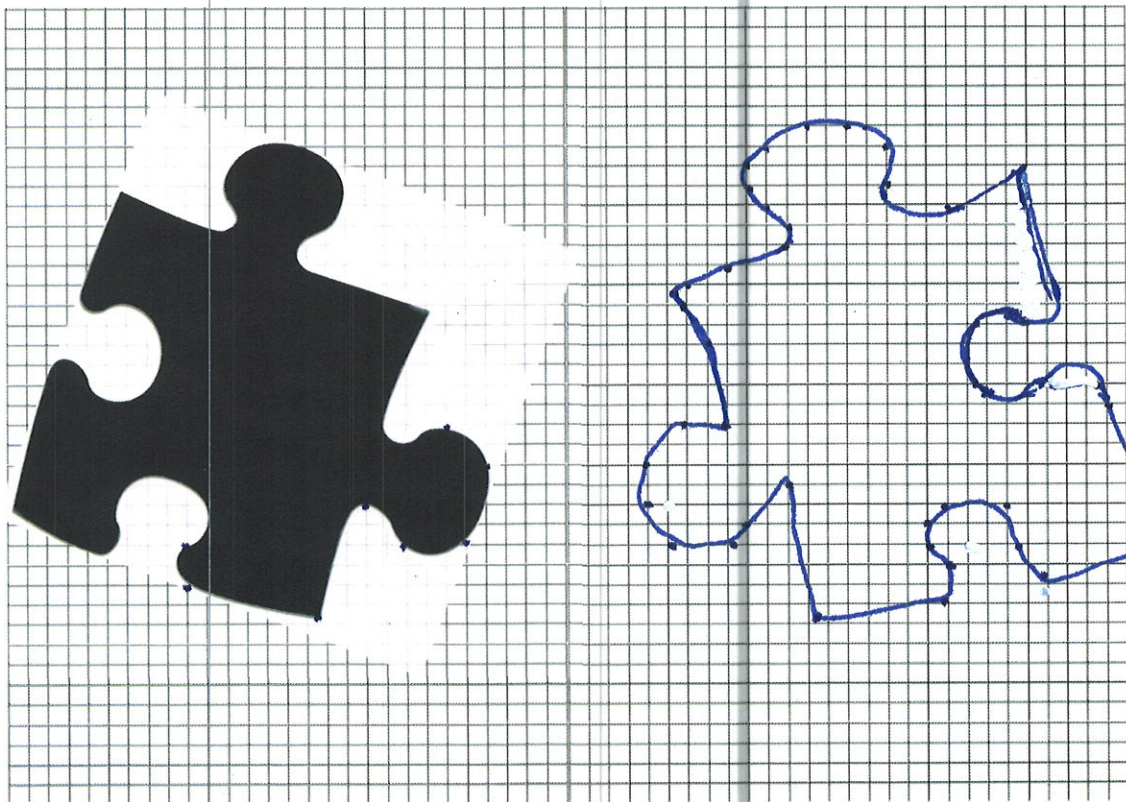
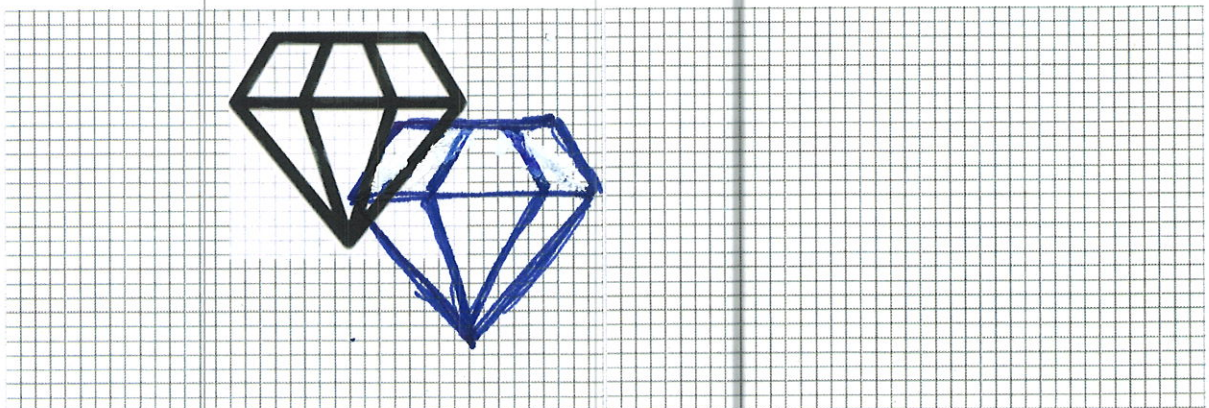


Instructions: Answer the following questions on separate numbered page(s) and attach work to this page. Indicate for each problem on this sheet which page the answer to the question can be found, and indicate the answers clearly in your work (you can circle the answer, for instance).

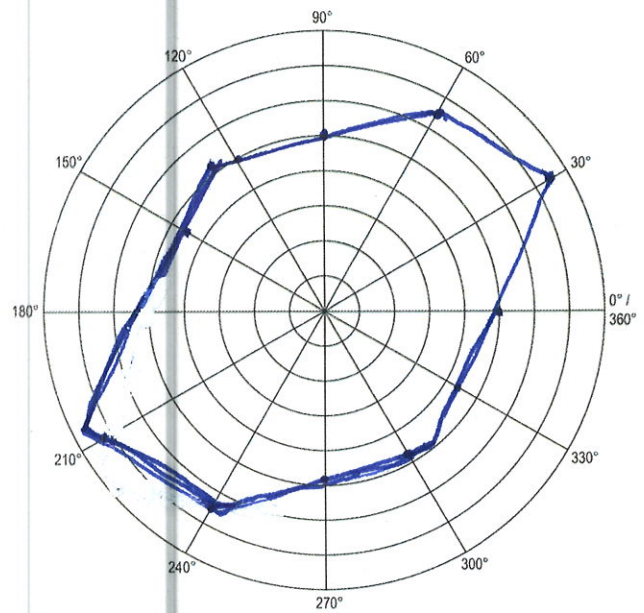
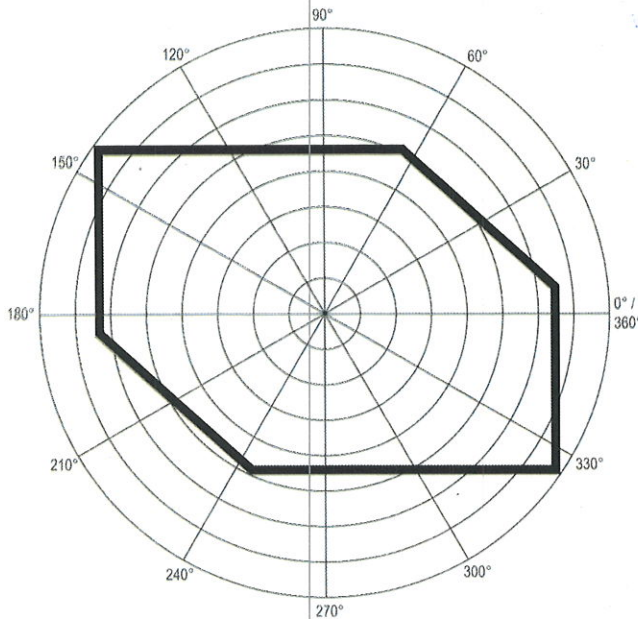
1. Define the term **fixed point** using your own words (don't copy the definition from the book!).
2. What is the difference between a **proper rigid motion** and an **improper rigid motion**?
3. Perform a reflection motion on the image shown (across the dark line in the middle of graph).



4. Translate the shape shown in the direction $\vec{v} = \langle 8, -6 \rangle$.

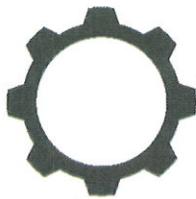


5. Draw a rotation of the shape shown. Rotate the shape 60°.

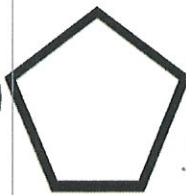


6. If you are standing so that the tip of your nose was exactly 12 inches from a mirror, how “far away” from the surface of the mirror is the reflection? What acts as the axis of reflection?
7. Given an example of an identity motion in each type of rigid motion.
8. We use the notation D_n to describe shapes with both rotation and reflection symmetry (n is the number of both), and Z_n for those that have rotation symmetry only. The smallest value n can have is one, since all objects have identity rotation symmetry. Use this fact to identify the symmetries of the following shapes.

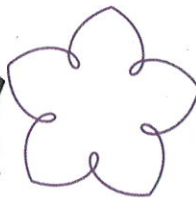
T X Q N Ψ Θ Δ ≡ Σ Ж ε ⊕



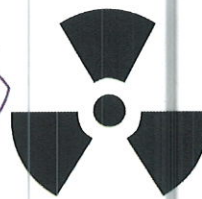
D_8



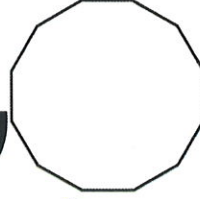
D_5



D_5



D_3



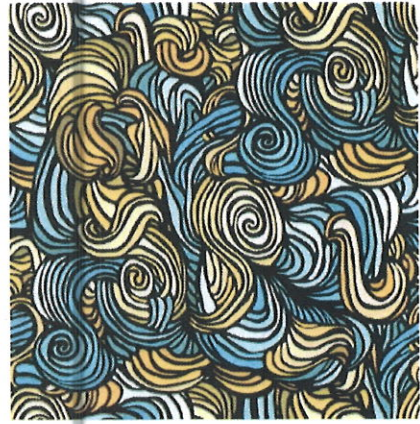
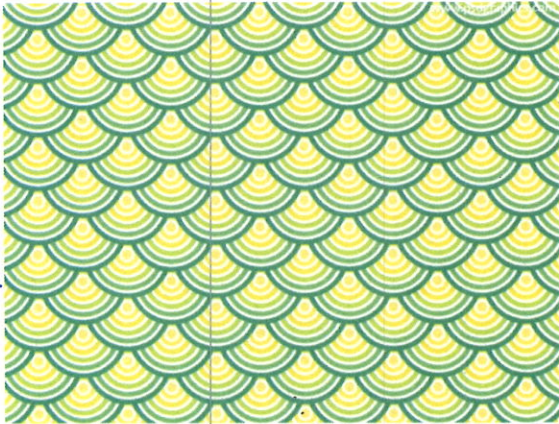
D_{12}



Z_1

9. Shown below are a series of wallpaper or border patterns. Describe the type of symmetry displayed. For borders, describe the symmetry types in words, and use the list in the textbook to provide the correct notation. For wallpapers, just list the symmetries.

translation
 ↓ ↘
 reflection
 ↔
 identity rotation
 only



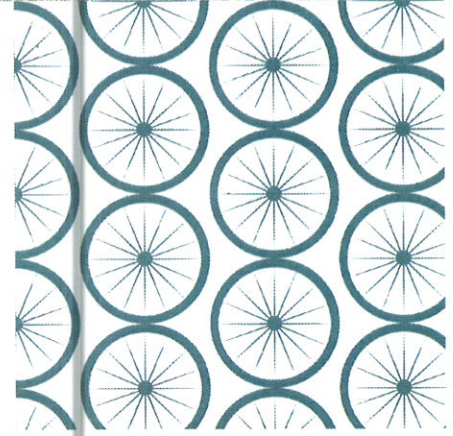
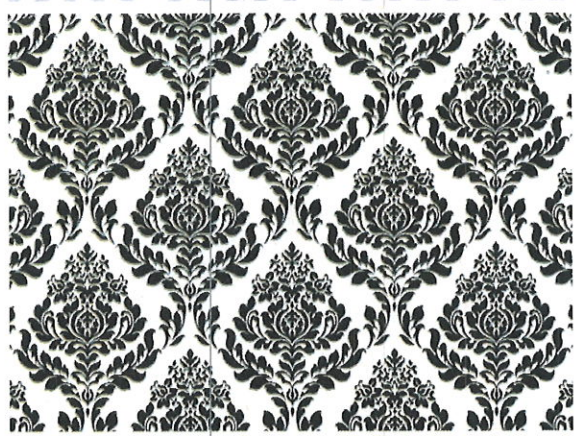
translation
 ↔

reflection
 ↔ ↕
 translation
 ↓ ↘
 rotation 4

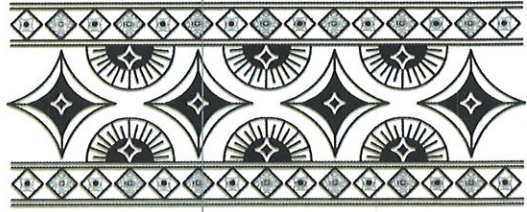


translation
 ↔ ↕

translation
 → ↓
 reflection
 identity
 rotation
 only



reflection
 ↕ ↔ ↗
 rotation 3
 translation
 ↔ ↕



translation →
 reflection ↔ ↕
 rotation
 identity #2

translation
 reflection 2
 identity rotation only

MAT 100 Homework #1 Key

①

1. A fixed point is a point that remains the same under a rigid motion.
2. A proper rigid motion maintains the handedness of any object. An improper one does not.

6. 12"; the surface of the mirror

7. a. reflection: reflect across an axis and then reflect a second time across the same line.

b. rotation: 360° rotation

c. translation: translate by \vec{v} , then translate by $-\vec{v}$

8. T: D_1

X: D_2 (could be D_4 if X is written in a square rather than a rectangle)

Q: Z_1

Δ : D_1

N: Z_2

Ψ : D_2

Ψ : D_1

ξ : Z_1

\ominus : D_2

\oplus : D_4

Δ : D_3

Ξ : D_2