16. [Geometry]

Q. One of these shapes is hidden in the maze. Find it and color it in.
(Same size and orientation.)

A.

Trace and cut out the shapes to lay over the maze. Slide them to check possible positions. [Remember: Do not change their orientation by turning them. The shapes must have every edge outlined.]

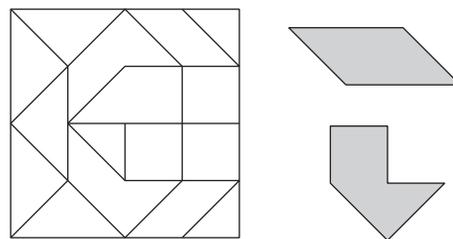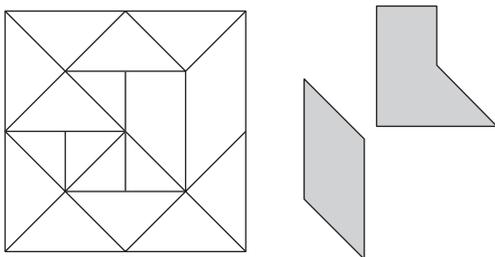**a)** One of these shapes is hidden in the maze. Find it and color it in.
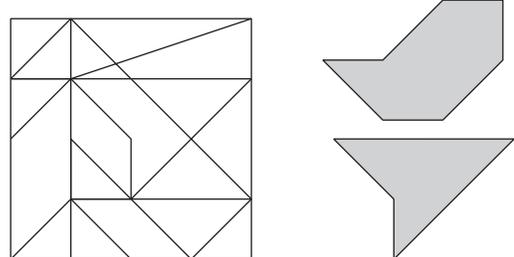(Same size and orientation.)
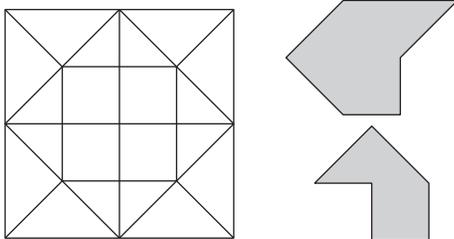
b) One of these shapes is hidden in the maze. Find it and color it in.
(Same size and orientation.)

c) One of these shapes is hidden in the maze. Find it and color it in.
(Same size and orientation.)

d) One of these shapes is hidden in the maze. Find it and color it in.
(Same size and orientation.)

e) One of these shapes is hidden in the maze. Find it and color it in.
(Same size and orientation.)

f) One of these shapes is hidden in the maze. Find it and color it in.
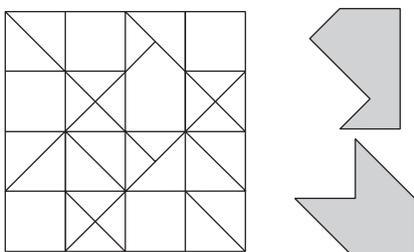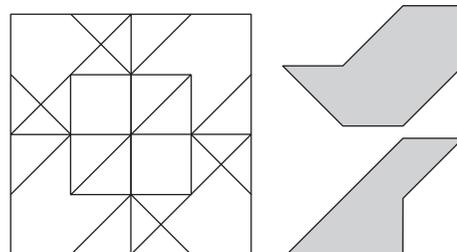(Same size and orientation.)
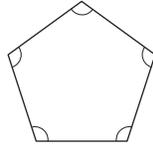
- Draw two dimensional shapes (2D) in two directions, length and width.
  Hint: 2D shapes have no height.

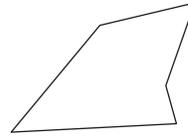- Use the name of the shape (based on Latin and Greek words) to work out the number of sides.

Hint:					
poly	*- many*	*mono*	*- one*	*hexa -*	*six*
equi	*- equal*	*bi or di*	*- two*	*hepta -*	*seven*
gon	*- angle*	*tri*	*- three*	*octa -*	*eight*
lateral -	*side*	*quad or tetra -*	*four*	*nona -*	*nine*
		penta	*- five*	*deca -*	*ten*

Q. Draw a pentagon.   **A.**   *or*   Consider the name:
gon = angle
penta = 5
You need to draw a shape that has 5 interior angles and therefore 5 sides.

a) Draw a quadrilateral.   **b)** Draw a triangle.   **c)** Draw a rectangle.

quad = 4
lateral = sides

d) Draw a square.   **e)** Draw a decagon.   **f)** Draw a heptagon.

g) Draw a pentagon.   **h)** Draw an octagon.   **i)** Draw a nonagon.

j) Draw a trapezoid.   **k)** Draw a hexagon.   **l)** Draw an equilateral triangle.

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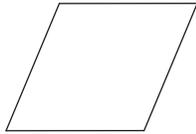
Skill 16.3   Describing polygons.

- Use the name of the polygon (poly means *'many'* and gon means *'angle'*) to determine the number of interior angles or the number of sides.

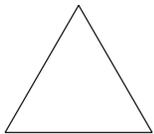 *Hint: The number of interior angles = The number of sides.*

Q. How many sides does a rhombus have?

A. *4*

A rhombus, rectangle, square, trapezoid and parallelogram all belong to the quadrilateral family: quad = 4
lateral = sides

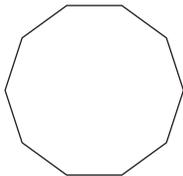**a)** How many interior angles does a triangle have?
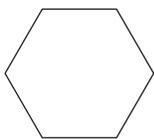
3

b) How many sides does a rectangle have?
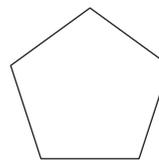
c) How many sides does a decagon have?

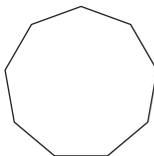**d)** How many interior angles does a square have?

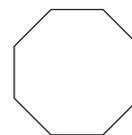**e)** How many interior angles does a hexagon have?
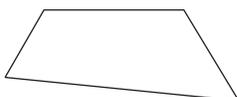
f) How many sides does a pentagon have?

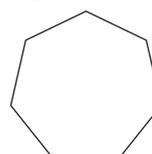**g)** How many sides does a nonagon have?

h) How many sides does an octagon have?

i) How many interior angles does a quadrilateral have?

j) How many sides does a heptagon have?

Skill 16.4   Recognizing 3D shapes.

- Observe whether the 3D shape has a curved surface (cones, cylinders and spheres) or flat surfaces (pyramids and prisms).
- If all surfaces are flat, then decide if the figure is a pyramid (narrowing to a point) or a prism (rectangular lateral faces).
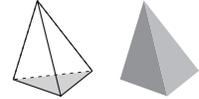
Q. What type of solid is shown below?

A) triangular pyramid
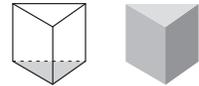B) triangular prism
C) cone

A. C

A) Triangular pyramid would have a triangle at its base and 3 faces that are triangles.
incorrect

B) Triangular prism would have a triangle at its base and top, and 3 faces that are rectangles.
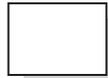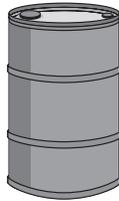incorrect

C) Cone has a circular base and one curved surface narrowing to a point.
correct

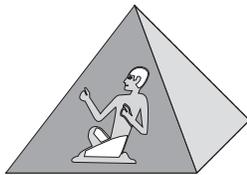**a)** What type of solid is shown below?

A) cone
B) sphere
C) cylinder

b) What type of solid is shown below?

A) square pyramid
B) rectangular prism
C) cone

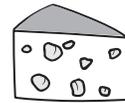**c)** What type of solid is shown below?

A) square pyramid
B) cube
C) sphere

d) What type of solid is shown below?

A) rectangular prism
B) triangular prism
C) cylinder

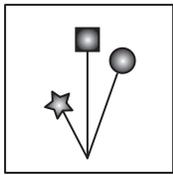**e)** What type of solid is shown below?

A) cylinder
B) cone
C) sphere

f) What type of solid is shown below?

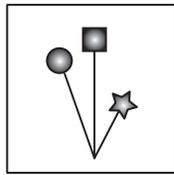A) rectangular prism
B) square pyramid
C) cube

Q. Which movement has transformed this shape?

A) flip (reflection)
B) slide (translation)
C) turn (rotation)

Position 1   Position 2

A. *A*

A) Hold a mirror vertically on the right edge of position 1. This shows the object has been reflected to achieve position 2.
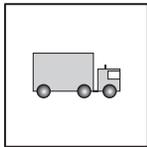   correct

Sketch the object as in position 1.
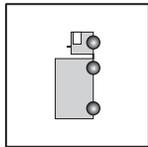B) Try flipping it. Note the change in position as a result.   incorrect

C) Try sliding it. Note the change in position as a result.   incorrect

---

a) Which movement has transformed this shape?

A) flip (reflection)
B) slide (translation)
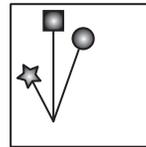C) turn (rotation)

Position 1   Position 2

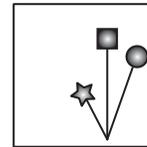*The truck has been turned a quarter of a turn, anticlockwise.*

C

b) Which movement has transformed this shape?

A) flip (reflection)
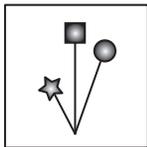B) slide (translation)
C) turn (rotation)

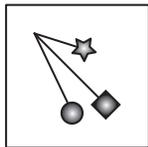Position 1   Position 2

c) Which movement has transformed this shape?

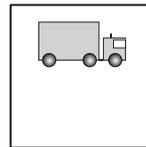A) flip (reflection)
B) slide (translation)
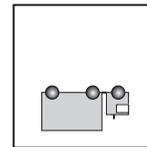C) turn (rotation)

Position 1   Position 2

d) Which movement has transformed this shape?

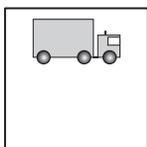A) flip (reflection)
B) slide (translation)
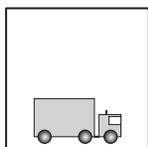C) turn (rotation)

Position 1   Position 2

e) Which movement has transformed this shape?

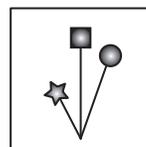A) flip (reflection)
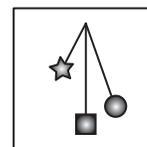B) slide (translation)
C) turn (rotation)

Position 1   Position 2

f) Which movement has transformed this shape?

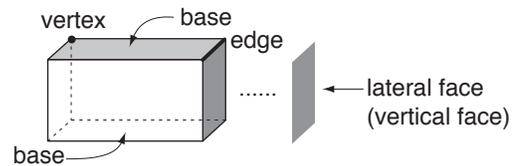A) flip (reflection)
B) slide (translation)
C) turn (rotation)

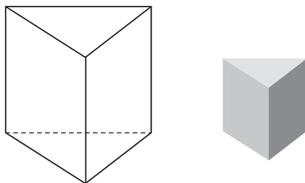Position 1   Position 2

- Count the number of: Faces,
 Edges and/or
  Vertices (points/corners).

vertex — base
edge
...... ← lateral face
(vertical face)
base

**Q.** The bases of a triangular prism are triangles. What shape are the other faces?

A. *rectangle*

The 2 parallel bases of a triangular prism are triangles.
These triangles, as for all prisms, are joined by rectangular faces. The number of rectangular faces is the same as the number of sides on the base shape.
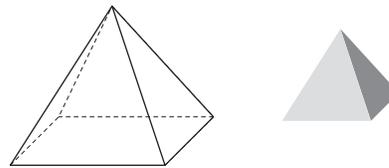
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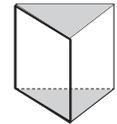
a) How many vertices does a triangular pyramid have?

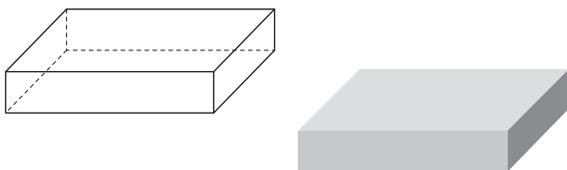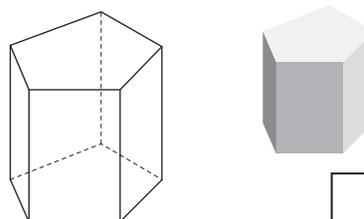1

Count the number of points.

2
4
3
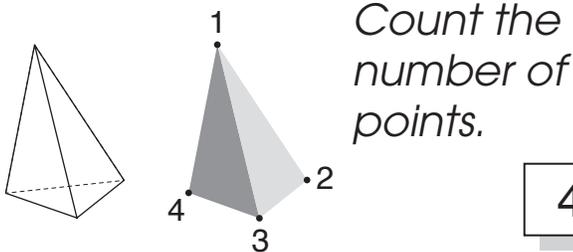
4

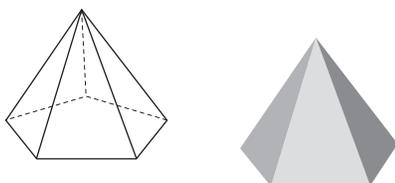**b)** How many edges does a rectangular pyramid have?

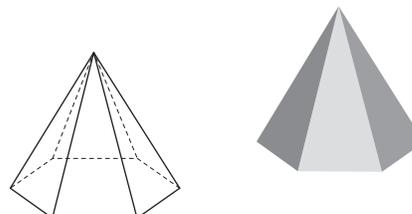**c)** How many edges does a rectangular prism have?

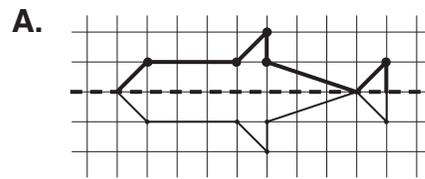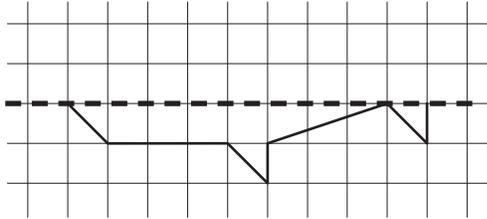**d)** The bases of a pentagonal prism are pentagons. What shape are the other faces?

e) How many vertices does a pentagonal pyramid have?

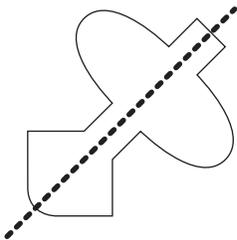**f)** How many faces does a hexagonal pyramid have?

Q. The dotted horizontal line is an axis of symmetry. Complete the drawing so that it is symmetrical about this axis of symmetry.

A.

Hold a mirror vertically on the axis. What you see is what needs to be drawn behind.
OR Mark every turning point on the shape. Copy these points to the same distance above the axis of symmetry as they are below. Join the points.

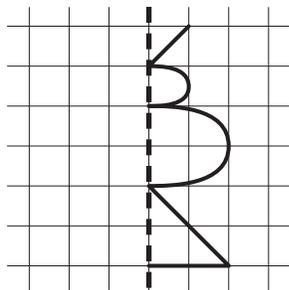**a)** Draw the line of symmetry through the shape below.

The shape on one side of the line is identical to the shape on the other side of the line. The line of symmetry is oblique.
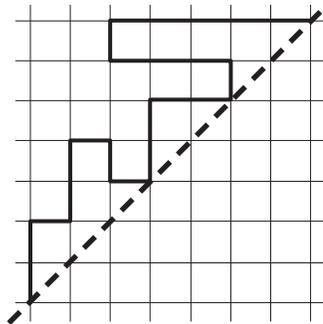
**b)** Draw the two lines of symmetry through the shape below.
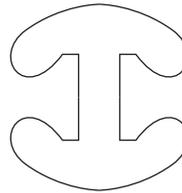
c) The dashed vertical line is an axis of symmetry. Complete the drawing so that it is symmetrical about this axis of symmetry.
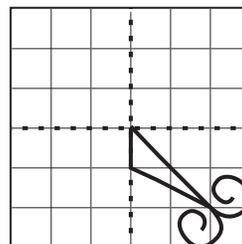
d) The dashed oblique line is an axis of symmetry. Complete the drawing so that it is symmetrical about this axis of symmetry.

**e)** This design has two lines of symmetry shown by the dotted lines. Complete the design.
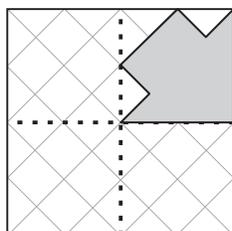
f) This design has two lines of symmetry shown by the dotted lines. Complete the design.

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- Two lines that meet at a point are called intersecting lines.

$a \cap b = \{M\}$ (line a intersects line b at a point M)

- Two lines in the same plane that do not intersect are called parallel lines.

$a \parallel b$ (line a is parallel to line b)

- Perpendicular lines intersect to form four right angles.

$a \perp b$ (line a is perpendicular to line b)
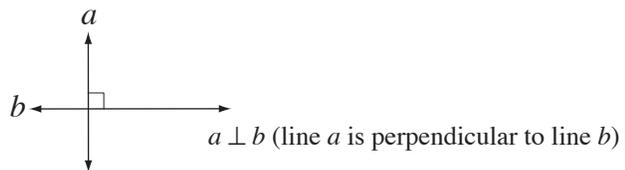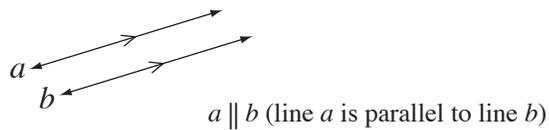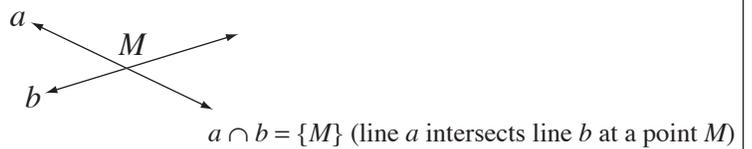
Q. Flamingo and Paradise Roads are:

A) parallel,
B) intersecting or
C) perpendicular.

Paradise Rd
Flamingo Rd
Las Vegas Blvd
Harmon Ave

A. *C*

Paradise Rd
Flamingo Rd
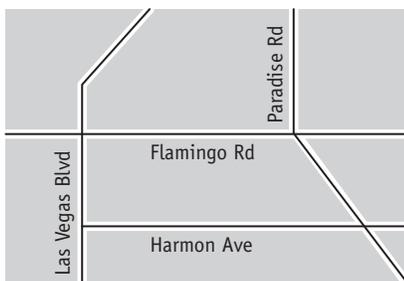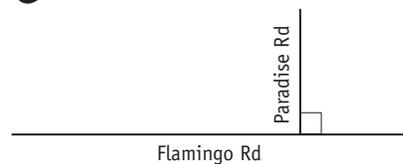
Flamingo and Paradise Roads are intersecting lines. They also form right angles, so they are perpendicular lines.

a) Montreal and Columbo Streets are:

A) parallel,
B) intersecting or
C) perpendicular.

Montreal St
Bealey Ave
Peacock St
Durham St
Columbo St
Conference St
Salisbury St

b) Esplanade and Redman Street are:

A) parallel,
B) intersecting or
C) perpendicular.

Esplanade
Jarman St
Homan St
Hansen St
Redman St
Warren St

c) Complete the statement using *always, sometimes* and *never.*
Parallel lines are ..... perpendicular.

d) Complete the statement using *always, sometimes* and *never.*
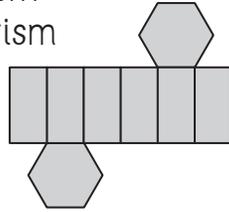Intersecting lines are ..... parallel.

- Identify the shapes in the net.
- Imagine the shape folded. OR
  Make a model by tracing, cutting out
  and folding the net.

Prism

base

lateral face

base

Pyramid

lateral face

base
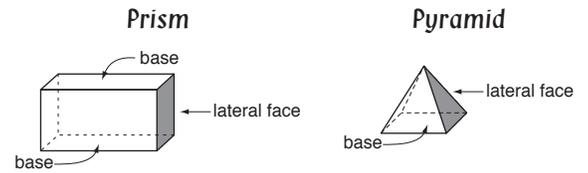
Q. Which shape can this net be
used to make?

    A) hexagonal pyramid
    B) hexagonal prism
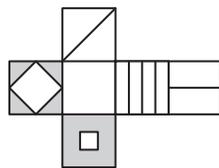   C) rectangular prism

A. *B*

The net has 2 hexagons and 6 rectangles.
Pyramids have triangles as their lateral
sides. Prisms have rectangles. It must
be a prism not a pyramid. This prism
has hexagons as its bases.
OR
Trace, cut out and fold the shape.

---

a) Which box can be made from this net?
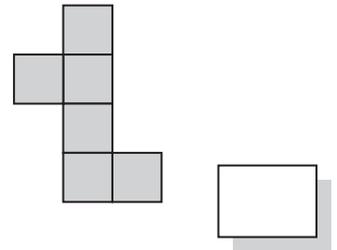
    A)

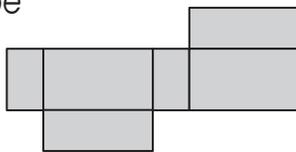   B)

    C)

*Trace, cut out and
fold the shape.*

B

b) Which shape can this net be
used to make?

    A) cube
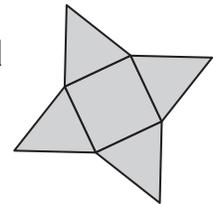   B) tetrahedron
    C) square prism

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c) Which shape can this net be
used to make?

    A) square prism
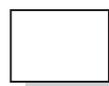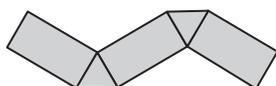   B) rectangular prism
    C) cube

d) Which shape can this net be
used to make?

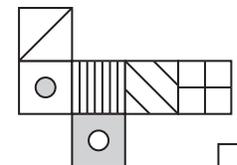   A) triangular pyramid
    B) square prism
    C) square pyramid

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e) Which shape can this net be
used to make?

    A) cube
    B) triangular prism
    C) triangular pyramid

**f)** Which box can be made from this net?

    A)

    B)

    C)

## Skill 16.10 Drawing top, side and front views of 3D shapes.

- To draw the top view of a 3D shape, imagine what you would see if you were looking at the solid from directly above.
- To draw the side view of a 3D shape, imagine what you would see if you were looking at one of the sides of the solid.
- To draw the front view of a 3D shape, imagine what you would see if you were looking at the front of the solid.
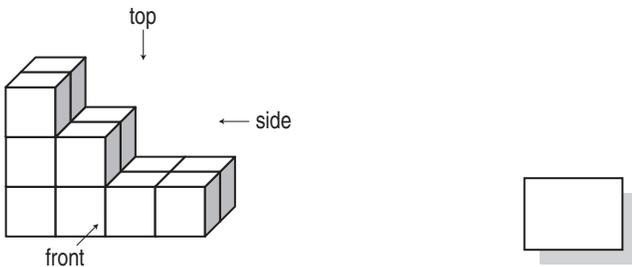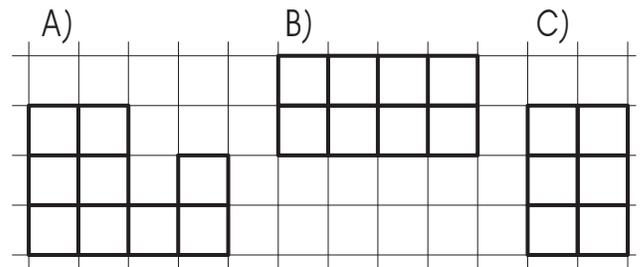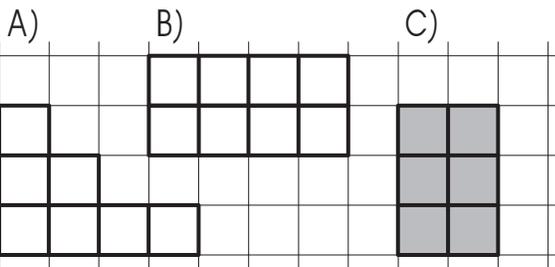
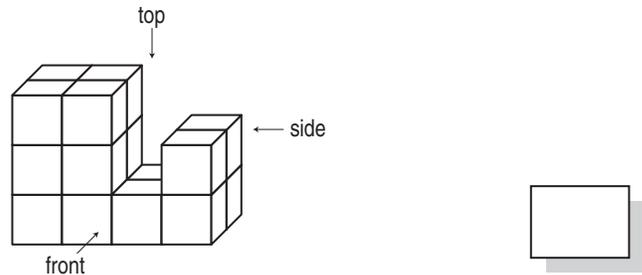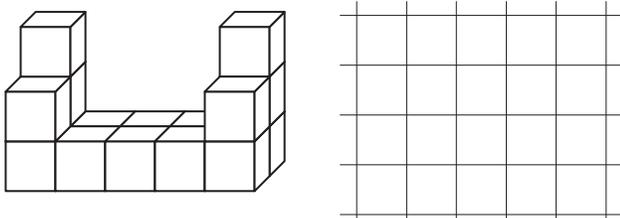**Q.** Draw the top, side and front views of this solid.
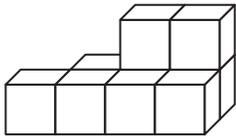
A.
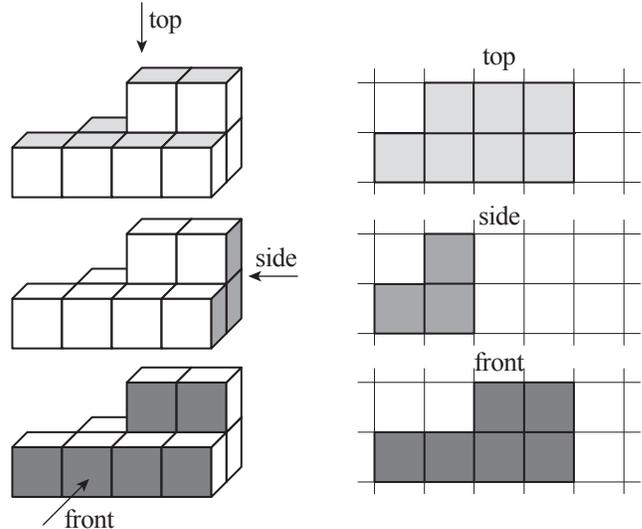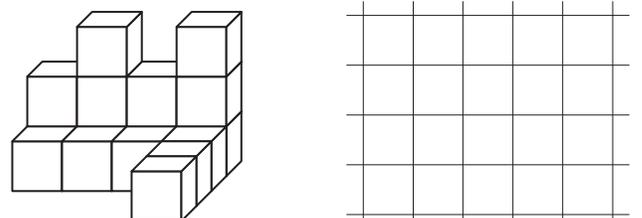

a) Which of the shapes below is the side view of this solid?

A)   B)   C)

b) Which of the shapes below is the top view of this solid?

A)   B)   C)

c) Draw the front view of this solid.

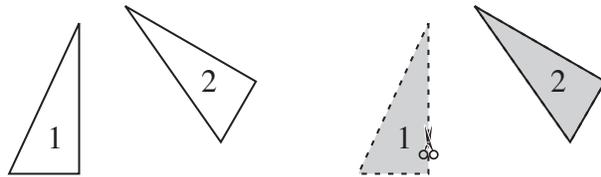**d)** Draw the side view of this solid.

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- Congruent shapes are exactly the same size and shape. They will fit on top of each other perfectly.
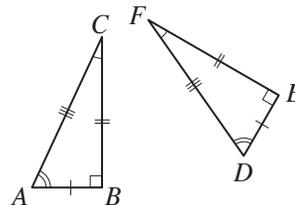 To check if two shapes are congruent:

EITHER

- Cut out one shape and place it on top of the other shape. If the cut out shape overlaps perfectly, the two shapes are congruent.

OR

- Measure the size of the sides and angles. Two congruent shapes have all the corresponding sides and angles the same size.
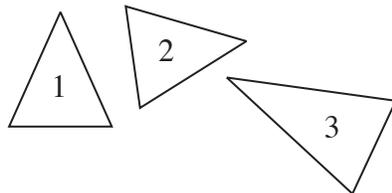
Sides Corresponding sides are congruent:
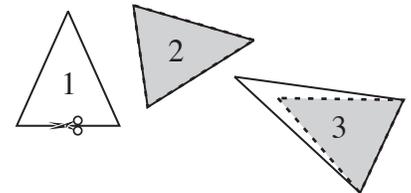$\overline{AB} \cong \overline{DE}, \overline{BC} \cong \overline{EF}, \overline{AC} \cong \overline{DF}$

Angles Corresponding angles are congruent:
$\angle A \cong \angle D, \angle B \cong \angle E, \angle C \cong \angle F$

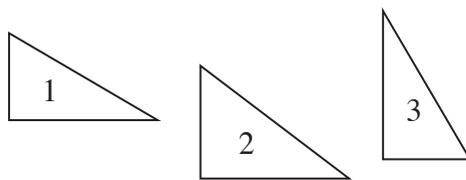**Q.** Which two triangles are congruent?

A. *1 and 2*

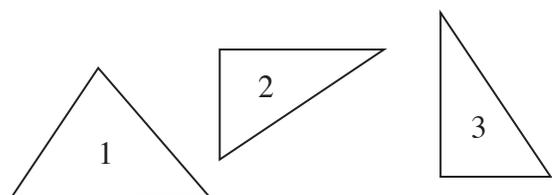The cut out of shape 1 fits perfectly on top of shape 2, but it doesn't fit perfectly on top of shape 3.
So shapes 1 and 2 are congruent.
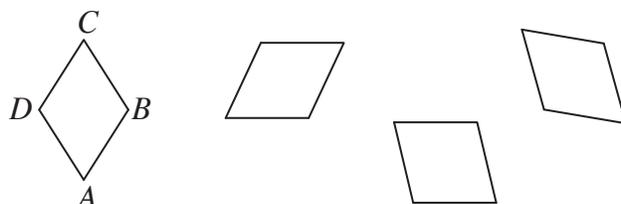
a) Which two triangles are congruent?
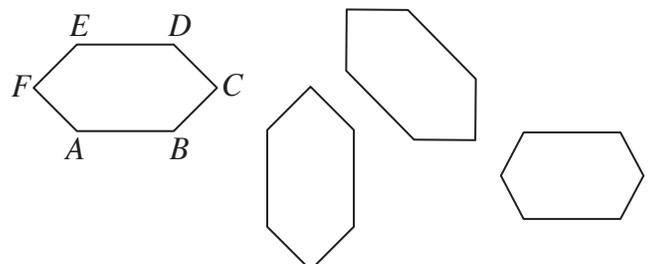
and

b) Which two triangles are congruent?

and

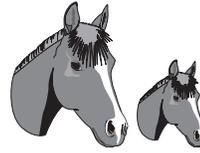**c)** Circle the shape that is **not** congruent with shape *ABCD*.

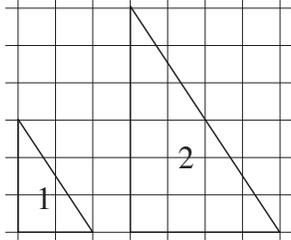**d)** Circle the shape that is **not** congruent with shape *ABCDEF*.

- Check to see if the shapes are exactly the same shape.
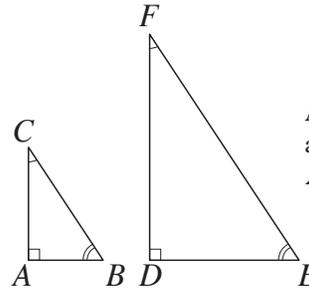 *Hint: They do not have to be the same size.*

EITHER

- Enlarge the smallest shape until it has the same size as the second shape. If they overlap perfectly, the two shapes are similar.
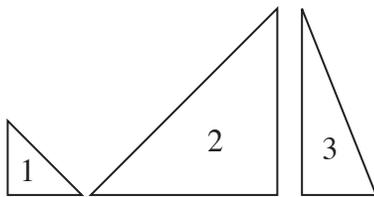

OR

- Measure the size of the angles. Two similar shapes have all the corresponding angles the same size.
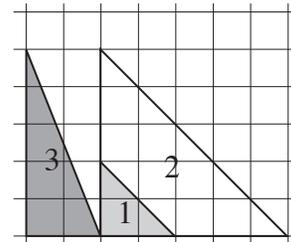

Angles Corresponding angles are congruent:
$\angle A \cong \angle D, \angle B \cong \angle E, \angle C \cong \angle F$

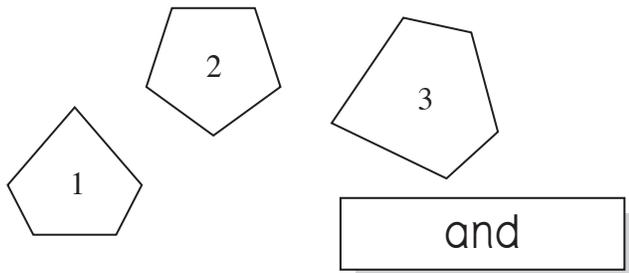**Q.** Which two shapes are similar?

A. *1 and 2*
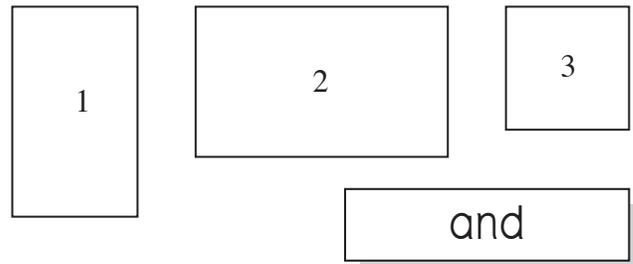

Triangle 2 is similar to triangle 1. It is the same shape, but not the same size. Triangle 3 has a different shape than triangles 1 and 2.
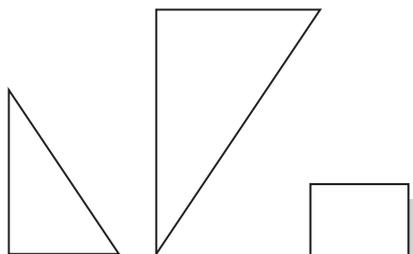
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a) Which two shapes are similar?

and

b) Which two shapes are similar?

and

c) These triangles are:
   A) congruent,
   B) similar or
   C) neither.

d) These triangles are:
   A) congruent,
   B) similar or
   C) neither.

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