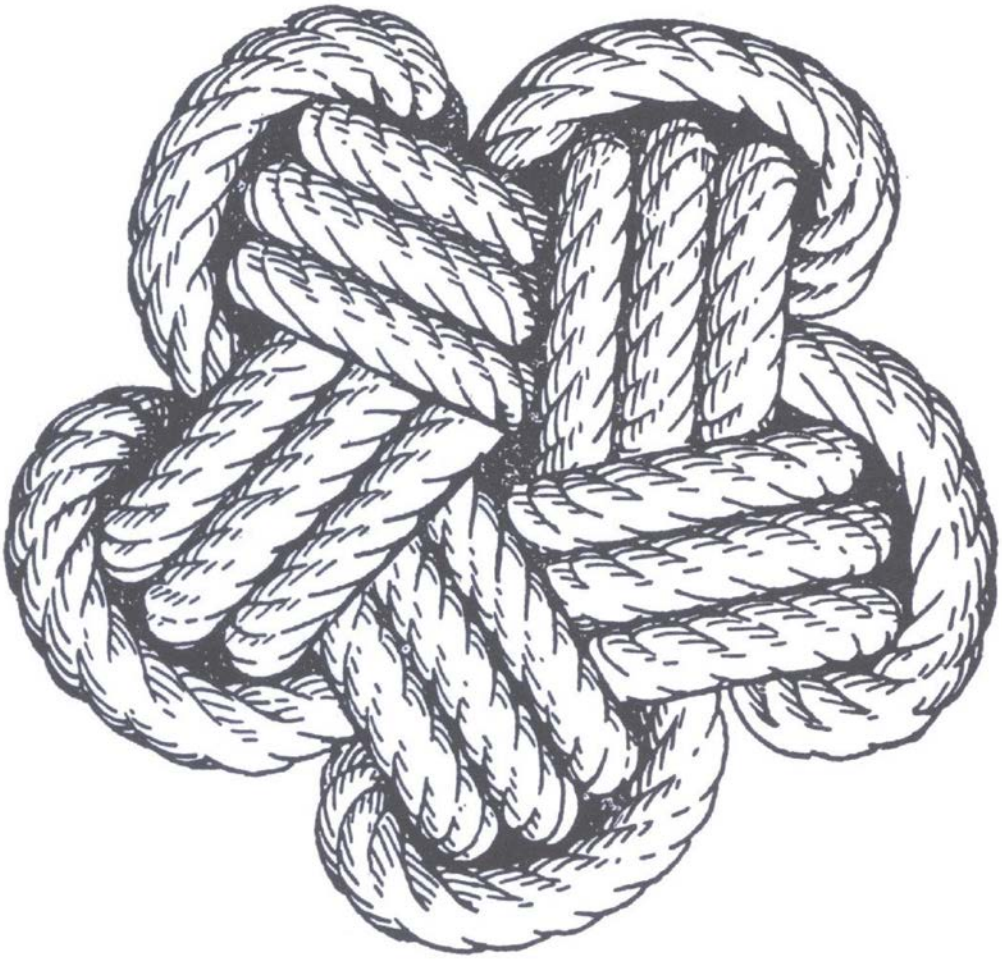
# COMPLETE A ROPEWORK PROJECT



**Self Study Package**

Choose one of the following sections to complete the ropework project.

**Section 1: TIE A STAR KNOT**

**Section 2: MAKE A PROLONG MAT**



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## SECTION 1
## TIE A STAR KNOT

### INTRODUCTION

Perhaps the most distinctive of all the sailor's decorative knots, the star knot has been admired for many years by the experienced sailor. Due to the intricacies of this uncommon knot, having this knot in one's repertoire is a mark of distinction.

The star knot is used as a terminal or end-finishing knot. Its unique design adds decorative appeal to bell lanyards, sea chest beckets and, in more modern times, key fobs (as illustrated in Figure A-1). The knot may be worked with three, four, five or six strands with all variations using the same basic construction.



*Note. Created by Director Cadets 3, 2010, Ottawa, ON: Department of National Defence.*

Figure A-1 Completed Star Knot

### STEPS FOR TYING A STAR KNOT



The steps listed below are for tying a five-strand star knot using a right-handed approach and can be modified by using the reverse direction or hand if necessary.

To aid in tying the star knot, draw the strands up snugly at each step. This helps in visualizing the form of the knot, keeping track of each strand and spotting mistakes easily.

1. Cut two 2-foot (60-cm) lengths of line and one 1-foot (30-cm) length of line. Double the long lines and seize them together with the short line near the end with the bights (as illustrated in Figure A-2). This end is called the stem. To help in identifying the strands, they can be labelled A to E.



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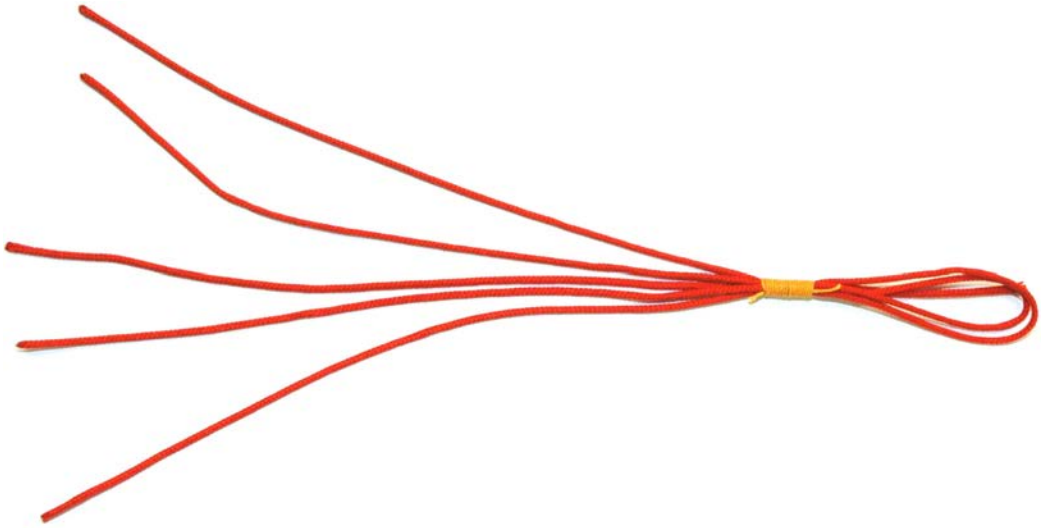

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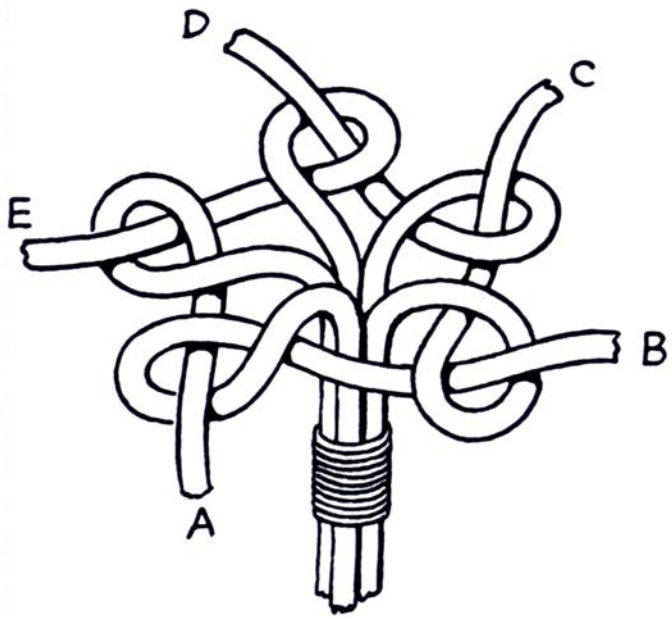
Figure A-2 Step 1

2. With the palm of the left hand held upward, push the stem down between the first and second fingers and arrange the five strands radially. With Strand A, take a hitch around Strand E. Working to the right, take a hitch around Strand A with Strand B. Continue by hitching Strand C around Strand B and Strand D around Strand C. Finally, pass Strand D up through a bight in Strand E.




*Note. From The Marlinspike Sailor (p. 32), by H. Smith, 1993, Camden, ME: International Marine. Copyright 1993 by Betsy Smith Nixon.*

Figure A-3 Step 2



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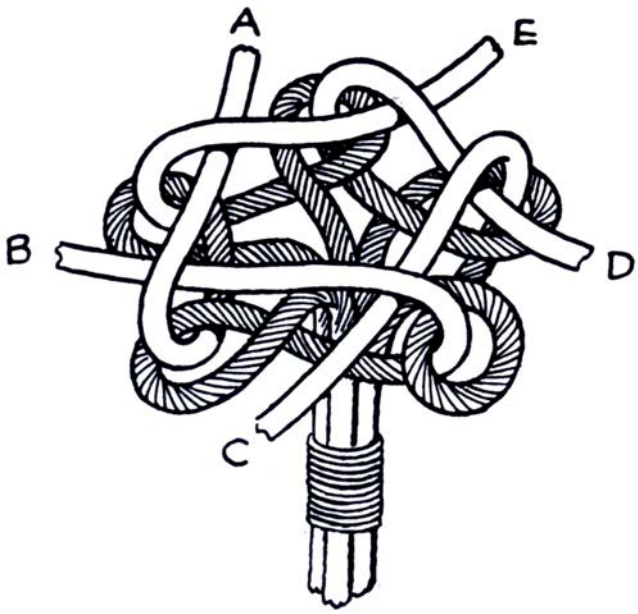
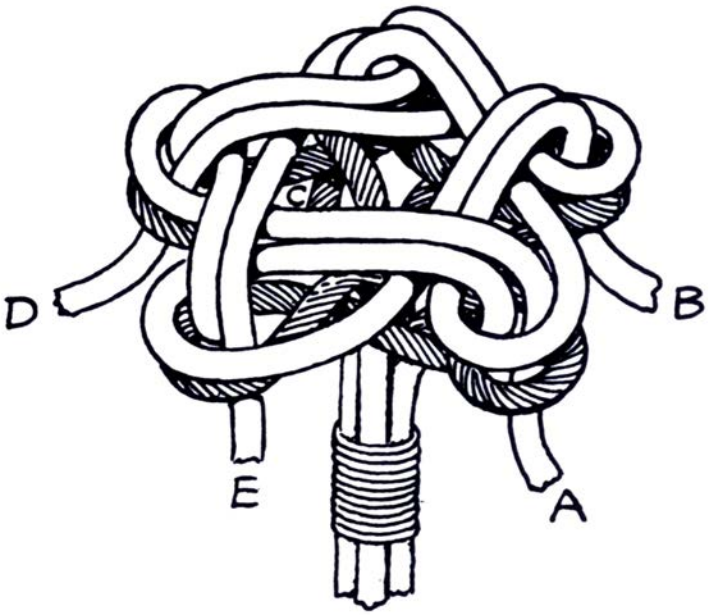
3. Crown the five strands to the left (as illustrated in Figure A-4).




*Note. From The Marlinspike Sailor (p. 32), by H. Smith, 1993, Camden, ME: International Marine. Copyright 1993 by Betsy Smith Nixon.*

Figure A-4 Step 3

4. Pass Strand A to the left around the bight of E, then under its own part to the right, parallel to strand B on the inner side, over Strand C and tuck the end down through the bight at the lower right corner. Next, pass Strand B around the bight of A, then under its own part along the inner side of Strand C, over Strand D and tuck the end down through the bight at the upper right corner. Continue with the rest of the strands (as illustrated in Figure A-5).




*Note. From The Marlinspike Sailor (p. 32), by H. Smith, 1993, Camden, ME: International Marine. Copyright 1993 by Betsy Smith Nixon.*

Figure A-5 Step 4

5. Turn the knot over so that the stem is pointing up (as illustrated in Figure A-6).



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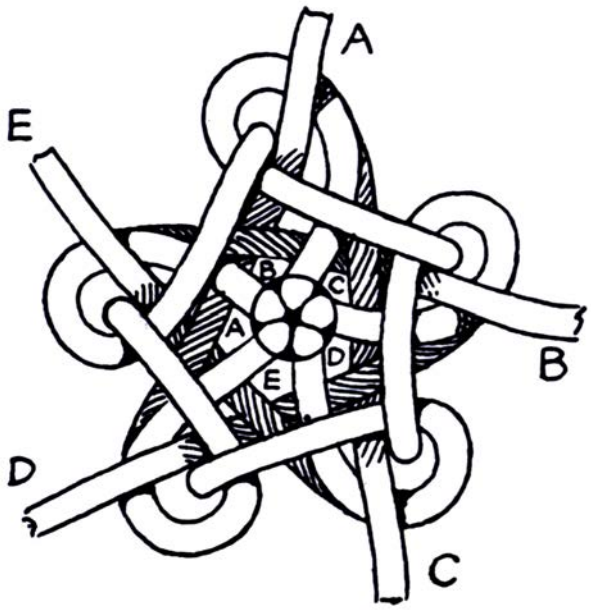


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Figure A-6 Step 5

Ensure that all strands are correctly placed before proceeding to the next step.

6. Bring Strand A forward, parallel to the adjacent strand and tuck it down through the centre of the knot alongside the stem beside the bight that Strand E emerges from. Continue to the right and tuck each remaining strand in the same manner as the first (as illustrated in Figure A-7).

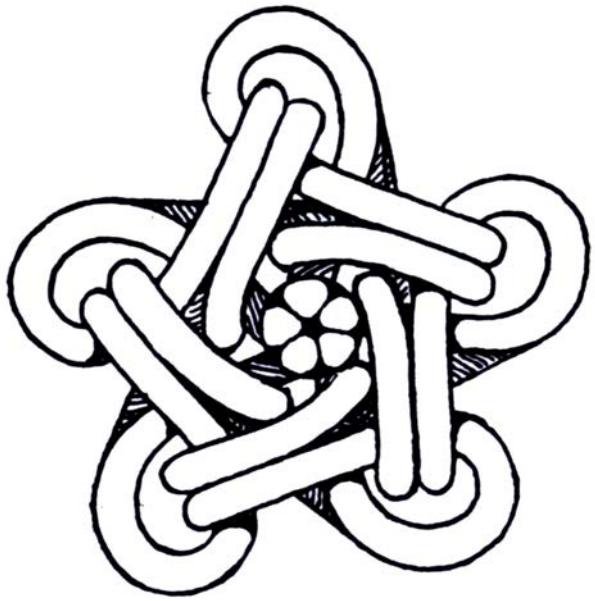

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Figure A-7 Step 6



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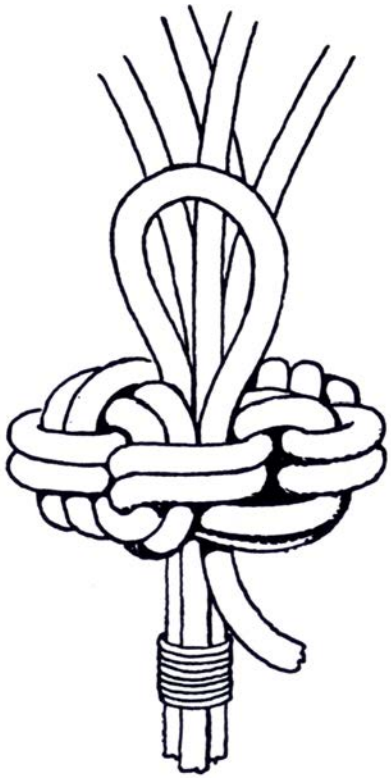
7. Turn the knot right side up, with the strand ends protruding from the top of the knot at the centre. Tuck each strand back down through the knot (as illustrated in Figure A-8), ensuring the end passes under four parts—the two strands which form the rim, then back toward the stem under the two bottom strands. Tighten each strand at this point.



*Note. From The Marlinspike Sailor (p. 32), by H. Smith, 1993, Camden, ME: International Marine. Copyright 1993 by Betsy Smith Nixon.*

Figure A-8 Step 7

8. Once the knot has been cinched tight, cut the strands off close to the bottom of the knot (as illustrated in Figure A-9). Cut the seizing from the stem and cut the single strand in the stem close to the bottom of the knot leaving the two bights extending from the knot.



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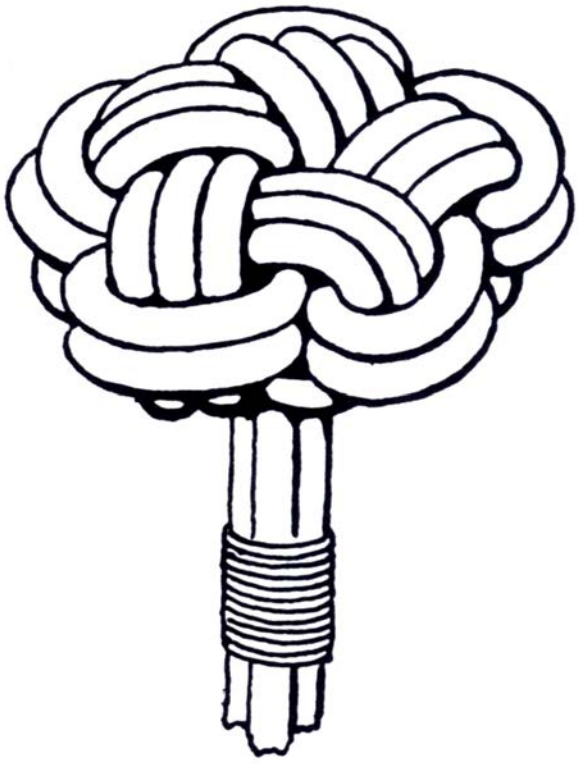

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Figure A-9  Step 8



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## SECTION 2
## MAKE A PROLONG MAT

### KNOT WEAVING

#### Introduction

As cord mats become more complicated, it becomes difficult to keep track of where cords are to be woven. One method of weaving intricate mats is to use a knot-weaving board. The board consists of wood, cork or cardboard, which allows a mat pattern to be affixed by pins or nails. The cord is woven around the pins following a given pattern that indicates direction and where cords cross under or over each other. The pins maintain the desired shape of the mat until it is complete.



The prolong mat derived its name from its ability to be lengthened. Given enough material and patience, it would be possible to continue adding indefinitely to this mat's length.

Once complete, this type of mat can be used as a companionway tread mat.



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Figure A-10 Completed Prolong Mat



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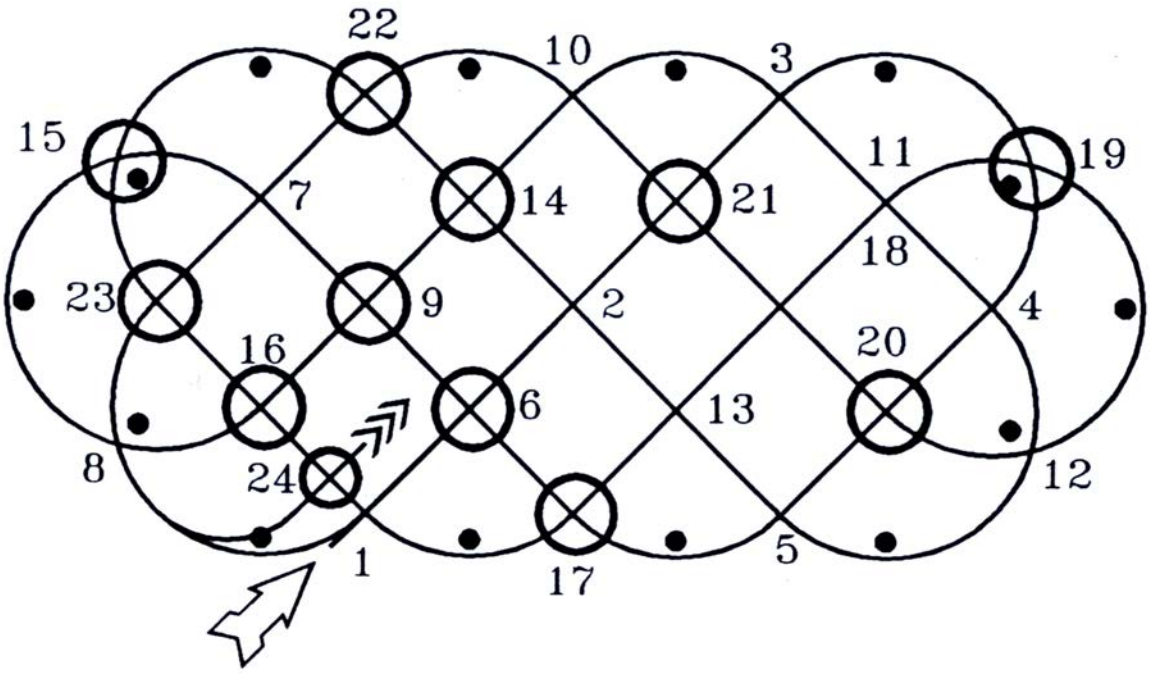
**Mat Patterns**

To make mat weaving easier, a series of arrows, dots, circles, lines and numbers are used on the mat patterns. They are as follows:

- The numbers are placed at alternate crossings on the diagram and are to be followed consecutively during the weaving process.
- A circle at a crossing indicates an underpass of a cord already there.
- A crossing with no circle indicates an overpass of a cord already there.
- An outlined arrow indicates the starting position and the initial direction for the lay of the cord.
- A feathered arrow indicates the end of the pattern.
- Small dots on the pattern indicate the turning points and the placement of pins.




*Note. From Fancy Knotting: An Introduction (p. 14), by D. Fukuhara, 2002, Vancouver, BC: David Fukuhara.*

Figure A-11 Typical Mat Pattern

**Scaling a Pattern**

Each mat pattern is drawn on a square grid. This allows for visualization of the mat pattern and easy identification of which crossover points are overpasses and which are underpasses.



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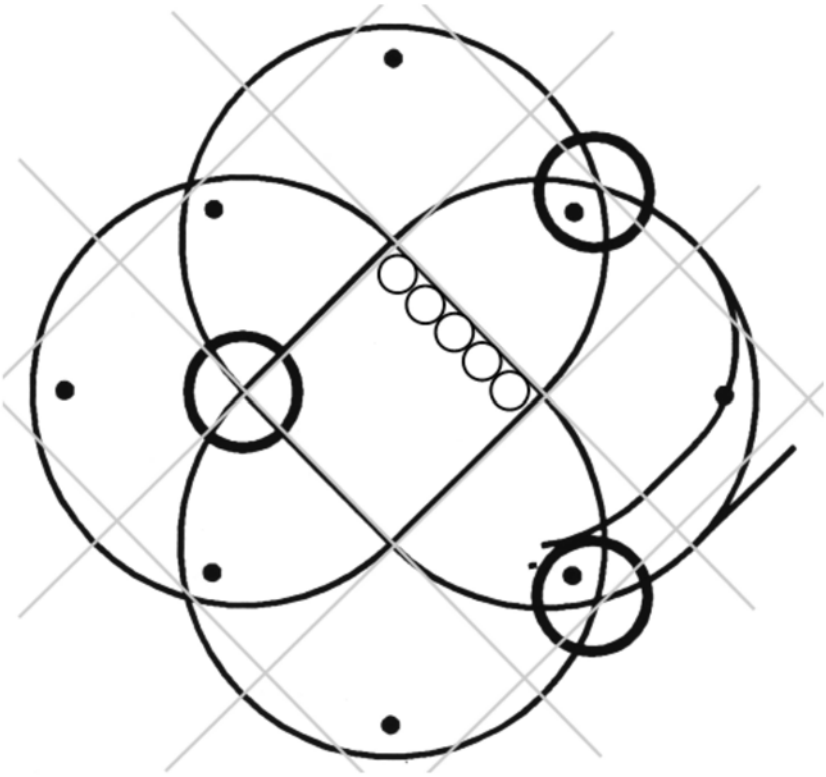

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Figure A-12 Pattern Grid

By scaling the size of the squares, the pattern can be used for different sizes of line. The sides of squares should be roughly five cord diameters in length. The following guide may be used:

| Diameter of cord | Length of square's side* |
|---|---|
| 4 mm (3/16 inch) | 20 mm (3/4 inch) |
| 6 mm (1/4 inch) | 30 mm (1 1/4 inch) |
| 9 mm (3/8 inch) | 45 mm (1 7/8 inch) |
| 12 mm (1/2 inch) | 60 mm (2 1/2 inch) |
| ***Based on a 3 lead pattern. To change the number of leads in the pattern, add or subtract a cord diameter from the side measurement accordingly.** | |

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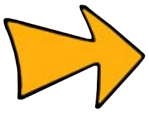
Figure A-13 Pattern Scaling Chart



The term "lead" refers to a cord that follows the mat pattern to completion. For example, a three-lead mat has the cord following the pattern to completion three times.



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**Length of Cord**

The length of cord required to weave the mat is determined before weaving. With the pattern on the knot-weaving board, put a pin at each turning point. Pin one end of the uncut cord at the starting point. Lay the cord on the pattern following the numbers from start to finish ignoring the underpasses. Mark this length with a piece of tape. After removing the cord, cut a length of cord equal to three times this measurement and add 30 cm (12 inches). The extra length allows for hiding the ends in the middle of the mat.

**STEPS TO MAKING A PROLONG MAT (WEAVING METHOD)**

1. Cut out the prolong mat pattern.

2. With the pattern on a knot-weaving board, put a straight pin at each turning point (as illustrated in Figure A-14).

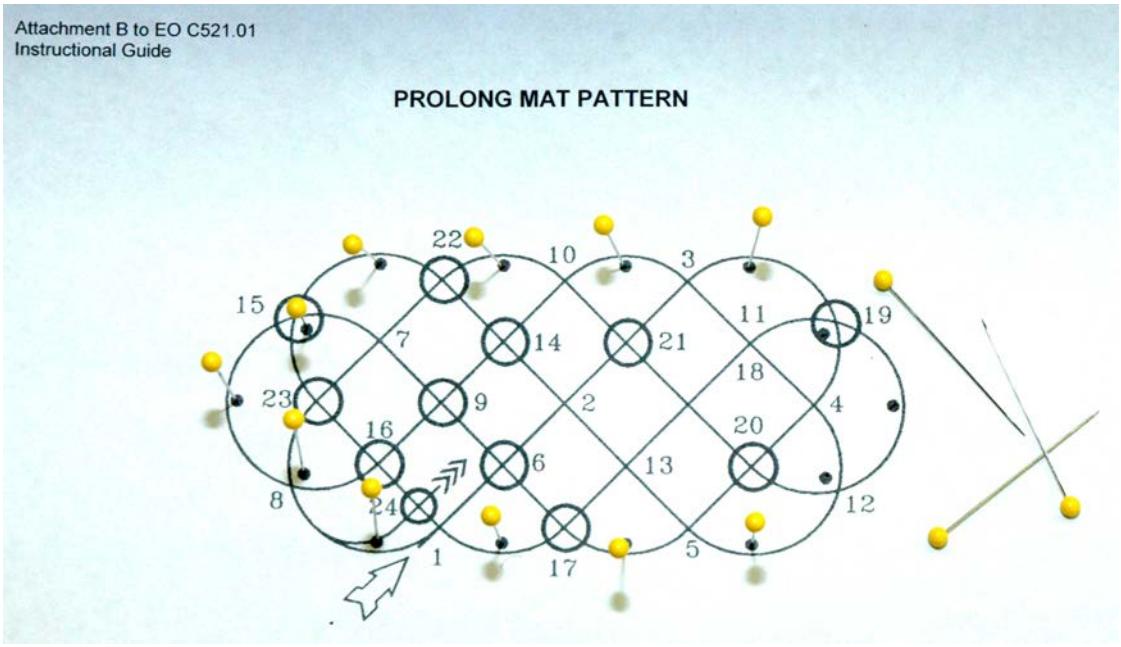


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Figure A-14 Step 2

3. Lay the cord onto the pattern following the numbers from start to finish, ignoring the underpasses (as illustrated in Figure A-15). Mark the one-third position and remove the cord from the pattern. Cut the cord to a length equal to three times the one-third length plus 30 cm (12 inches).



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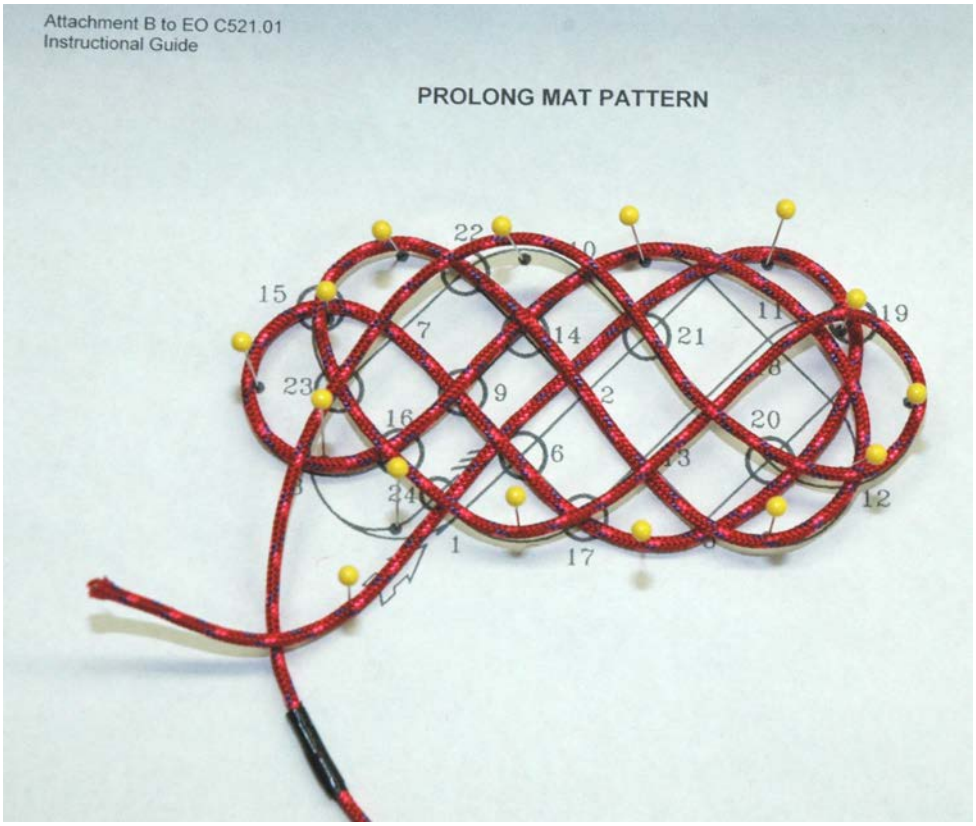


*Note. Created by Director Cadets 3, 2010, Ottawa, ON: Department of National Defence.*

Figure A-15 Step 3

4. Pin the cord's one-third position onto the outlined arrowhead at the starting point (as illustrated in Figure A-16).

5. Lay the shorter length of cord onto the pattern following the numbers. At the turns, lay the cord around the pins and continue (as illustrated in Figure A-16). Pay attention for the underpasses at crossings with circles.



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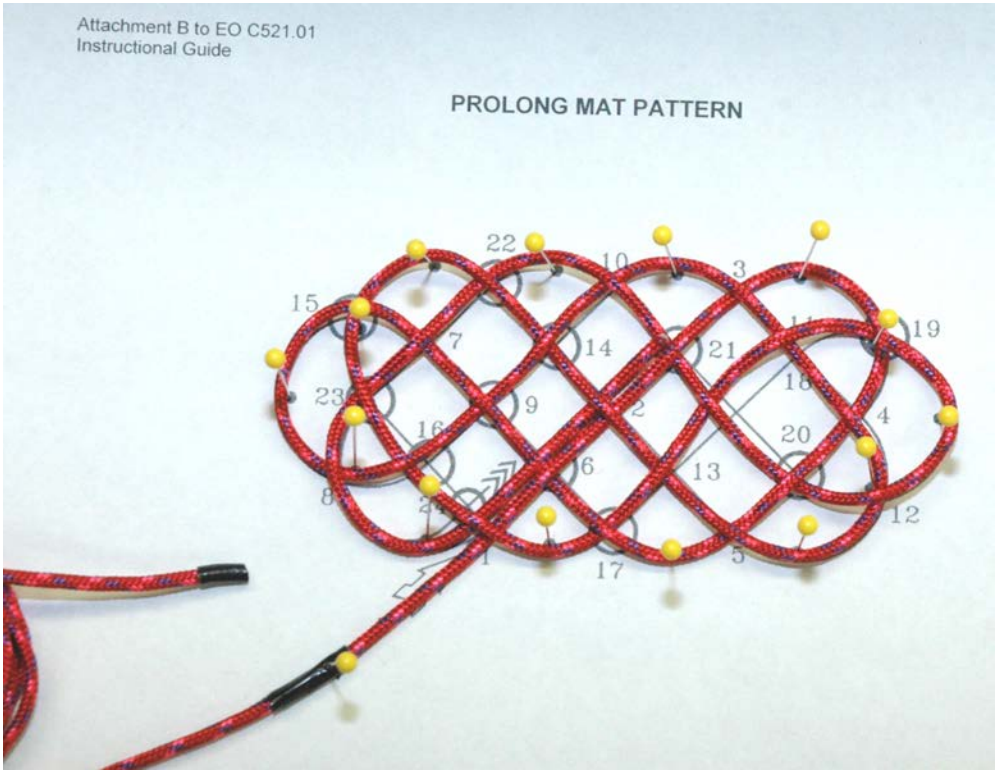


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Figure A-16 Steps 4 and 5

6. When the cord is back to crossing Number 1, the initial tying sequence is complete. Check to ensure that the over and under sequence has been maintained from start to finish.



Any errors must be corrected at this point before proceeding.



Once the initial lay of cord is complete, the pattern is no longer required.

7. Lay the remaining two-thirds of the cord following the previously laid cord in the opposite direction (as illustrated in Figure A-17).



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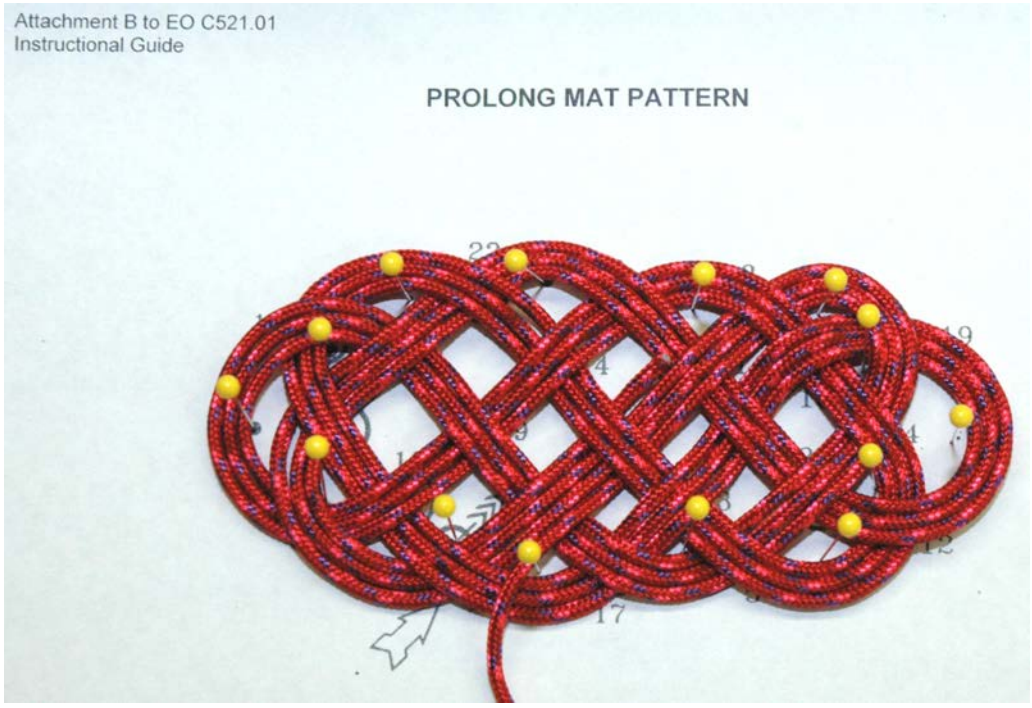


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Figure A-17 Step 7

Avoid drawing or pulling the cord tight, as this causes the mat to curl up at the rim or at the corners.

8. When there are three leads, remove the pins from the corkboard (as illustrated in Figure A-18).



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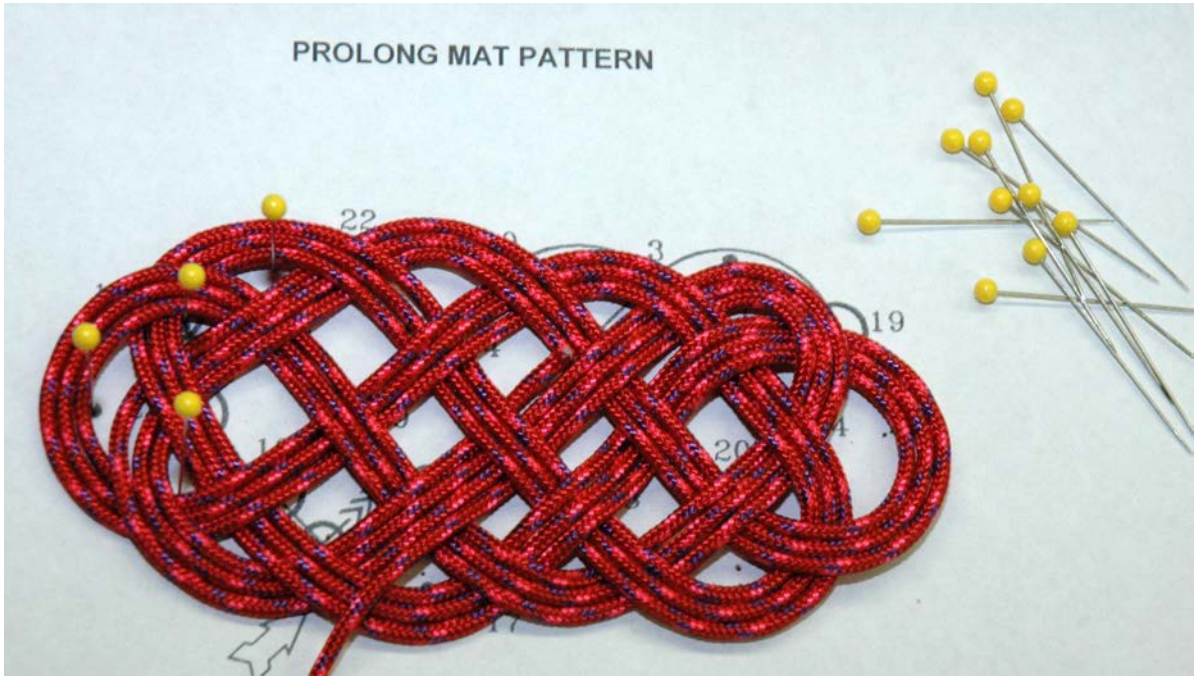


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Figure A-18 Step 8

9. To finish the mat, the cord can be glued to its adjacent cord for about four cord diameters and the excess cord can be trimmed (as illustrated in Figure A-19).



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Figure A-19 Step 9

An alternative to finishing larger diameter cord is to sew the cord to its adjacent cord for about four cord diameters. Whip the ends and trim the excess.



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Congratulations, you have completed your self study package on EO C521.01 (Complete a Ropework Project). Hand your completed package to the Training Officer / Course Officer who will record your completion in your Phase Five logbook.



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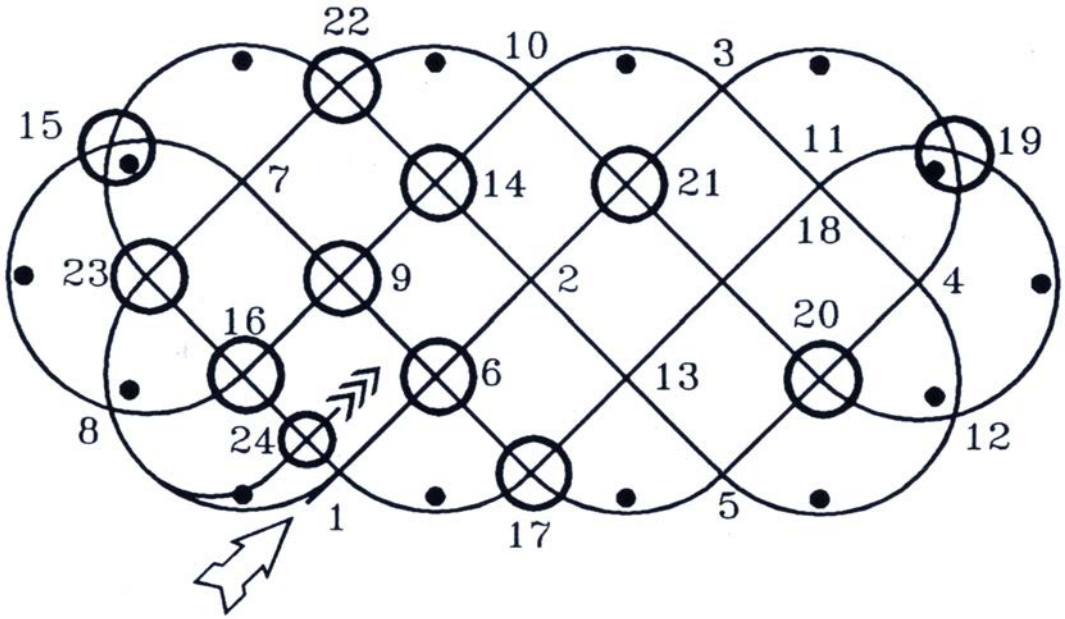
**PROLONG MAT PATTERN**



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