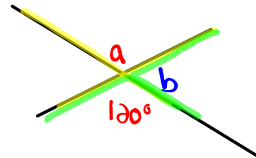


"F pattern"

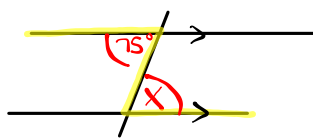
$x = 105 \rightarrow$  corresponding angles are equal



$a = 120^\circ \rightarrow$  vertically opposite angles are equal.

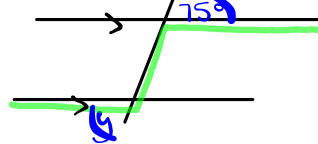
$b + 120^\circ = 180^\circ \rightarrow$  supplementary angles add to  $180^\circ$   
 $b = 180^\circ - 120^\circ$   
 $b = 60^\circ$

Alternate Interior



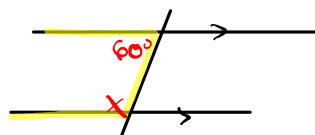
$x = 75^\circ \rightarrow$  Alternate Interior angles are equal

Alternate Exterior



$y = 75^\circ \rightarrow$  Alternate Exterior angles are equal

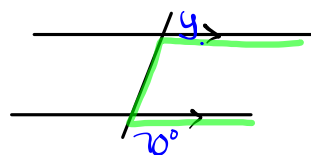
Co-Interior



$x + 60^\circ = 180^\circ$   
 $x = 180^\circ - 60^\circ$   
 $x = 120^\circ$

Co-Interior angles are supplementary

Co-Exterior



$y + 70^\circ = 180^\circ$   
 $y = 180^\circ - 70^\circ$   
 $y = 110^\circ$

Co-Exterior angles are supplementary

# Triangles

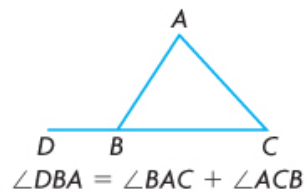
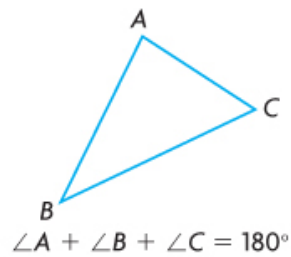
## In Summary

### Key Idea

- You can prove properties of angles in triangles using other properties that have already been proven.

### Need to Know

- In any triangle, the sum of the measures of the interior angles is proven to be  $180^\circ$ .
- The measure of any exterior angle of a triangle is proven to be equal to the sum of the measures of the two non-adjacent interior angles.



## Polygons:

### In Summary

#### Key Idea

- You can prove properties of angles in polygons using other angle properties that have already been proved.

#### Need to Know

- The sum of the measures of the interior angles of a convex polygon with  $n$  sides can be expressed as  $180^\circ(n - 2)$ .
- The measure of each interior angle of a regular polygon is  $\frac{180^\circ(n - 2)}{n}$ .
- The sum of the measures of the exterior angles of any convex polygon is  $360^\circ$ .

(does not matter how many sides)

$n = \#$  sides

Ex:

triangle:  $n=3$

hexagon:  $n=6$

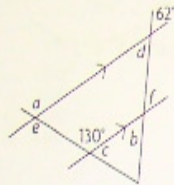
Chapter 2 Review

Name: \_\_\_\_\_

Multiple Choice

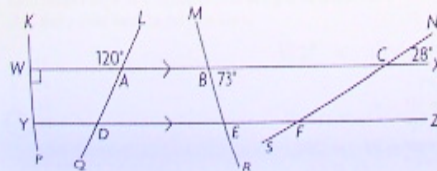
Identify the choice that best completes the statement or answers the question.

- b 1. Which statement about the angles in this diagram is false?



- a.  $\angle a = \angle e$  ✓
- b.  $\angle c = \angle e$
- c.  $\angle d = \angle b$
- d.  $\angle b = \angle f$

- a 2. Which angle property proves  $\angle PYD = 90^\circ$ ?

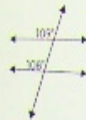


- a. corresponding angles
- b. alternate interior angles
- c. alternate exterior angles
- d. supplementary angles

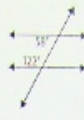
- c. alternate exterior angles
- d. supplementary angles

C 3. In which diagrams are two lines parallel?

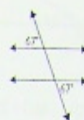
1.



2.



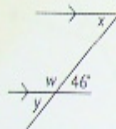
3.



- a. Choices 1, 2, and 3
- b. Choice 1 and Choice 3
- c. Choice 2 and Choice 3
- d. Choice 1 only

b

4. Which are the correct measures of the indicated angles?



$$w = 134^\circ$$

$$x = 46$$

$$y = 46^\circ$$

- a.  $\angle w = 146^\circ, \angle x = 44^\circ, \angle y = 146^\circ$
- b.  $\angle w = 134^\circ, \angle x = 46^\circ, \angle y = 46^\circ$
- c.  $\angle w = 136, \angle x = 44^\circ, \angle y = 136^\circ$
- d.  $\angle w = 116^\circ, \angle x = 64^\circ, \angle y = 64^\circ$

a. 5. Which are the correct measures for  $\angle YXZ$  and  $\angle XZY$ ?



$$\angle YXZ = 180^\circ - 128^\circ = 52^\circ$$

$$\angle XZY = 180^\circ - 52^\circ - 51^\circ = 77^\circ$$

- a.  $\angle YXZ = 52^\circ, \angle XZY = 77^\circ$
- b.  $\angle YXZ = 52^\circ, \angle XZY = 87^\circ$
- c.  $\angle YXZ = 62^\circ, \angle XZY = 77^\circ$
- d.  $\angle YXZ = 62^\circ, \angle XZY = 87^\circ$

d. 6. Which are the correct measures for  $\angle DCE$  and  $\angle CAB$ ?

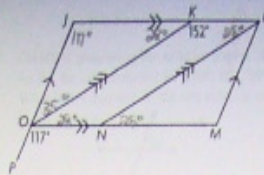


$$\angle DCE = 180^\circ - 125^\circ = 55^\circ$$

- a.  $\angle DCE = 75^\circ, \angle CAB = 55^\circ$
- b.  $\angle DCE = 65^\circ, \angle CAB = 50^\circ$
- c.  $\angle DCE = 75^\circ, \angle CAB = 66^\circ$
- d.  $\angle DCE = 55^\circ, \angle CAB = 61^\circ$

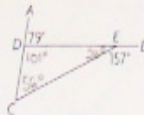
$\angle DCE = 55^\circ$ ,  $\angle CAB = 61^\circ$

7. Which are the correct measures for  $\angle OJK$ ,  $\angle JKO$ , and  $\angle JOK$ ?

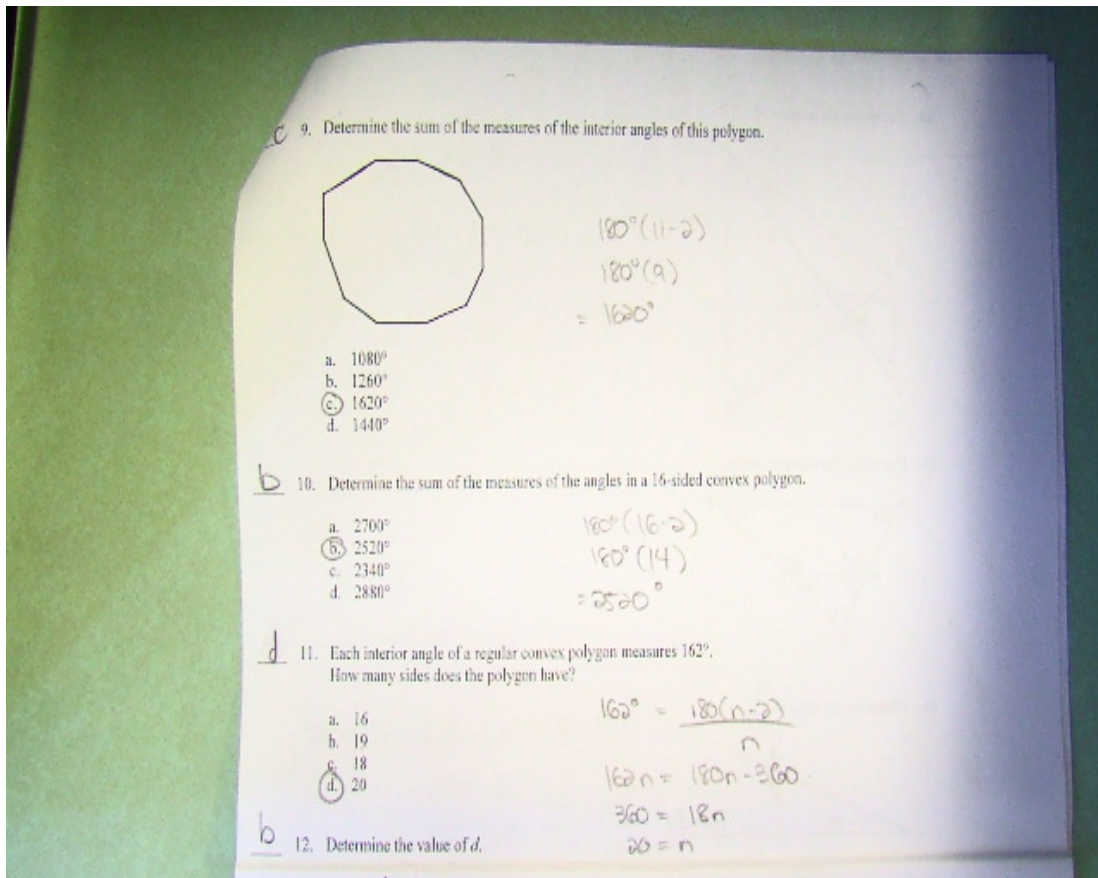


- w.  $\angle OJK = 102^\circ$ ,  $\angle JKO = 28^\circ$ , and  $\angle JOK = 50^\circ$
- k.  $\angle OJK = 152^\circ$ ,  $\angle JKO = 18^\circ$ , and  $\angle JOK = 10^\circ$
- c.  $\angle OJK = 117^\circ$ ,  $\angle JKO = 28^\circ$ , and  $\angle JOK = 35^\circ$
- d.  $\angle OJK = 117^\circ$ ,  $\angle JKO = 36^\circ$ , and  $\angle JOK = 37^\circ$

8. Which are the correct measures of the interior angles of  $\triangle CDE$ ?



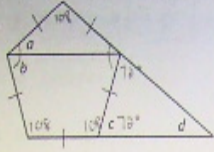
- a.  $\angle DCE = 46^\circ$ ,  $\angle CDE = 101^\circ$ , and  $\angle CED = 33^\circ$
- b.  $\angle DCE = 32^\circ$ ,  $\angle CDE = 83^\circ$ , and  $\angle CED = 65^\circ$
- c.  $\angle DCE = 76^\circ$ ,  $\angle CDE = 91^\circ$ , and  $\angle CED = 13^\circ$
- d.  $\angle DCE = 56^\circ$ ,  $\angle CDE = 101^\circ$ , and  $\angle CED = 23^\circ$





(d) 20

b 12. Determine the value of  $d$ .



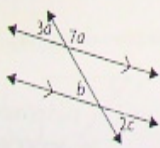
$16n = 180n - 360$   
 $360 = 18n$   
 $20 = n$

$x = \frac{180(5-2)}{5}$   
 $x = \frac{180(3)}{5}$   
 $x = 108^\circ$

a.  $48^\circ$   
 (b)  $36^\circ$   
 c.  $52^\circ$   
 d.  $42^\circ$

Short Answer

13. Determine the values of  $a$ ,  $b$ , and  $c$ .

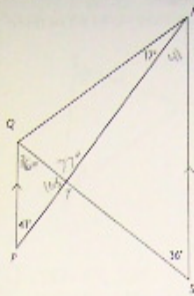


$3a + 7a = 180$   
 $10a = 180$   
 $a = 18$

$3a = b$   
 $3(18) = b$   
 $54 = b$

$b = 2c$   
 $54 = 2c$   
 $27 = c$

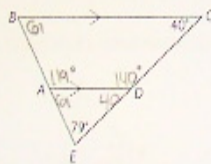
14. Determine the measure of  $\angle RTQ$ .



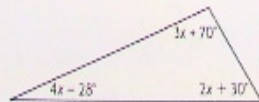
$$\angle QTP = 180^\circ - 36^\circ - 41^\circ = 103$$

$$\angle RTQ = 180 - 103 = 77^\circ$$

15. Determine the unknown angles.



16. Determine the value of  $x$ .



$$4x - 28 + 2x + 70 + 2x + 30 = 180^\circ$$

$$9x + 72 = 180$$

$$9x = 108$$

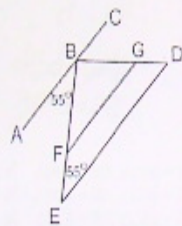
$$x = 12$$

17. Gareth is measuring the exterior angles of a convex hexagon.  
 So far, he has measured  $60^\circ$ ,  $60^\circ$ ,  $60^\circ$ ,  $30^\circ$ , and  $30^\circ$ .  
 What is the measure of the last exterior angle?  
 Show your calculation.

$$360^\circ - 60 - 60 - 60 - 30 - 30^\circ = 120^\circ$$

18. PROOF

Prove:  $AC \parallel ED$



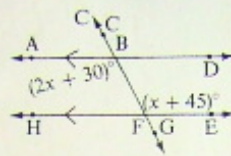
Statement	Justification
$\angle ABF = 55^\circ$	Given
$\angle FED = 55^\circ$	Given
$AC \parallel ED$	alternate interior

**Finding Missing Angles**  
**Extra Practice**

Name: ANSWERS

1. Use the diagram.

- (a) Why is  $2x + 30 = x + 45$ ?
- (b) Find the measure of  $\angle ABF$ .

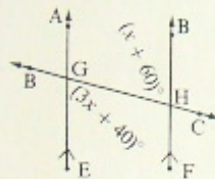


a)  $2x + 30 = x + 45$  since Alternate Interior Angles are equal.

b)  $2x + 30 = x + 45$   $\angle ABF$   
 $2x - x = 45 - 30 = 2x + 30$   
 $x = 15$   
 $= 2(15) + 30$   
 $= 30 + 30$

2. Use the diagram.

- (a) Write an equation.
- (b) Find the measure of  $\angle EGH$  and  $\angle AGH$ .  
Give reasons for your answers.



a)  $x + 60 = 3x + 40 = 60$

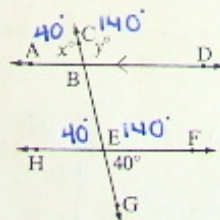
b)  $x + 60 = 3x + 40$   $\angle EGH$   
 $60 - 40 = 3x - x = 3x + 40$   
 $20 = 2x = 3(0) + 40$   
 $10 = x = 30 + 40$

$\angle AGH = 180 - 70 = 110 = 70$

3. Use the diagram to find the measure of

- (a)  $\angle ABC = 40^\circ$  (b)  $\angle CBD = 140^\circ$
- (c)  $\angle HEC = 40^\circ$  (d)  $\angle FEB = 140^\circ$

Give reasons for your answers above.



- a) Alt. Exterior
- b) Supplementary
- c) Vertically Opposite
- d) Supplementary

1. Use the diagram.

(a) Why is  $2x + 30 = x + 45$ ?

(b) Find the measure of  $\angle ABF$ .

a)  $(2x+30)^\circ = (x+45)^\circ \rightarrow$  Alternate Interior angles are equal

b) (i) Solve for  $x$ :

$$2x+30 = x+45$$

$$2x - x = 45 - 30$$

$$x = 15$$

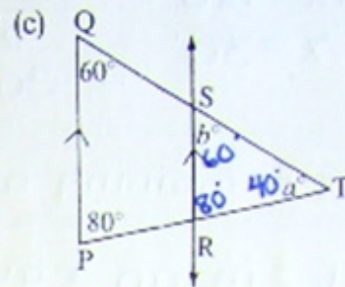
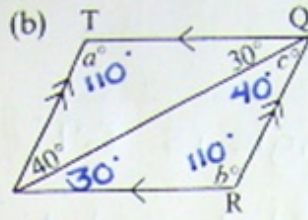
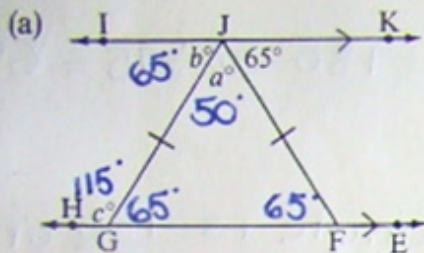
(ii) Find  $\angle ABF$

$$\angle ABF = 2x+30$$

$$\angle ABF = 2(15) + 30$$

$$\angle ABF = 60^\circ$$

4. Find the values of  $a$ ,  $b$ , and  $c$  for the following diagrams.



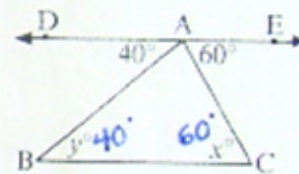
5. Explain why

(a)  $x^\circ = 60^\circ$  Alternate Interior

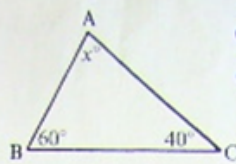
(b)  $y^\circ = 40^\circ$  Alternate Interior

(c)  $\angle DAB + \angle BAC + \angle CAE = 180^\circ$

They are supplementary angles.



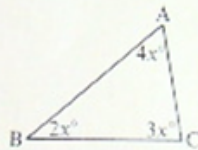
6. Use the diagram.  
 (a) Why can you write  $x^\circ + 60^\circ + 40^\circ = 180^\circ$ ?  
 (b) Find  $x$ .



a)  $x^\circ + 60^\circ + 40^\circ = 180^\circ$   
 since the interior angles in a triangle add to  $180^\circ$ .

b)  $x + 60 + 40 = 180$   
 $x + 100 = 180$   
 $x = 180 - 100$   
 $x = 80$

7. Use the diagram.  
 (a) Explain why  $2x^\circ + 3x^\circ + 4x^\circ = 180^\circ$ .  
 (b) Find the measure of  $\angle A$ .

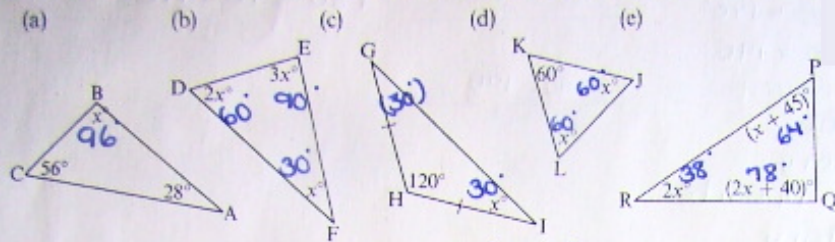


a)  $2x^\circ + 3x^\circ + 4x^\circ = 180^\circ$   
 since the interior angles in a triangle add to  $180^\circ$ .

b)  $2x + 3x + 4x = 180$   
 $9x = 180$   
 $x = 20$

$\angle A = 4x$   
 $= 4(20)$   
 $= 80$

8. For each triangle, find the missing measures. Justify your answers.



$$6x = 180$$

$$x = 30$$

$$\frac{180 - 120}{2} = 30$$

$$2x + x + 45 + 2x + 40 = 180$$

$$5x + 85 = 180$$

$$5x = 95$$

$$x = 19$$

$$180 - 36 - 75 = 69$$

9. (a) Two angles of a triangle are  $36^\circ$  and  $75^\circ$ . Find the measure of the third angle. The remaining angle is  $69^\circ$ .  
 (b) Show that the measure of each angle in an equilateral triangle is  $60^\circ$ .

Each angle in an equilateral triangle is  $\frac{180}{3}$  or  $60^\circ$ .



10. Find the values of  $a$ ,  $b$ , and  $c$  for the following diagrams.

