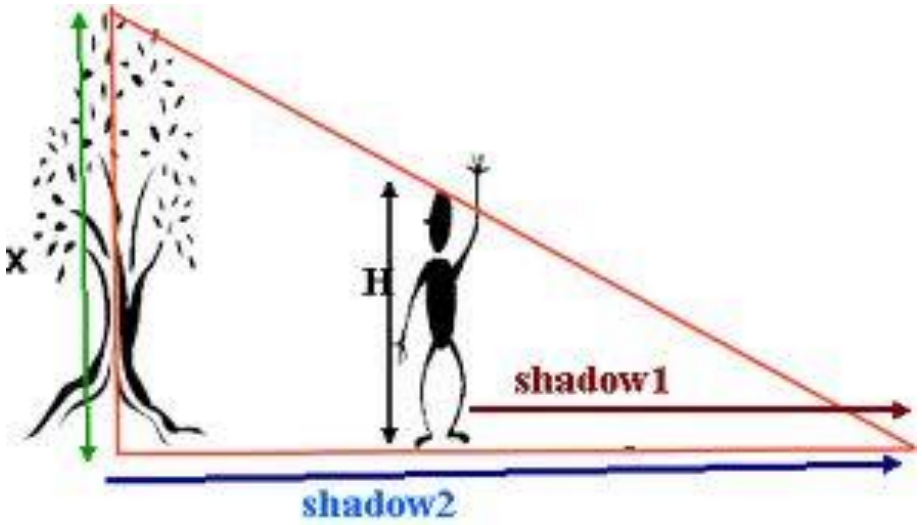
Unit 1 Day 12

Line segments and points,
Cross sections, and rotations

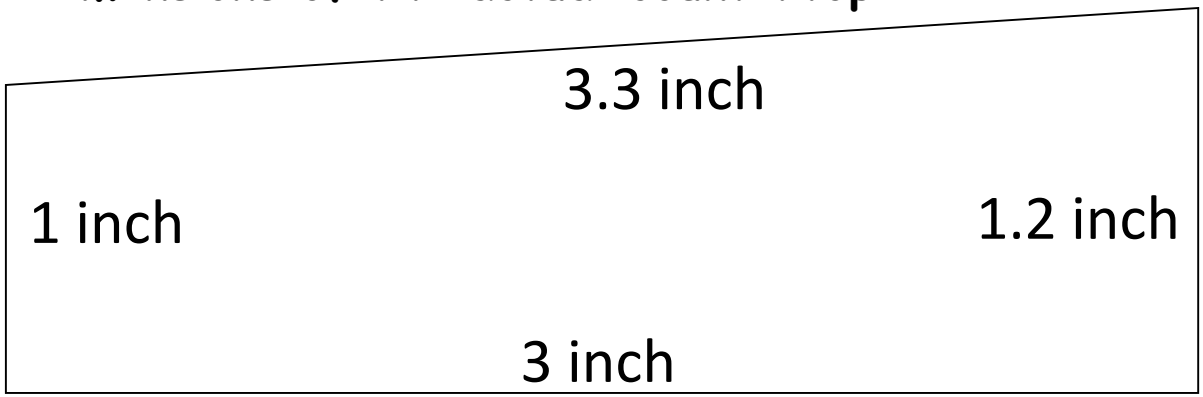
Warm Up

1) Height of person (H) = 64 in.
Length of shadow 1 = 80 in.
Length of shadow 2 = 120 in.

The two triangles in the figure are similar.
Explain why this is true.
How tall is the tree?
Justify your answer.



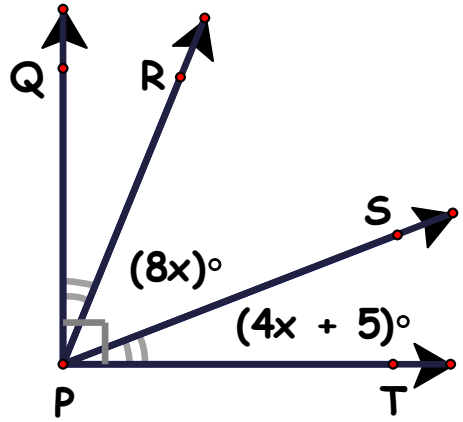
2) A contractor is installing a new counter top in a kitchen. The figure shown here is a model for a counter top. The measurements on the model diagram are given. If the actual countertop will be similar to the model, explain one thing that must be true about the actual countertop. If the ratio of sides of the model to the actual countertop is 1:30, what are the dimensions of the actual countertop?



Warm-Up Continues on the Next Slide ->

Warm-Up (continued)

3. Find the m∠RPS.



4. **H is in the interior of IGF. You are given that m∠IGH = (2x + 5), m∠FGH = 47, m∠IGF = (18x - 12).**

Find m∠IGH and m∠FGI.

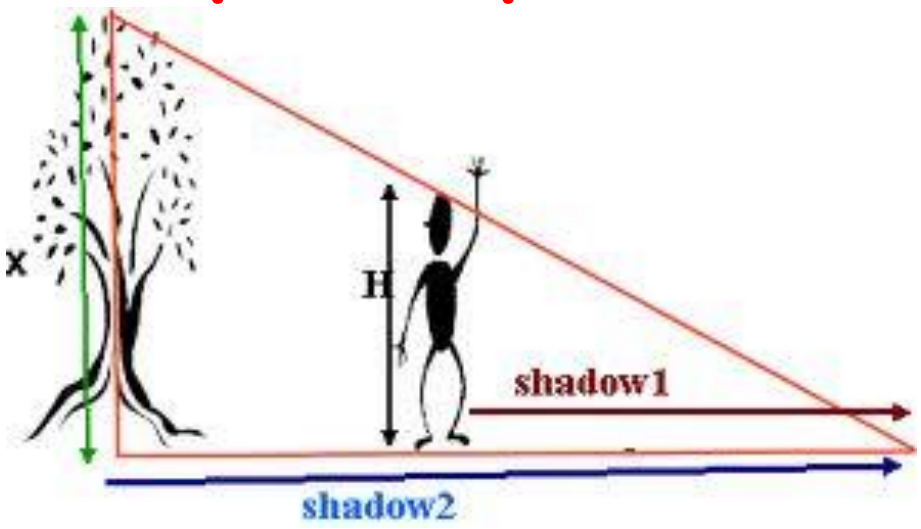
(Hint: Draw a diagram!)

5. If T is in the interior of ∠ABC, and m∠ABC = 3x, m∠ABT = x + 3, and m∠TBC= 13, find m∠ABC.

Warm Up ANSWERS

1) Height of person (H) = 64 in.
   Length of shadow 1 = 80 in.
   Length of shadow 2 = 120 in.

The two triangles in the figure are similar.
Explain why this is true.
How tall is the tree?
Justify your answer.

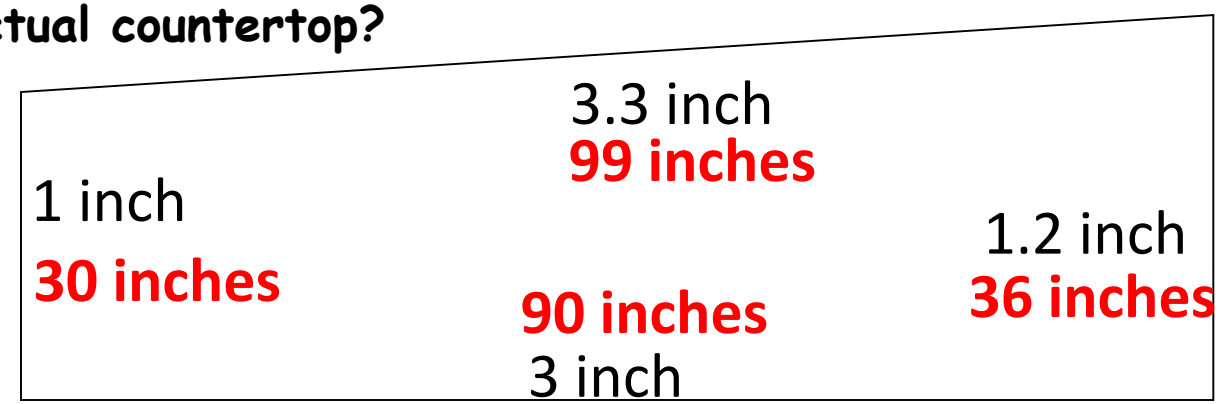


The triangles are similar by AA~ because both heights are measured at a right angle (height is always at a right angle) and the triangles share an angle at the bottom right corner.

The tree is 96 inches tall.

Warm Up ANSWERS

2) A contractor is installing a new counter top in a kitchen. The figure shown here is a model for a counter top. The measurements on the model diagram are given. If the actual countertop will be similar to the model, explain one thing that must be true about the actual countertop. If the ratio of sides of the model to the actual countertop is 1:30, what are the dimensions of the actual countertop?

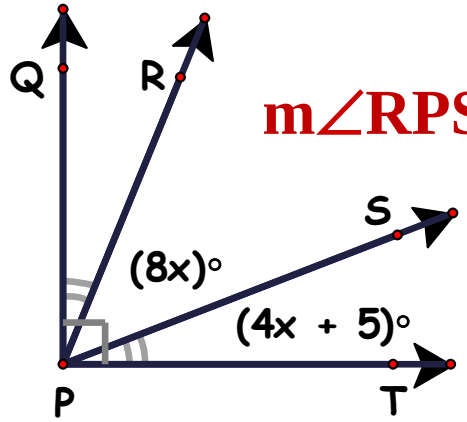


Corresponding dimensions for the actual countertop are shown in RED.

Use Proportions to solve!! ☺

Warm-Up (continued)

3. Find the m∠RPS.



m∠RPS = 40

4. **H is in the interior of IGF. You are given that m∠IGH = (2x + 5), m∠FGH = 47, m∠IGF = (18x - 12). Find m∠IGH and m∠FGI.**

m∠IGF = 13

m∠FGI = 60

5. If T is in the interior of ∠ABC, and m∠ABC = 3x, m∠ABT = x + 3, and m∠TBC= 13, find m∠ABC.

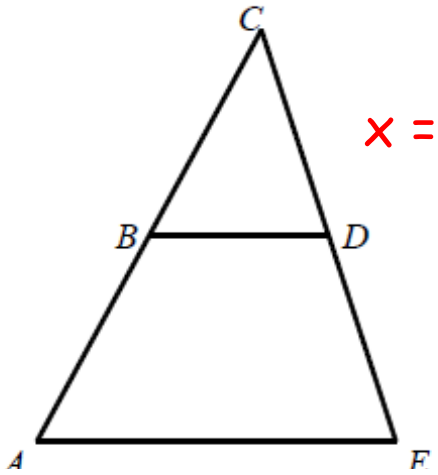
m∠ABC=24

Day 11 Homework Answers
p. 31-32 odds

5. In ΔDEF, $m\angle D = (5x + 11)°$, $m\angle E = (9x - 33)°$, and $m\angle F = (4x + 4)°$. What type of triangle is ΔDEF? Explain your reasoning.

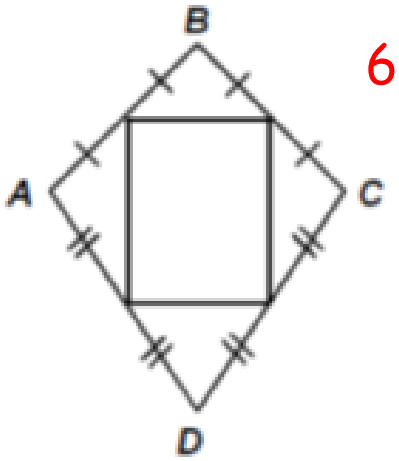
D = 66, E = 66, F = 48 … So the triangle is isosceles.

1. Solve for x given $BD = \frac{5}{2}x + 3$ and $AE = 6x + 4$. Assume B is the midpoint of $\overline{AC}$ and D is the midpoint of $\overline{CE}$.



x = 2

5. Find the area of the rectangle if $\overline{AC} = 11$ and $\overline{BD} = 22$.

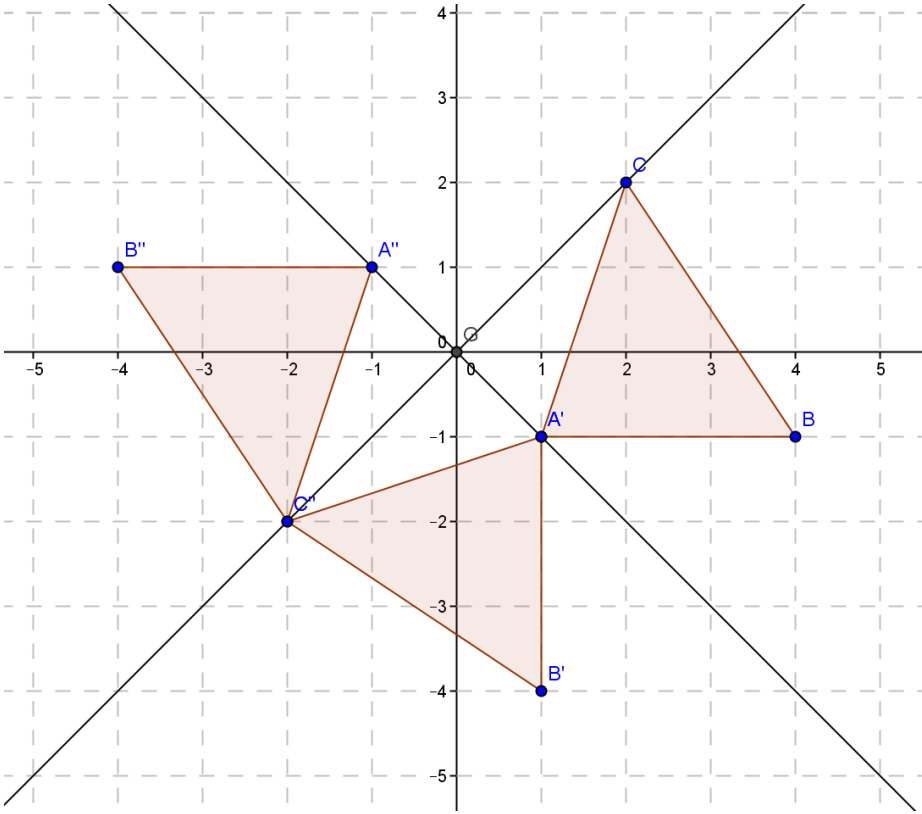


60.5

11. If the midpoints of the sides of a triangle are connected, the area of the triangle formed is what part of the area of the original triangle?

The area of the inner triangle is $\frac{1}{4}$ the outer triangle.

Day 11 Homework
p. 33-34 Evens



2. v = 28, w = 28, x = 36,
   y = 70°, z = 70°
4. Rotate 180°
   $(x, y) \rightarrow (-x, -y)$
6. x = 39
8. 12
10. EF = 24, AB = 13
12. x = 50/11
14. Reflection over CD
16. Composition (reflection across x-axis & translation right)
18. Translate 5 units right and 8 units up.

Notes p. 41: Segment Addition Postulate

Points A, B and C are collinear. Point B is between A and C. Solve for x.

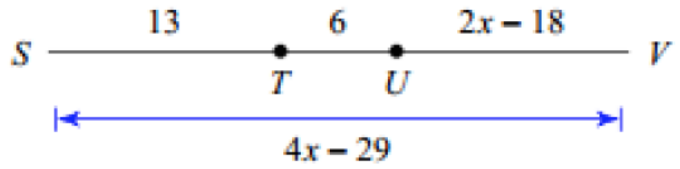
1. $AC = 3x + 3$, $AB = -1 + 2x$, and $BC = 11$. Find x.

X = 7

2. $AC = 22$, $BC = x + 14$, and $AB = x + 10$. Find x.

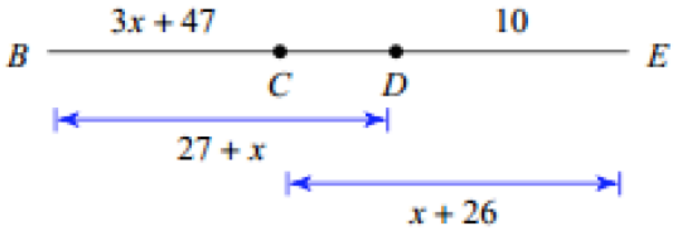
X = -1

3.



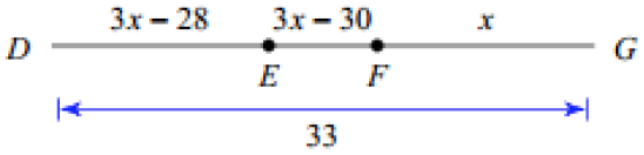
X = 15

4. Find CE



CE = 14

5. Find DE



DE = 11

6. Points A, B, C, D, and E are collinear and in that order. Find AC if $AE = x + 50$ and $CE = x + 32$.

AC = 18

Tonight's Homework

Packet p. 35-36

Heads up about the HW on Packet p 35

Remember to **show ALL your work**!

You **will** probably need separate paper for this page.

Let's start #3 together by marking the diagram

3. In the figure below, $\overline{EC}$ bisects $\overline{AD}$ at C, and $\overline{EF}$ bisects $\overline{AC}$ at B. For each of the following, find the value of x and the measure of the indicated segment.

a) $AB = 3x + 6,\ BC = 2x + 14;\ \overline{AC}$

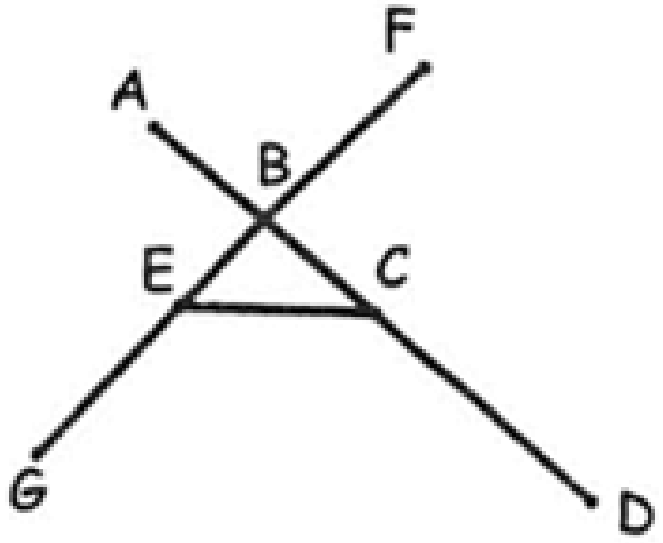
b) $AC = 5x - 8,\ CD = 16 - 3x;\ \overline{AD}$

c) $AD = 6x - 4, AC = 4x - 3;\ \overline{CD}$

d) $AC = 3x - 1,\ BC = 12 - x;\ \overline{AB}$

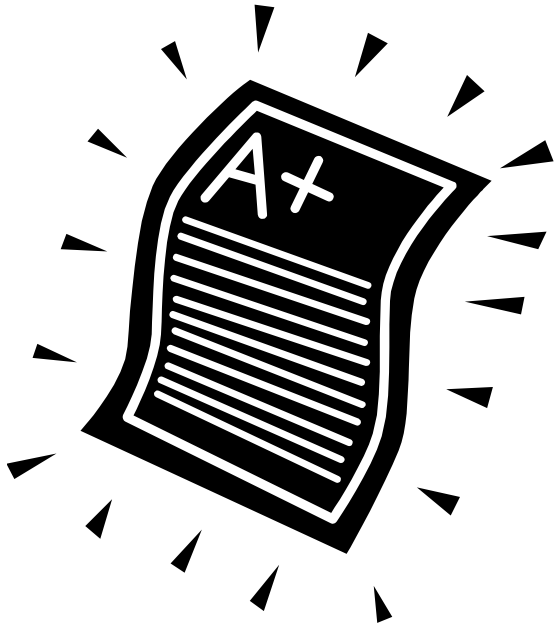
e) $AD = 5x + 2,\ BC = 7 - 2x;\ \overline{CD}$

f) $AB = 4x + 17,\ CD = 25 + 5x;\ \overline{BC}$



Test Reminder!

The Test will be Monday!



For today's notes you need

- Notes packet

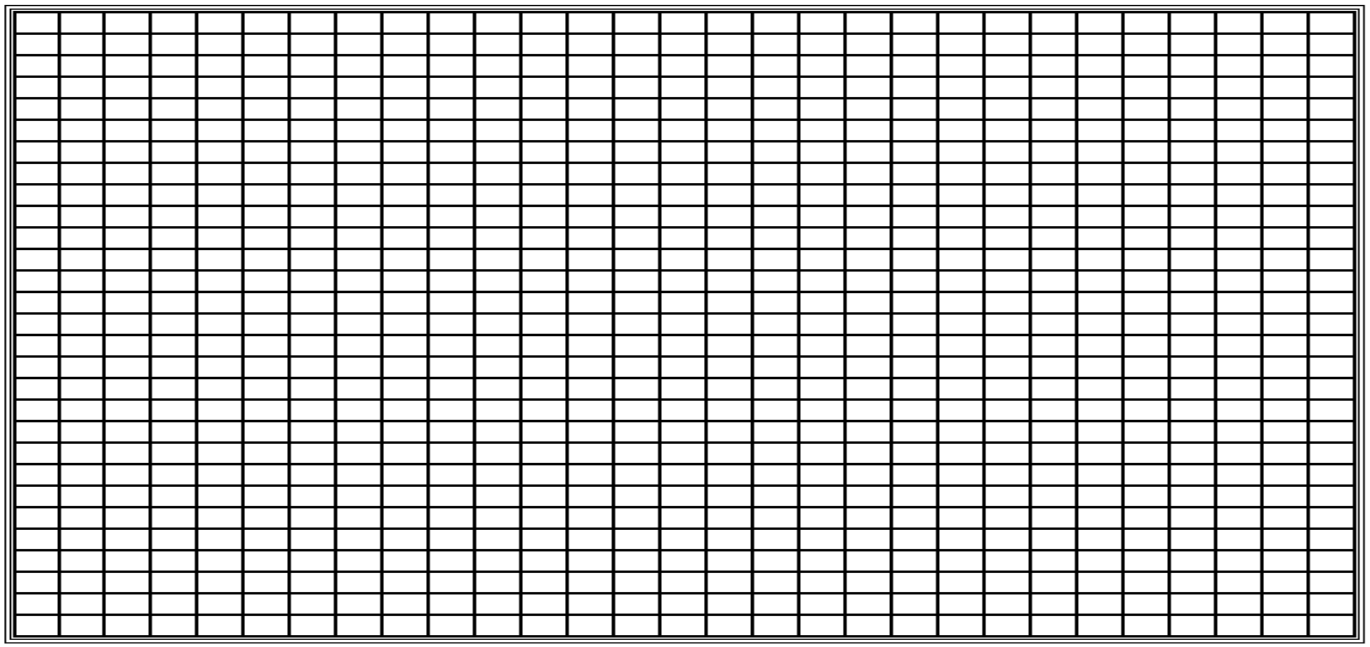
AND

- Notebook paper

Notes p. 42

A **midpoint** of a segment is a point that divides a segment into two congruent segments.

Midpoint Formula: $\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

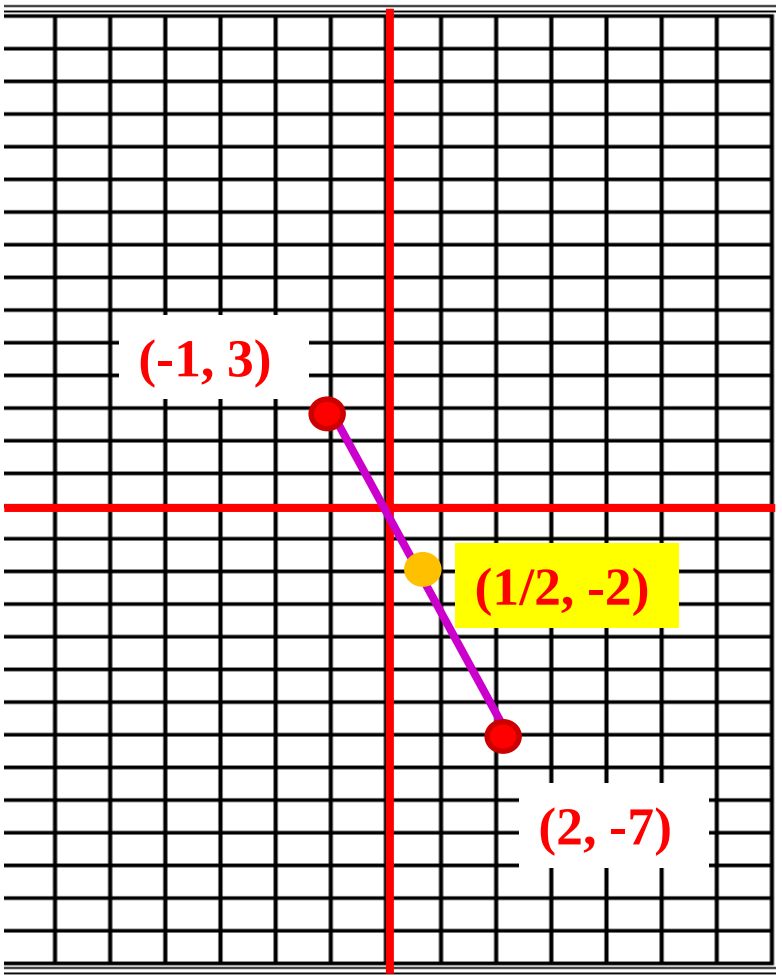


Examples:

1. Billy and Evan are standing on a coordinate grid. Billy is currently on point (-1, 3) and Evan is currently on point (2, -7). They decide to meet in the middle of the segment connecting their locations. What point should they walk to?

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\left(\frac{1}{2}, -2 \right)$$



2. Sarah is also standing on a coordinate grid at point (-5, 0). Her friend is somewhere on the grid. Sarah walks in a straight line to point (4, 8) and realizes that she's gone exactly half of the distance to her friend's location. On what point is her friend (assuming that her friend did not move).

$$(4,8)=\left(\frac{-5+x}{2},\frac{0+y}{2}\right)$$

$$4=\frac{-5+x}{2}$$

$$8=-5+x$$

$$x=13$$

$$8=\frac{0+y}{2}$$

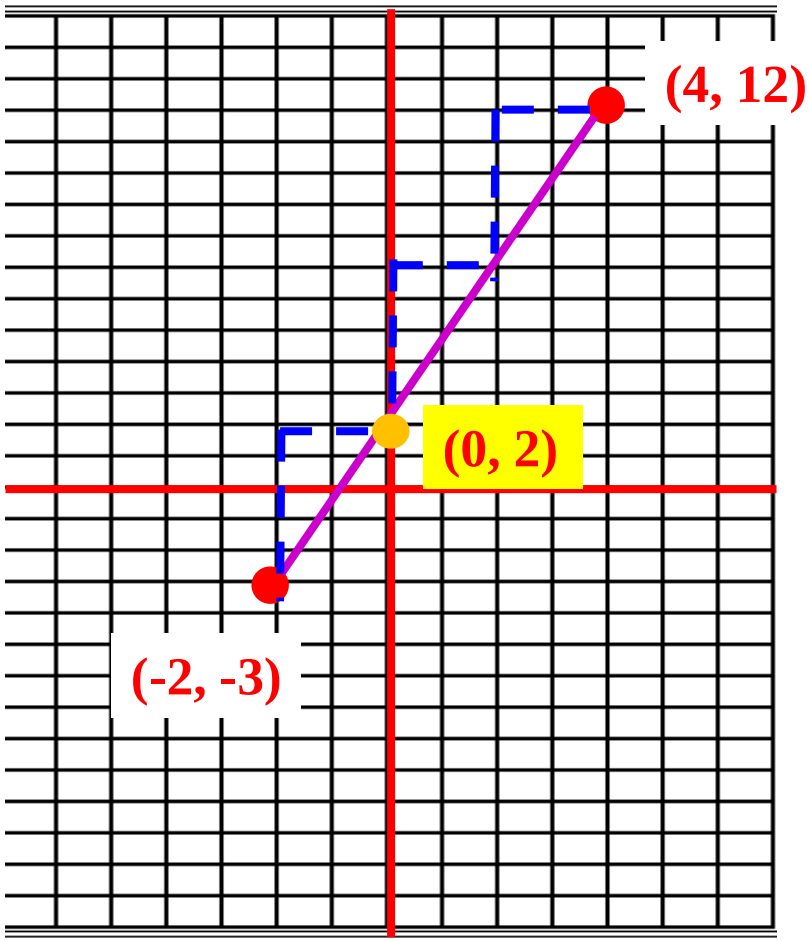
$$16=0+y$$

$$y=16$$

$$(13,16)$$

3. Caitlyn and Jack are standing on a coordinate grid. Caitlyn is at point (4, 12) and Jack is at point (-2, -3). Cailtyn can walk much faster than Jack, so they agree to met at the point 1/3 the distance from Jack (so Caitlyn would walk 2/3 the distance and Jack would walk 1/3 the distance). On what point do they meet?

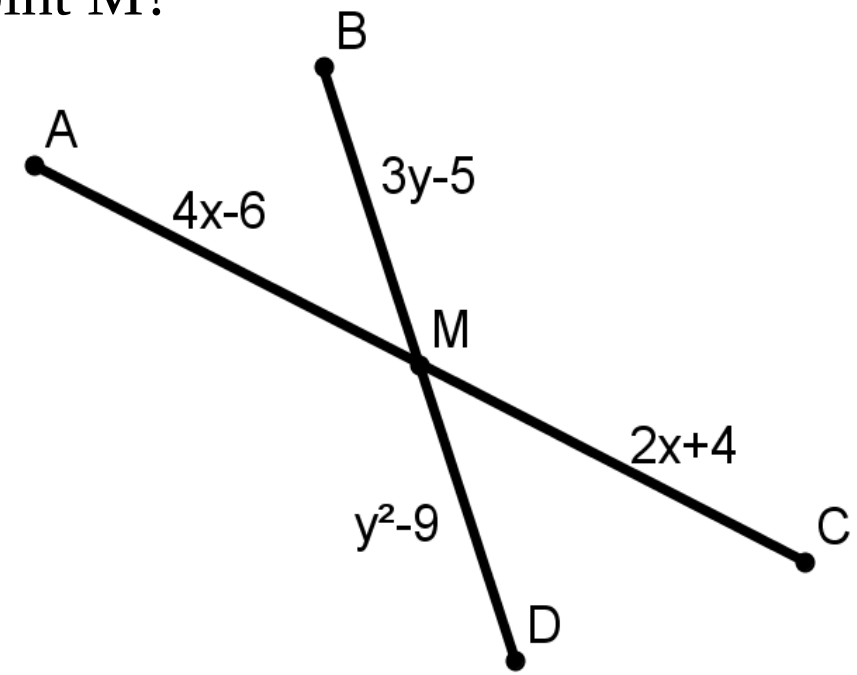
They meet at (0, 2).



4. In the following diagram, $\overline{AC}$ and $\overline{BD}$ bisect each other.

a. What is the official name for point M?

Midpoint of segment AC
Midpoint of segment BD



b. Find the value(s) of x and y.

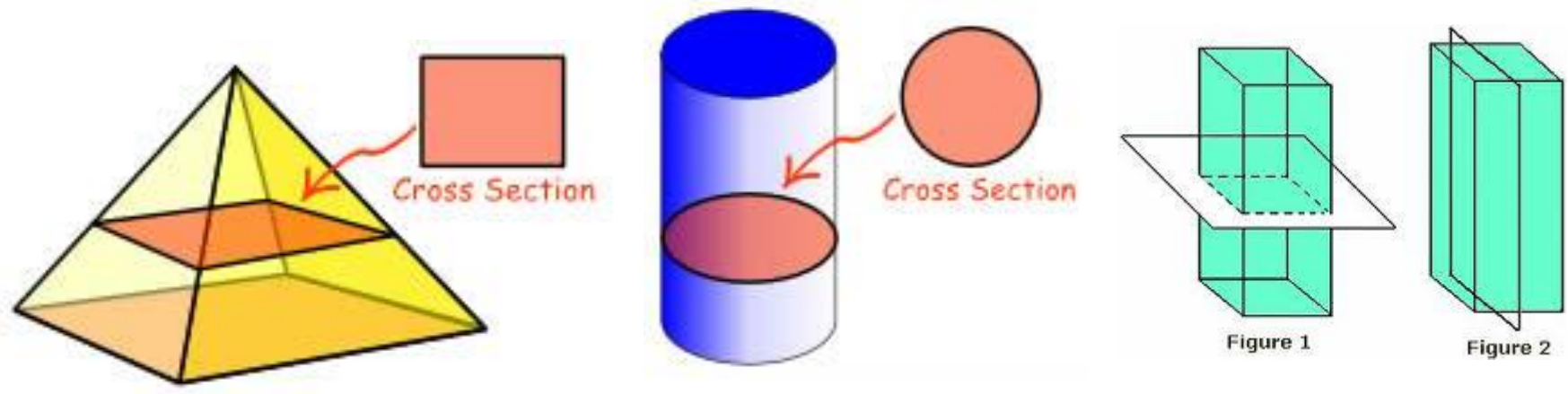
x = 5
y = 4

c. Find AM, MC, BM, and BD.
(Two points together with no line or segment above them mean "the distance between." AM translates to "the distance between A and M.)

AM = 14
MC = 14
BM = 7
BD = 14

Cross Sections of Solids

Cross Section: A figure obtained by the intersection of a solid with a plane.



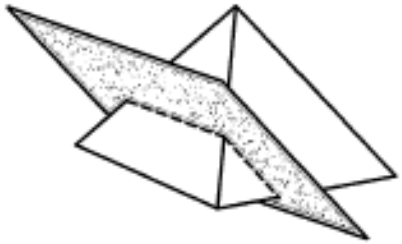
*The polygon formed by the slice is the cross section.

http://www.shodor.org/interactivate/activities/CrossSectionFlyer/

Practice:
Notes p. 45 - 47

Just as we can cut segments into pieces, we can cut 3-dimensional objects:

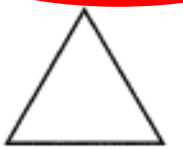
1 A square pyramid is cut along the shaded plane shown below.

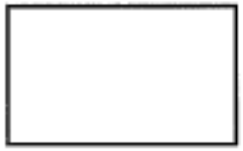


Which of the following is the cross-section of this solid?

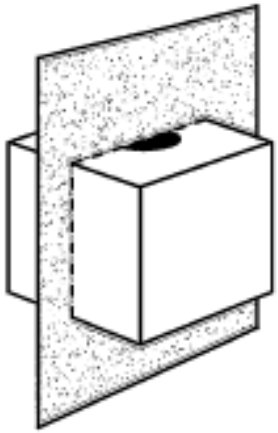
Ⓐ 

Ⓑ 

Ⓒ 

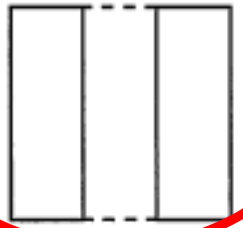
Ⓓ 

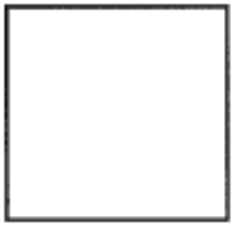
2 A cube with a cylinder cut from its center is cut along the plane shown below.

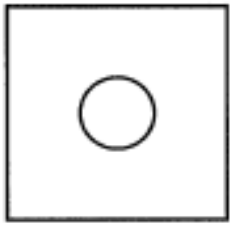


Which of the following is the cross-section of this solid?

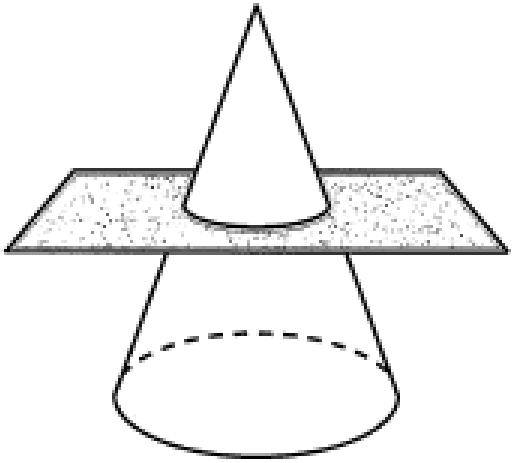
Ⓕ 

Ⓗ 

Ⓖ 

Ⓙ 

3 A cross-section is cut from the circular cone below.



What is the shape of the cross-section?

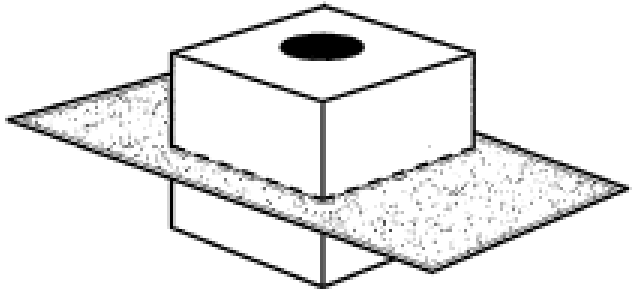
Ⓐ Square

Ⓑ Semicircle

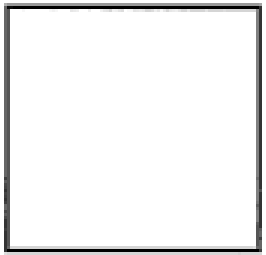
Ⓒ Triangle

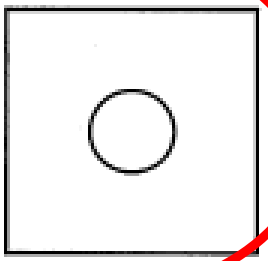
Ⓓ Circle

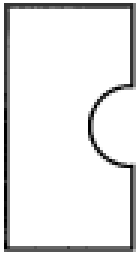
4 A cube with a cylinder cut from its center is cut along the plane shown below.

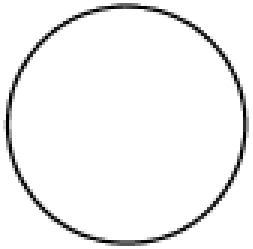


Which of the following is the cross-section of this solid?

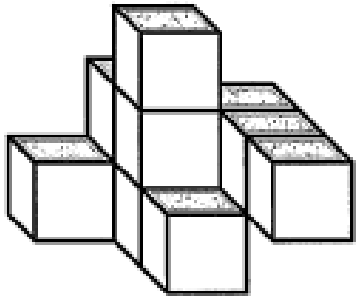
Ⓕ 

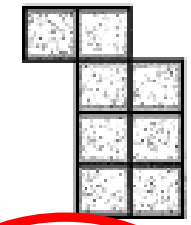
Ⓗ 

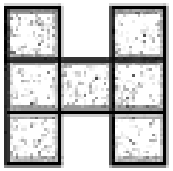
Ⓖ 

Ⓙ 

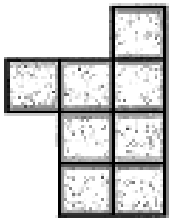
5 Which drawing represents the top view of this solid?



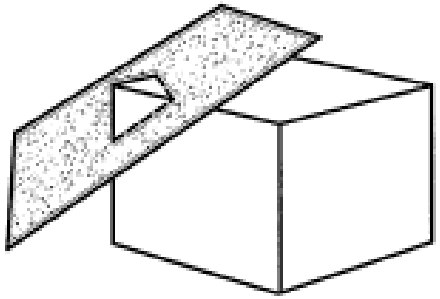
Ⓐ 

Ⓒ 

Ⓑ 

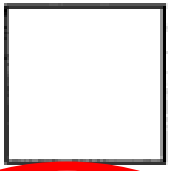
Ⓓ 

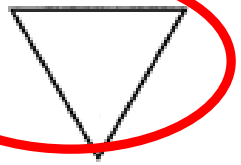
6 A rectangular prism is cut along the shaded plane shown below.

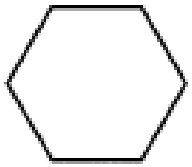


Which of the following is the cross-section of this solid?

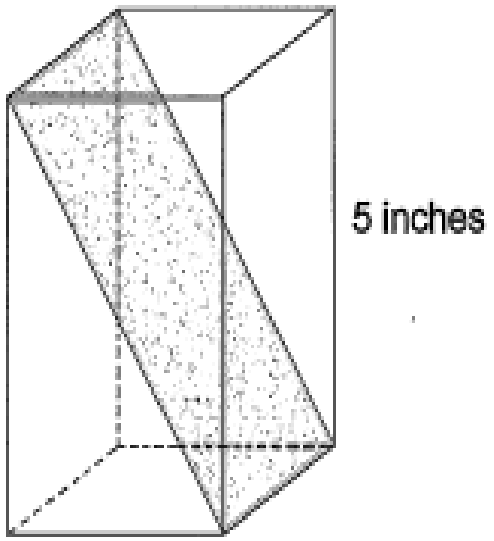
Ⓕ 

Ⓖ 

Ⓗ 

Ⓙ 

9 Andrew had a piece of foam in the shape of a rectangular prism as shown below. The base is a square with sides 3 inches long, and the piece is 5 inches tall. He cut the foam along the diagonal plane shown by the shaded area.



Which of the following is closest to the area of the shaded diagonal plane?

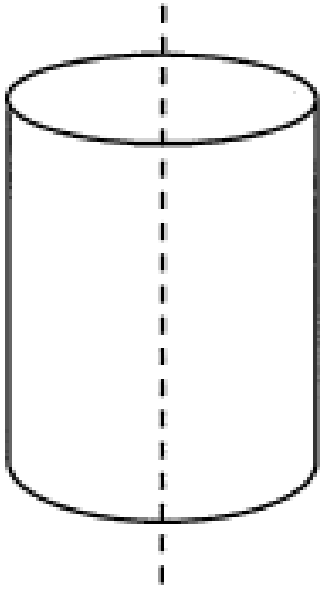
Ⓐ 19.3 square inches

Ⓑ 12 square inches

Ⓒ 15.8 square inches

Ⓓ 17.5 square inches

11 A cross-section is cut from the cylinder below.



What is the shape of the cross-section?

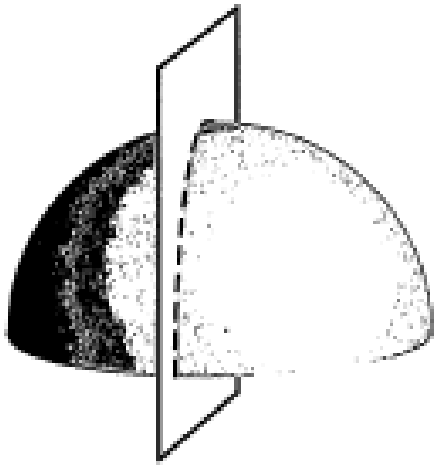
Ⓐ Rectangle

Ⓑ Circle

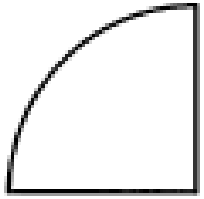
Ⓒ Semicircle

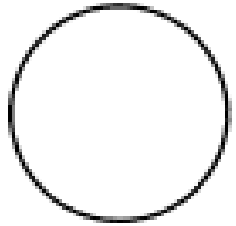
Ⓓ Oval

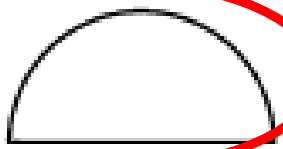
18 A hemisphere is cut along the plane shown below.

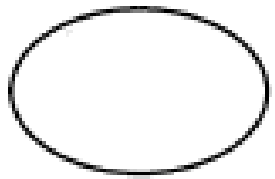


Which of the following is the cross-section of this solid?

Ⓕ 

Ⓗ 

Ⓖ 

Ⓙ 

Use the original solid to **describe** the shape of the **cross section**.

7. **Cylinder:** Cross section parallel to the base: **circle**
Cross section perpendicular to the base: **rectangle**
Diagonal - from corner to corner: **oval (ellipse)**

8. **Square Pyramid**: Cross section parallel to the base: **square**
Cross section perpendicular to the base: **triangle**
Diagonal - from corner to corner: **trapezoid**

Homework

Packet p. 35-36