



KING EDWARD VI  
HANDSWORTH GRAMMAR  
SCHOOL FOR BOYS



KING EDWARD VI  
ACADEMY TRUST  
BIRMINGHAM

# Year 8

## Mathematics

### Unit 10 Booklet

2024

2025

HGS Maths



Tasks



Dr Frost Course



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

Class: \_\_\_\_\_

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# 1 Estimation

# 1.1 Significant Figures



## 1.2 Estimations

## Worked Example

Estimate:

a)  $409 + 571$

b) 
$$\frac{409+571}{0.53}$$

c) 
$$\frac{409+571}{0.53-0.11}$$

## Your Turn

Estimate:

a)  $593 + 401$

b) 
$$\frac{593+401}{0.47}$$

c) 
$$\frac{593+401}{0.47-0.43}$$

# Fill in the Gaps

Question	Values Rounded to 1 sf		Calculation	Estimated Answer	Overestimate or Underestimate?	Actual Answer
$3.3 \times 2194 \times 1.2$	3.3	2194			<i>Underestimate</i>	8688.24
	3	2000				
$\frac{17.8 + 67.3}{12.29}$	17.8	67.3	$\frac{20 + 70}{10}$		<i>Overestimate</i>	6.92
	20	70				
$\frac{47 \times 78.6}{0.53}$	47	78.6	$\frac{50 \times 80}{0.5}$			
$\frac{1.78^3}{62.1 + 43.3}$	1.78	62.1				
		43.3				
$\frac{\sqrt{103}}{0.98 \times 19}$	103	0.98				
		19				
$\frac{5.34 + 3.296}{0.195}$	5.34	3.296				
		0.195				
$\frac{(4.12 \times 0.53)^2}{\sqrt[3]{7.97}}$	4.12	0.53				
		7.97				

## Worked Example

Estimate:

a)  $354 \div 6.9$

b)  $\sqrt{17} \times 14$

## Your Turn

Estimate:

a)  $357 \div 8.9$

b)  $\frac{\sqrt{150}}{3}$

## Worked Example

Estimate:

a)  $\sqrt{110}$

b)  $\sqrt[3]{100}$

Give your answers to 1 decimal place.

## Your Turn

Estimate:

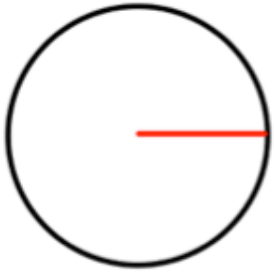
a)  $\sqrt{20}$

b)  $\sqrt[3]{140}$

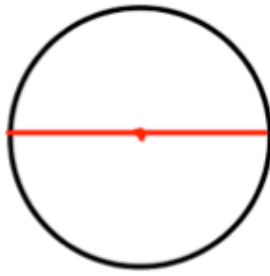
Give your answers to 1 decimal place.

# 2 Circles

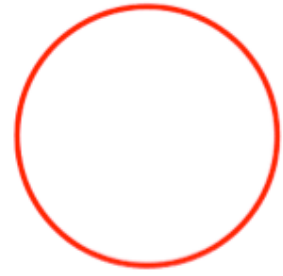
## 2.1 Parts of the Circle



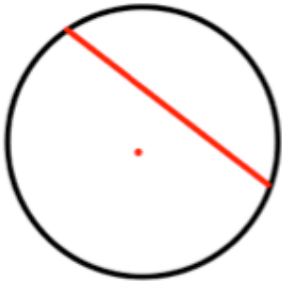
Radius



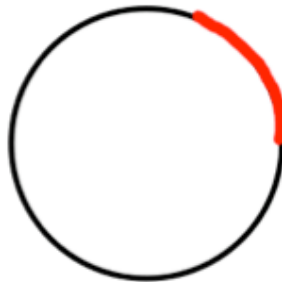
Diameter



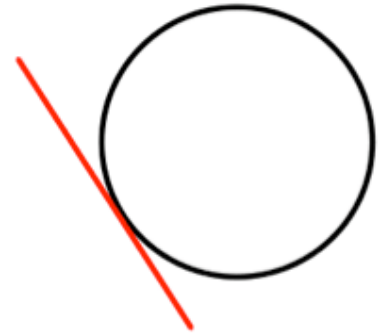
Circumference



Chord



Arc



Tangent



Segment

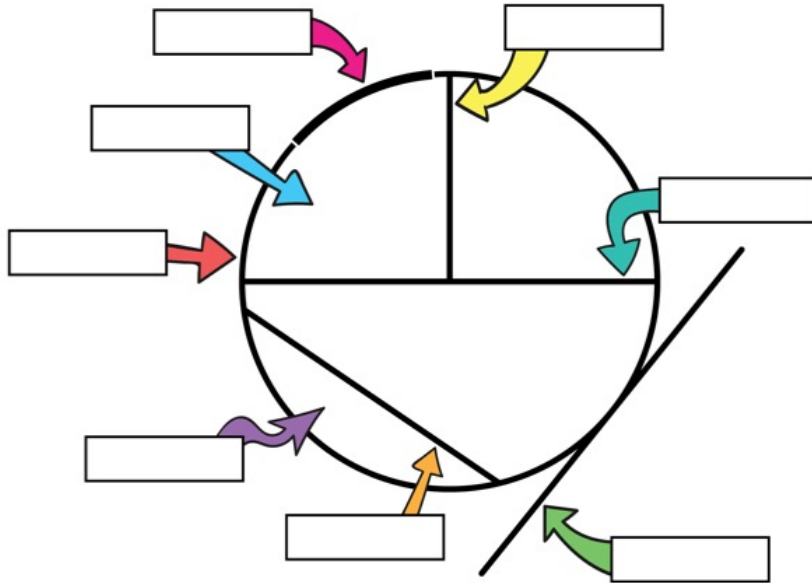


Sector

# Fluency Practice

## Labelling parts of a circle

Use the words below to label each part of the circle correctly



Arc

Chord

Circumference

Diameter

Radius

Sector

Segment

Tangent

**Circle Vocabulary:** Match each word with its definition.

Arc

Line joining two points on a circumference.

Segment

Perimeter of a circle.

Chord

Part of a circle between a chord and an arc.

Radius

Line touching the circumference of a circle once.

Diameter

Distance from the centre of a circle to the edge.

Circumference

Part of the circumference of a circle.

Tangent

Part of a circle between two radii and an arc.

Sector

Width of a circle.

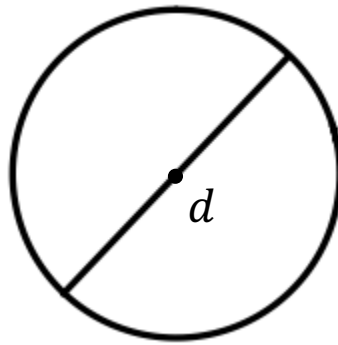


## 2.2 Circumference of Circles

The circumference is the perimeter of a circle.

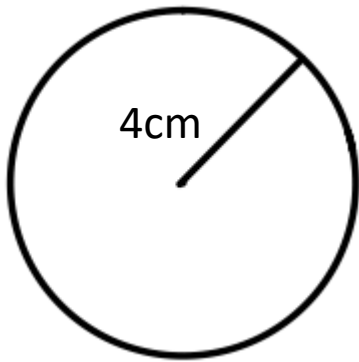
Circumference =  $\pi \times$  diameter

$$C = \pi d$$



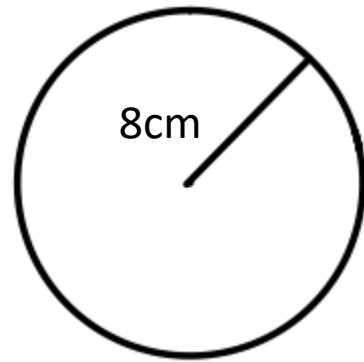
## Worked Example

Calculate the circumference of the circle below. Give your answer in terms of  $\pi$  and to 1 decimal place.



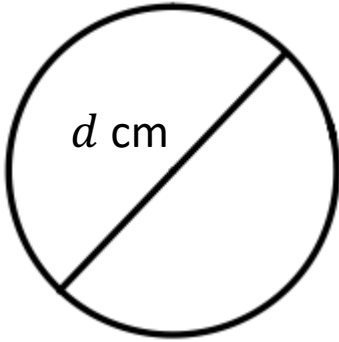
## Your Turn

Calculate the circumference of the circle below. Give your answer in terms of  $\pi$  and to 1 decimal place.



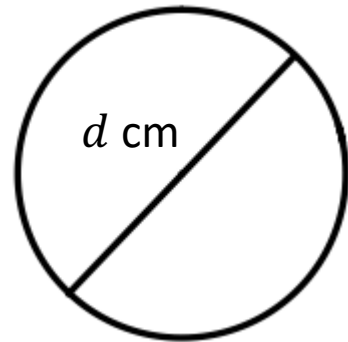
## Worked Example

Calculate the diameter,  $d$ , of the circle below given that the circumference is 12.6 cm. Give your answer to 2 decimal places.

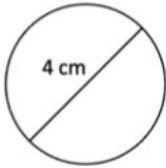
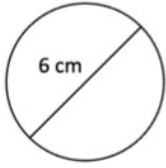
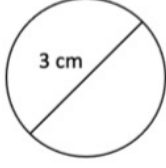
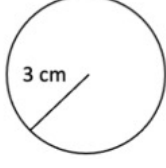
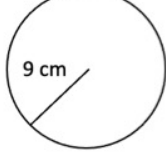


## Your Turn

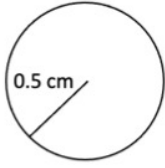
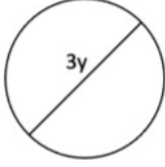
Calculate the diameter,  $d$ , of the circle below given that the circumference is 25.1 cm. Give your answer to 2 decimal places.



# Fill in the Gaps

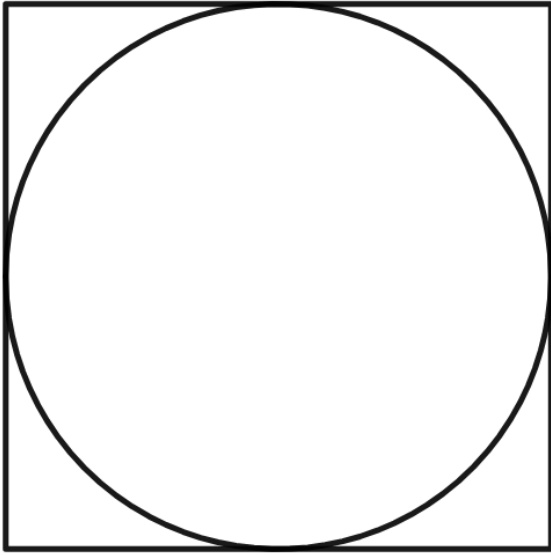
Diagram	Radius	Diameter	Calculation	Circumference (in terms of $\pi$ )	Circumference (1 dp)
					
					
					
					
					
		12 mm			
	5 m				

# Fill in the Gaps

Diagram	Radius	Diameter	Calculation	Circumference (in terms of $\pi$ )	Circumference (1 dp)
				$16\pi$ km	
					
					
	$5a$				

## Worked Example

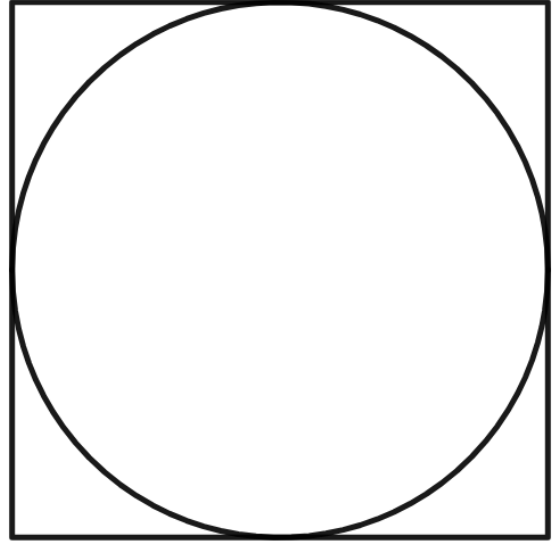
The area of the square is  $25 \text{ cm}^2$ .



Work out the circumference of the circle. Give your answer to 1 decimal place.

## Your Turn

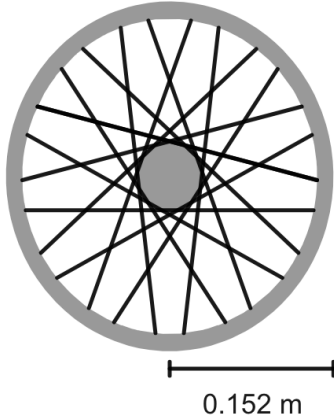
The area of the square is  $8 \text{ m}^2$ .



Work out the circumference of the circle. Give your answer to 1 decimal place.

## Worked Example

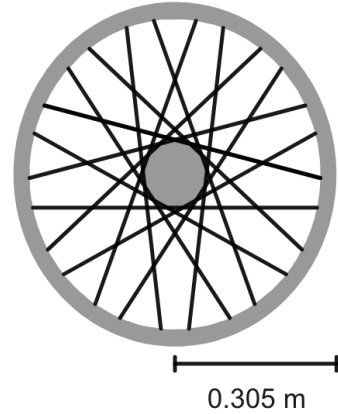
Omar has a bicycle with a wheel radius of 0.152 m.



He rides for 1600 metres. Calculate how many full turns the wheel makes during his ride.

## Your Turn

Connor has a bicycle with a wheel radius of 0.305 m.



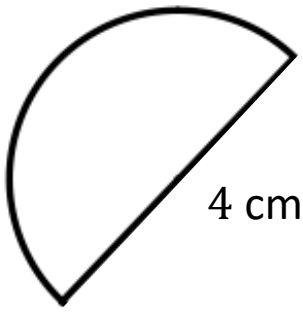
He rides for 1400 metres. Work out how many full turns the wheel needs to make to cover the whole distance.

## 2.3 Perimeter of Fractions of Circles



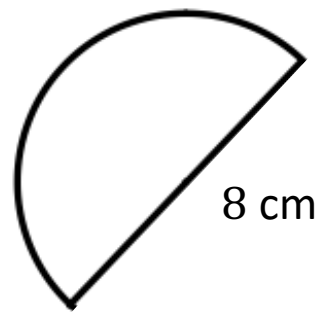
## Worked Example

Calculate the perimeter of the semi-circle below. Give your answer in terms of  $\pi$  and to 1 decimal place.



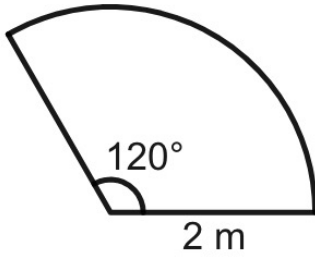
## Your Turn

Calculate the perimeter of the semi-circle below. Give your answer in terms of  $\pi$  and to 1 decimal place.



## Worked Example

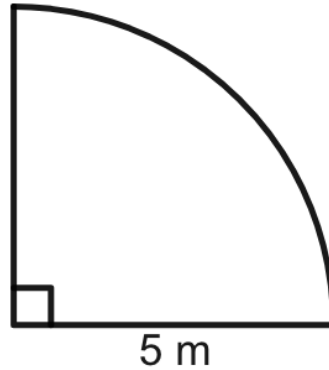
Calculate the perimeter of the shape drawn below.



Give your answer correct to 1 decimal place.

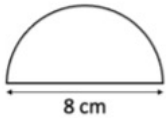
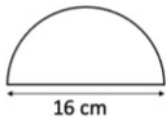
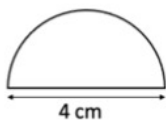
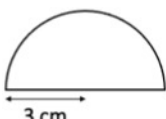

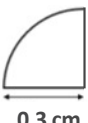
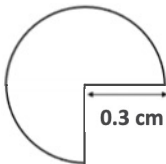
## Your Turn

Calculate the perimeter of the shape drawn below.



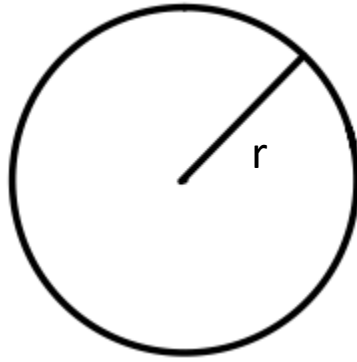
Give your answer correct to 1 decimal place.

# Fill in the Gaps

Diagram	Radius	Diameter	Calculation	Perimeter (in terms of $\pi$ )	Perimeter (1 dp)
					
					
					
					
					
					
					

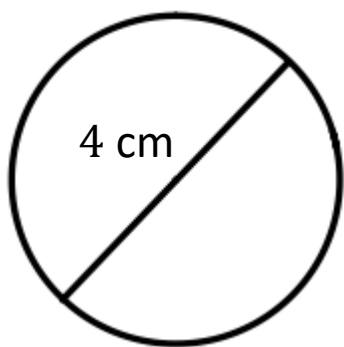
## 2.4 Area of Circles

$$\text{Area} = \pi \times \text{radius}^2$$
$$A = \pi r^2$$



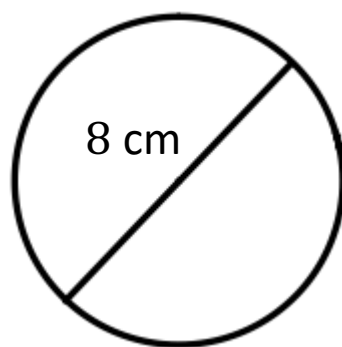
## Worked Example

Calculate the area of the circle below. Give your answer in terms of  $\pi$  and to 1 decimal place.



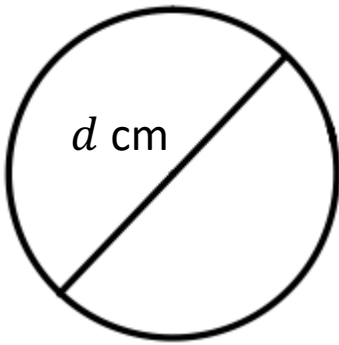
## Your Turn

Calculate the area of the circle below. Give your answer in terms of  $\pi$  and to 1 decimal place.



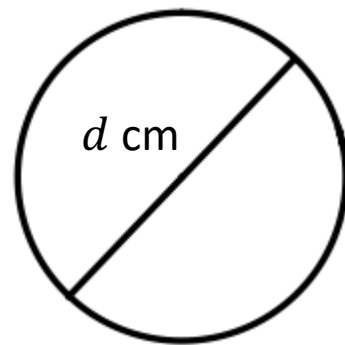
## Worked Example

Calculate the diameter,  $d$ , of the circle below given that the area is  $12.6 \text{ cm}^2$ . Give your answer to 2 decimal places.

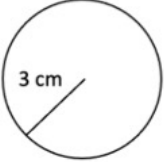
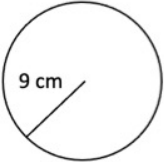
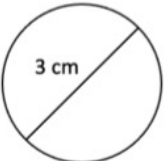
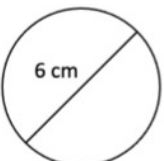
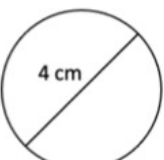


## Your Turn

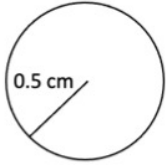
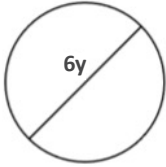
Calculate the diameter,  $d$ , of the circle below given that the area is  $50.3 \text{ cm}^2$ . Give your answer to 2 decimal places.



# Fill in the Gaps

Diagram	Radius	Diameter	Calculation	Area (in terms of $\pi$ )	Area (1 dp)
					
					
					
					
					
	6 mm				
		10 m			

# Fill in the Gaps

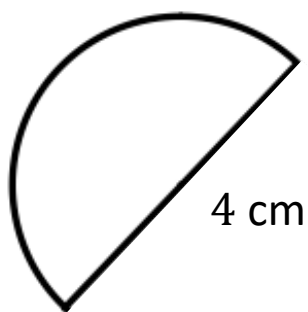
Diagram	Radius	Diameter	Calculation	Area (in terms of $\pi$ )	Area (1 dp)
				$16\pi \text{ km}^2$	
					
	$5a$				
					



## 2.5 Area of Fractions of Circles

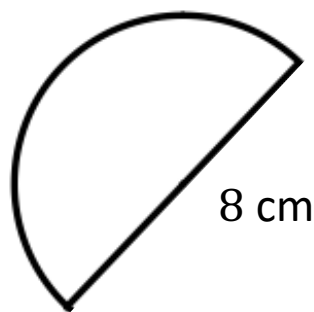
## Worked Example

Calculate the area of the semi-circle below. Give your answer in terms of  $\pi$  and to 1 decimal place.



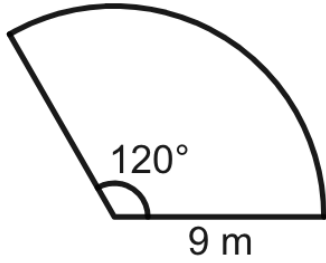
## Your Turn

Calculate the area of the semi-circle below. Give your answer in terms of  $\pi$  and to 1 decimal place.



## Worked Example

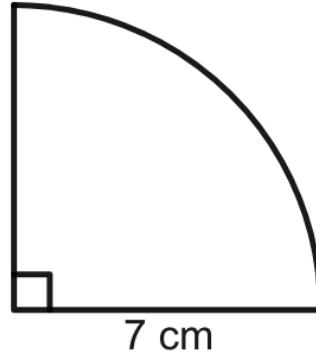
Calculate the area of the shape drawn below.



Give your answer correct to 1 decimal place.

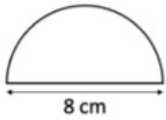
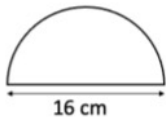
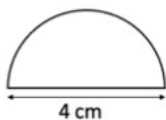
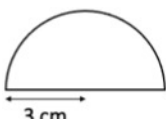


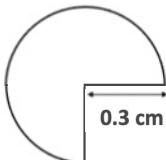
## Your Turn

Calculate the area of the shape drawn below.



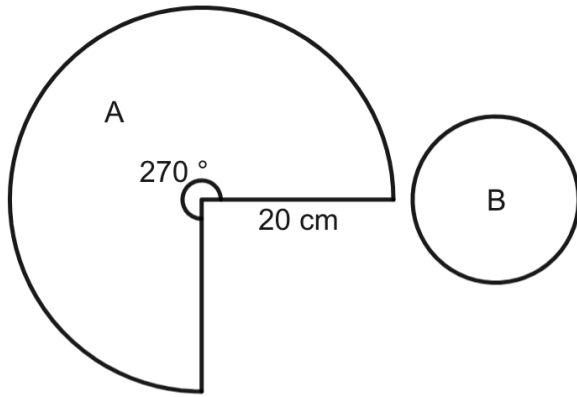
Give your answer correct to 1 decimal place.

# Fill in the Gaps

Diagram	Radius	Diameter	Calculation	Area (in terms of $\pi$ )	Area (1 dp)
					
					
					
					
					
					
					

## Worked Example

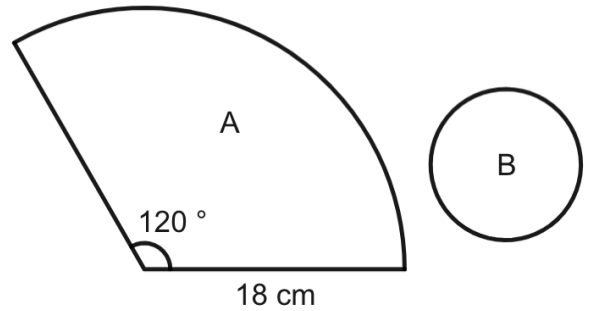
Shape  $A$  is a sector with angle  $270^\circ$  and radius  $20\text{ cm}$ . Shape  $B$  is a circle. The area of  $A$  is 3 times the area of  $B$ .



Calculate the radius of shape  $B$ .

## Your Turn

Shape  $A$  is a sector with angle  $120^\circ$  and radius  $18\text{ cm}$ . Shape  $B$  is a circle. The area of  $A$  is 3 times the area of  $B$ .



Work out the radius of shape  $B$ .

## 2.6 Area and Circumference of Circles

# Fluency Practice

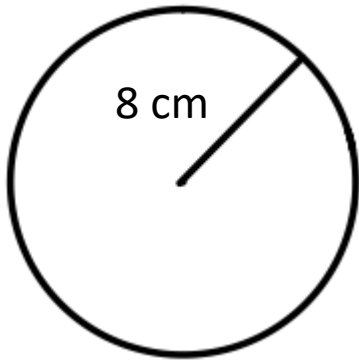
Which units should we use for the answer?

Question	Description	Units
1.	A circle has a radius of $10m$ , what is the area?	
2.	A circle has a radius of $10cm$ , what is the area?	
3.	A circle has a radius of $10cm$ , what is the circumference?	
4.	A circle has a diameter of $10cm$ , what is the circumference?	
5.	A circle has a circumference of $10cm$ , what is the diameter?	
6.	A circle has an area of $10cm^2$ , what is the diameter?	
7.	A circle has an area of $10cm^2$ , what is the circumference?	
8.	A circle has an circumference of $10cm$ , what is the area?	

9. Write a circles question where the units of the answer would be  $mm$

10. Write a circles question where the units of the answer would be  $mm^2$

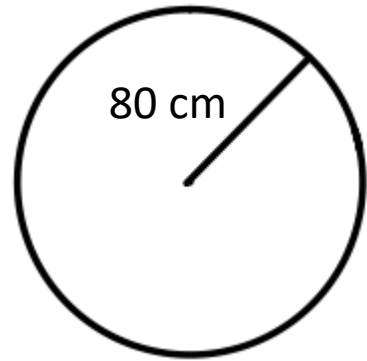
## Worked Example



Circumference =

Area =

## Your Turn



Circumference =

Area =



# Fill in the Gaps

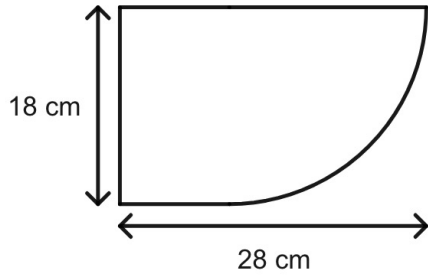
Round all answers to 1 decimal place. Remember to give units.

Radius	Diameter	Circumference	Area
<i>3 cm</i>	<i>6 cm</i>		<i>28.3 cm<sup>2</sup></i>
<i>7 cm</i>	<i>14 cm</i>	<i>44.0 cm</i>	
<i>5 mm</i>			<i>78.5 mm<sup>2</sup></i>
	<i>2.4 m</i>	<i>7.5 m</i>	
<i>4.5 cm</i>	<i>9 cm</i>		
<i>6 cm</i>			
	<i>8 cm</i>		
	<i>40 mm</i>		
<i>0.7 m</i>			
		<i>49.0 cm</i>	<i>191.1 cm<sup>2</sup></i>
		<i>100.5 mm</i>	<i>804.2 mm<sup>2</sup></i>
		<i>81.7 m</i>	<i>530.9 m<sup>2</sup></i>
		<i>11.3 cm</i>	
		<i>147.0 mm</i>	
			<i>38.5 m<sup>2</sup></i>
			<i>498.8 cm<sup>2</sup></i>

## 2.7 Area and Perimeter of Compound Shapes

## Worked Example

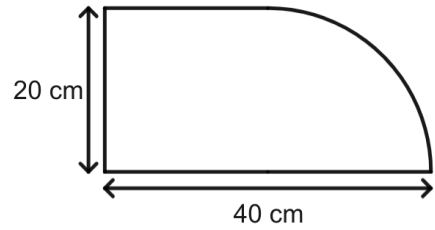
Logan designs a new badge. The design is based on a rectangle and a quadrant as shown in the diagram.



They decide to put silver thread around the badge. Calculate the length of silver thread they need. Give your answer to 2 decimal places.

## Your Turn

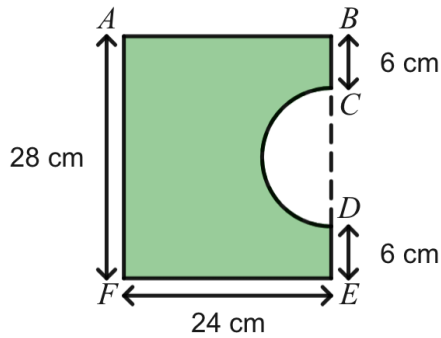
John designs a new badge. The design is based on a rectangle and a quadrant as shown in the diagram.



They decide to put silver thread around the badge. Calculate the length of silver thread they need. Give your answer to 2 decimal places.

## Worked Example

The shaded shape is made by cutting a semicircle from a rectangular piece of card,  $ABEF$  as shown in the diagram.



$BCDE$  is a straight line.

The centre of the semicircle lies on  $CD$ .

$$AB = EF = 24 \text{ cm}$$

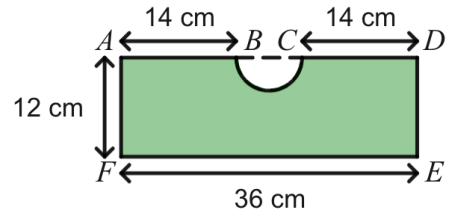
$$AF = 28 \text{ cm}$$

$$BC = DE = 6 \text{ cm}$$

Work out the perimeter of the shaded shape. Give your answer to 2 decimal places.

## Your Turn

The shaded shape is made by cutting a semicircle from a rectangular piece of card,  $ADEF$  as shown in the diagram.



$ABCD$  is a straight line.

The centre of the semicircle lies on  $BC$ .

$$AF = DE = 12 \text{ cm}$$

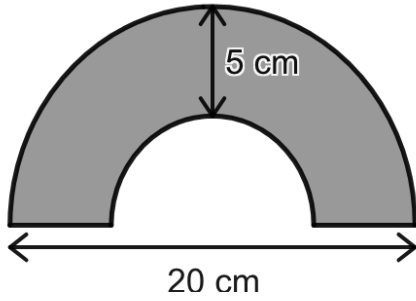
$$EF = 36 \text{ cm}$$

$$AB = CD = 14 \text{ cm}$$

Work out the perimeter of the shaded shape. Give your answer to 2 decimal places.

## Worked Example

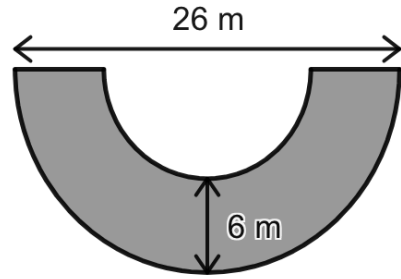
The diagram contains two concentric semi-circles.



Calculate the shaded area.  
Give your answer to 1 decimal place.

## Your Turn

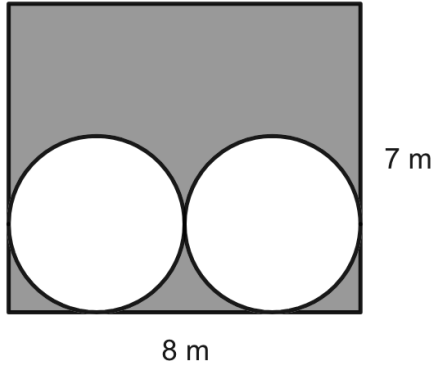
The diagram contains two concentric semi-circles.



Calculate the shaded area.  
Give your answer to 1 decimal place.

## Worked Example

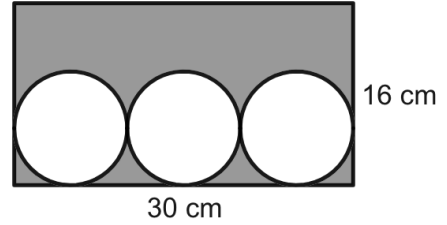
The diagram shows two circles enclosed in a rectangle.



Calculate the shaded area.  
Give your answer correct to 1 decimal place.

## Your Turn

The diagram shows three circles enclosed in a rectangle.



Calculate the shaded area.  
Give your answer correct to 1 decimal place.

# 3 Angles in Parallel Lines

## 3.1 Transversals



# Frayer Model – Transversal

**Definition**

**Characteristics**

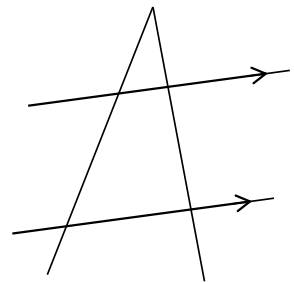
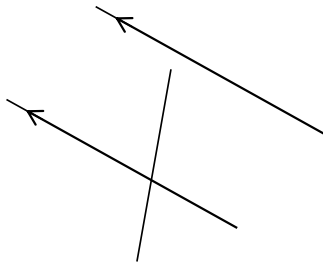
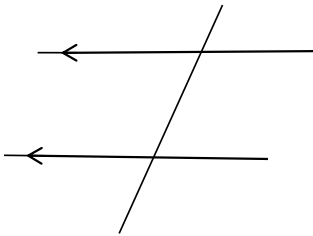
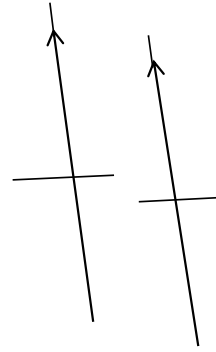
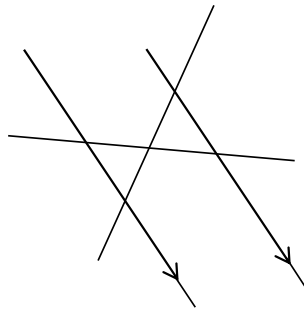
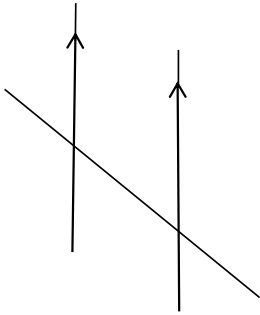
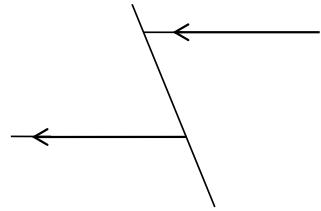
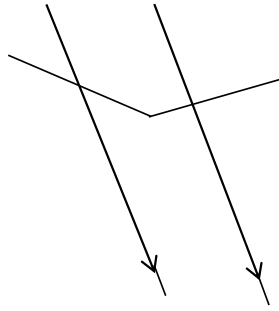
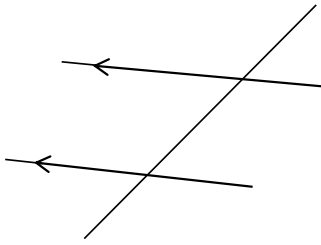
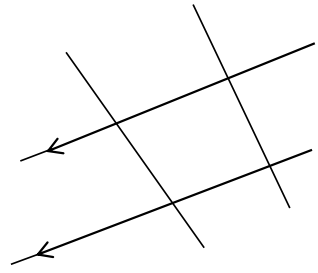
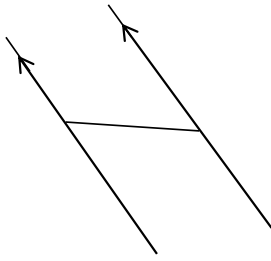
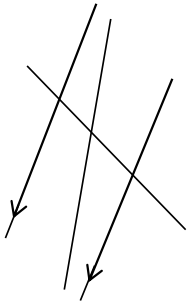
**Examples**

**Non-Examples**

# Fluency Practice

The diagrams are not drawn accurately

Highlight any transversals



## 3.2 Corresponding Angles

# Frayer Model – Corresponding Angles

Definition

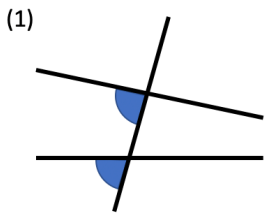
Characteristics

Examples

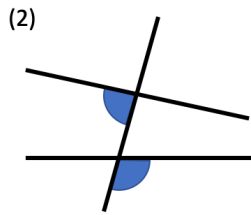
Non-Examples

# Fluency Practice

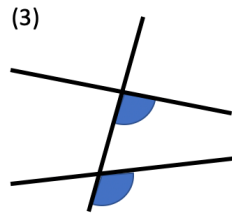
For each question, write either *'corresponding'* or *'not corresponding'* on the line.



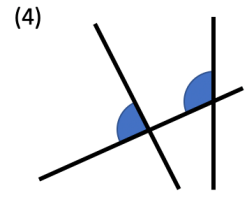
These angles are \_\_\_\_\_.



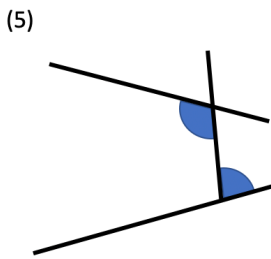
These angles are \_\_\_\_\_.



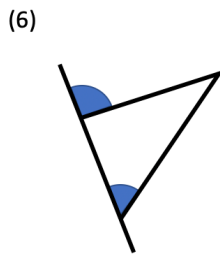
These angles are \_\_\_\_\_.



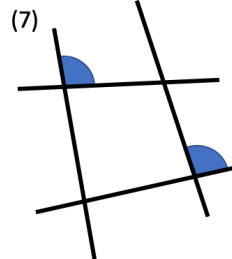
These angles are \_\_\_\_\_.



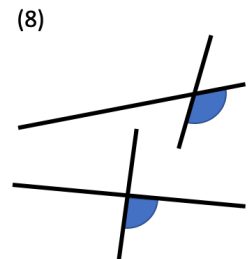
These angles are \_\_\_\_\_.



These angles are \_\_\_\_\_.

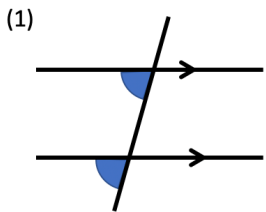


These angles are \_\_\_\_\_.

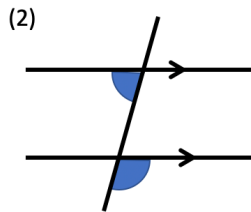


These angles are \_\_\_\_\_.

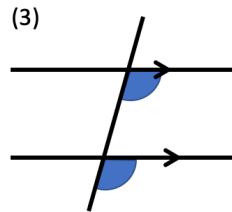
For each question, write either *'corresponding'* or *'not corresponding'* on the line.



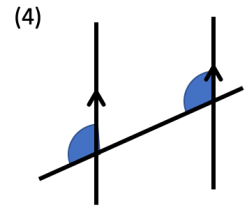
These angles are \_\_\_\_\_.



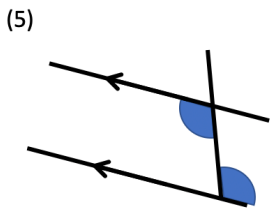
These angles are \_\_\_\_\_.



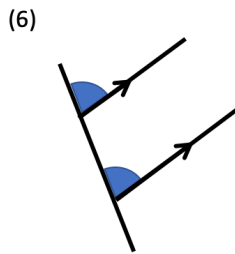
These angles are \_\_\_\_\_.



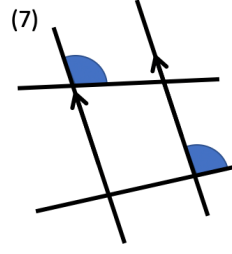
These angles are \_\_\_\_\_.



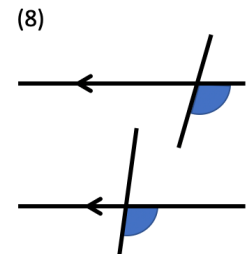
These angles are \_\_\_\_\_.



These angles are \_\_\_\_\_.



These angles are \_\_\_\_\_.



These angles are \_\_\_\_\_.

# Fluency Practice

Each diagram has one angle shaded in.  
Mark and shade in their corresponding angles.

(1)

(2)

(3)

(4)

(5)

(6)

(7)

(8)

Find all the pairs of corresponding angles in each diagram.  
Use three letter notation to identify the angles (e.g. " $\angle ACB$  and  $\angle HGC$ ").

(a)

(b)

(c)

(d)

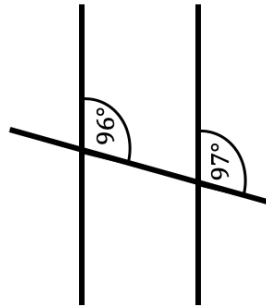
(e)

(f)

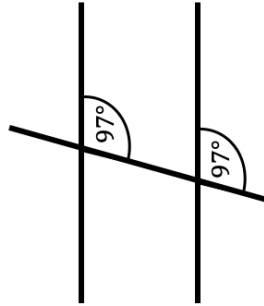
# Fluency Practice

Use your knowledge of corresponding angles to decide which diagrams contain parallel lines. Explain how you made your decision for each question.

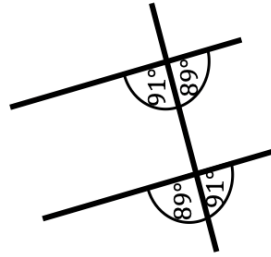
(1)



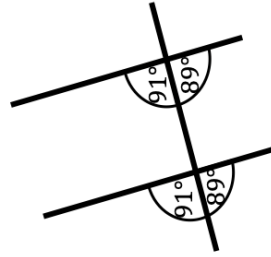
(2)



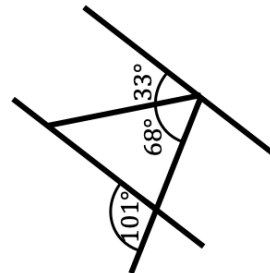
(3)



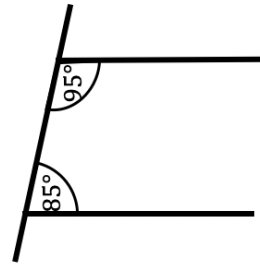
(4)



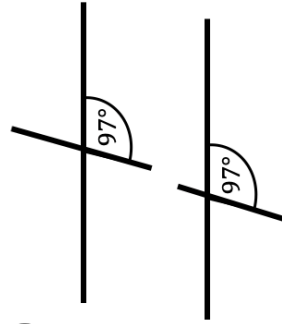
(5)



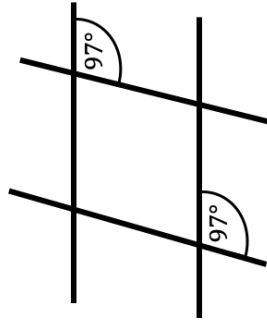
(6)



(7)



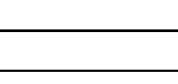
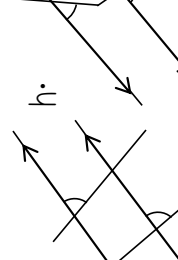
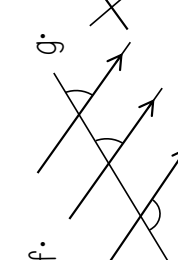
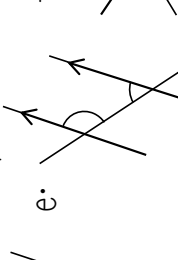
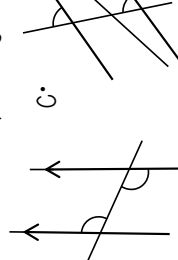
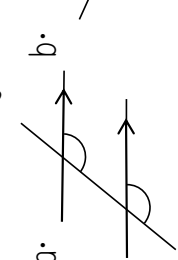
(8)



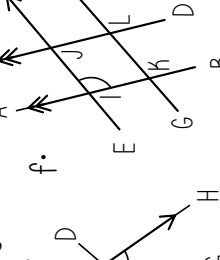
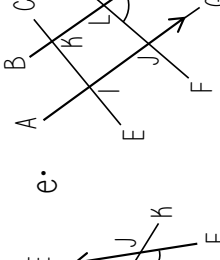
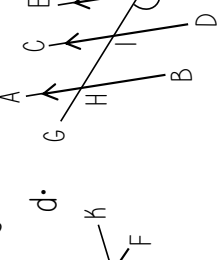
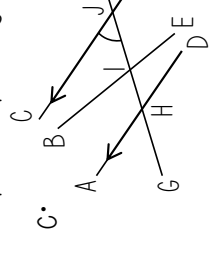
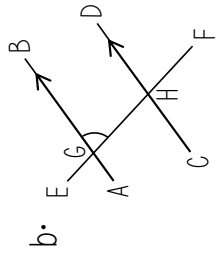
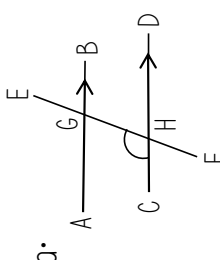
# Fluency Practice

The diagrams are not drawn accurately

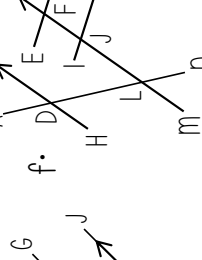
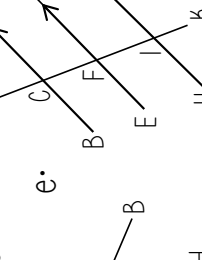
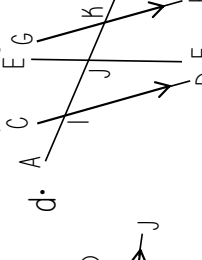
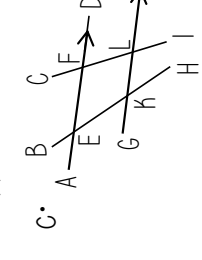
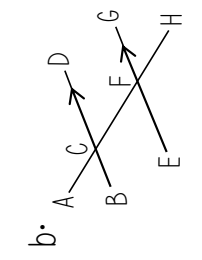
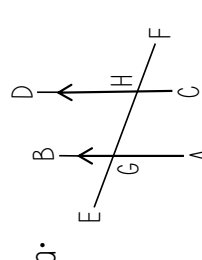
1. Do the diagrams show corresponding angles? Provide a reason for your answer.



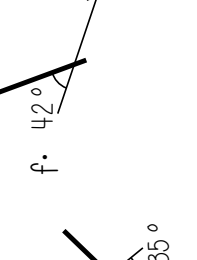
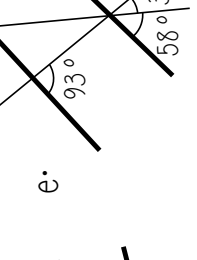
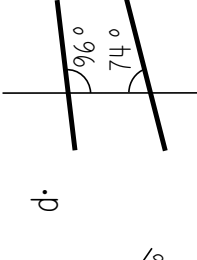
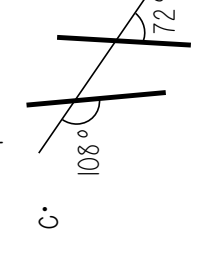
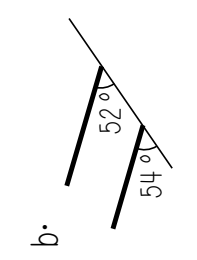
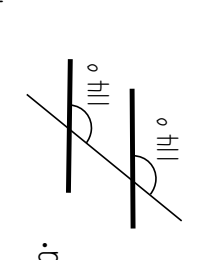
2. Write down the three letter notation for any corresponding angles to the one that is marked on the diagram.



3. Write down the three letter notation for any pairs (or more) of corresponding angles.



4. Are the bold lines parallel? Provide a reason for your answer.





## 3.3 Alternate Angles

# Frayer Model – Alternate Angles

Definition

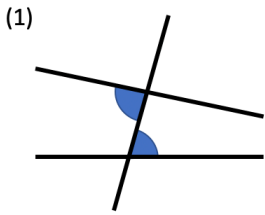
Characteristics

Examples

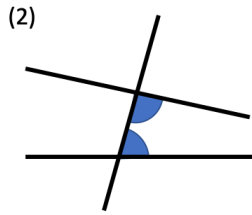
Non-Examples

# Fluency Practice

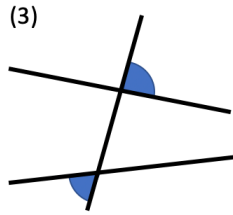
For each question, write either *'alternate'* or *'not alternate'* on the line.



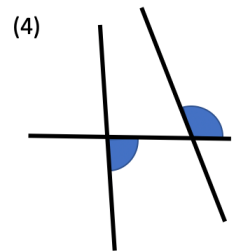
These angles are \_\_\_\_\_.



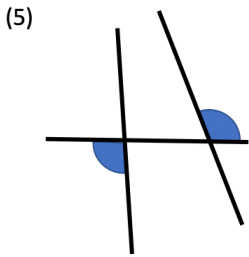
These angles are \_\_\_\_\_.



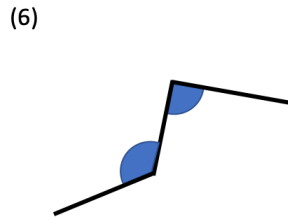
These angles are \_\_\_\_\_.



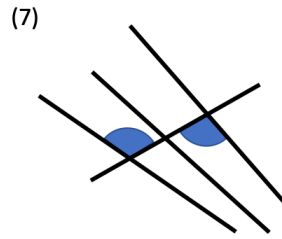
These angles are \_\_\_\_\_.



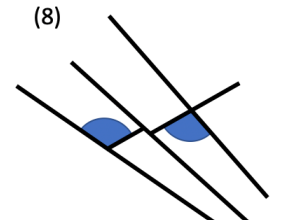
These angles are \_\_\_\_\_.



These angles are \_\_\_\_\_.

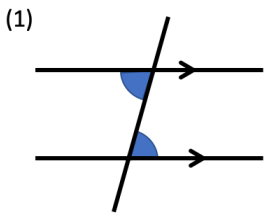


These angles are \_\_\_\_\_.

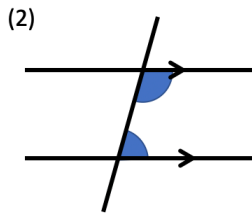


These angles are \_\_\_\_\_.

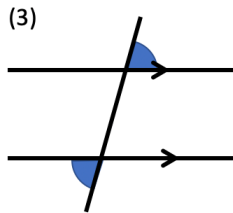
For each question, write either *'alternate'* or *'not alternate'* on the line.



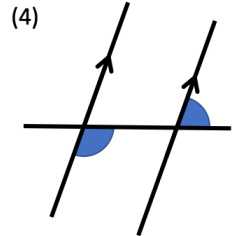
These angles are \_\_\_\_\_.



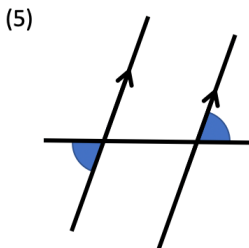
These angles are \_\_\_\_\_.



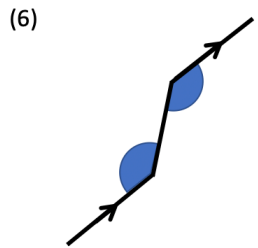
These angles are \_\_\_\_\_.



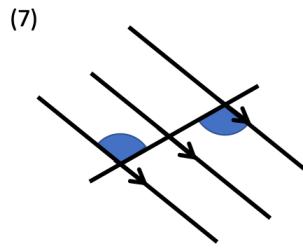
These angles are \_\_\_\_\_.



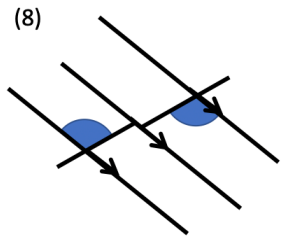
These angles are \_\_\_\_\_.



These angles are \_\_\_\_\_.



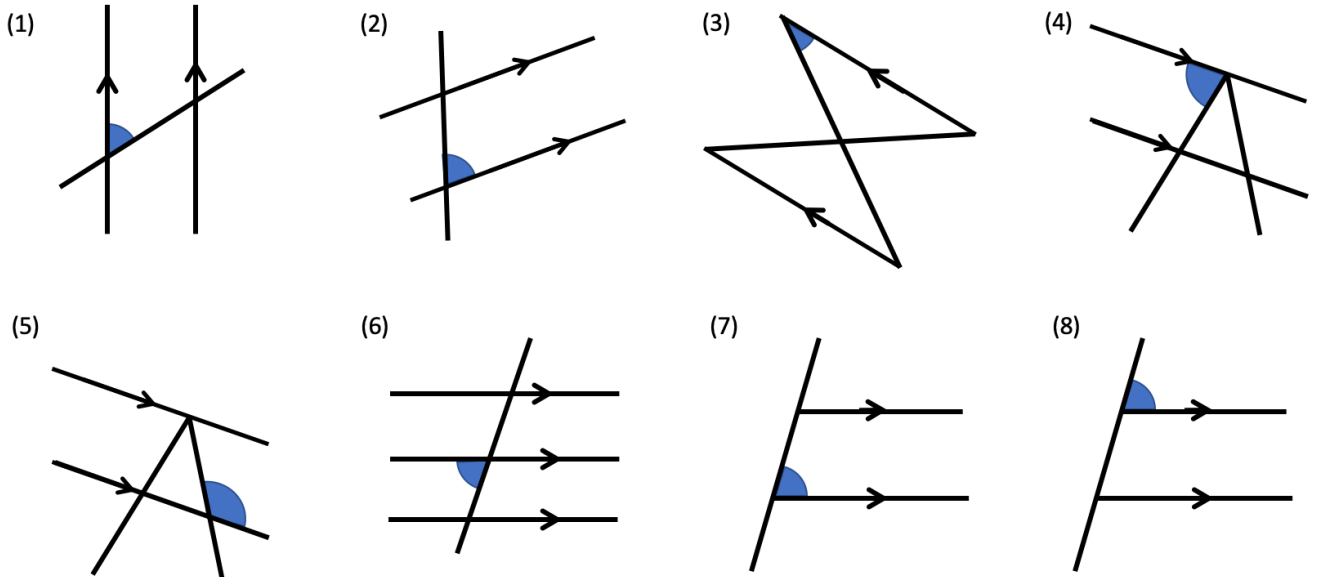
These angles are \_\_\_\_\_.



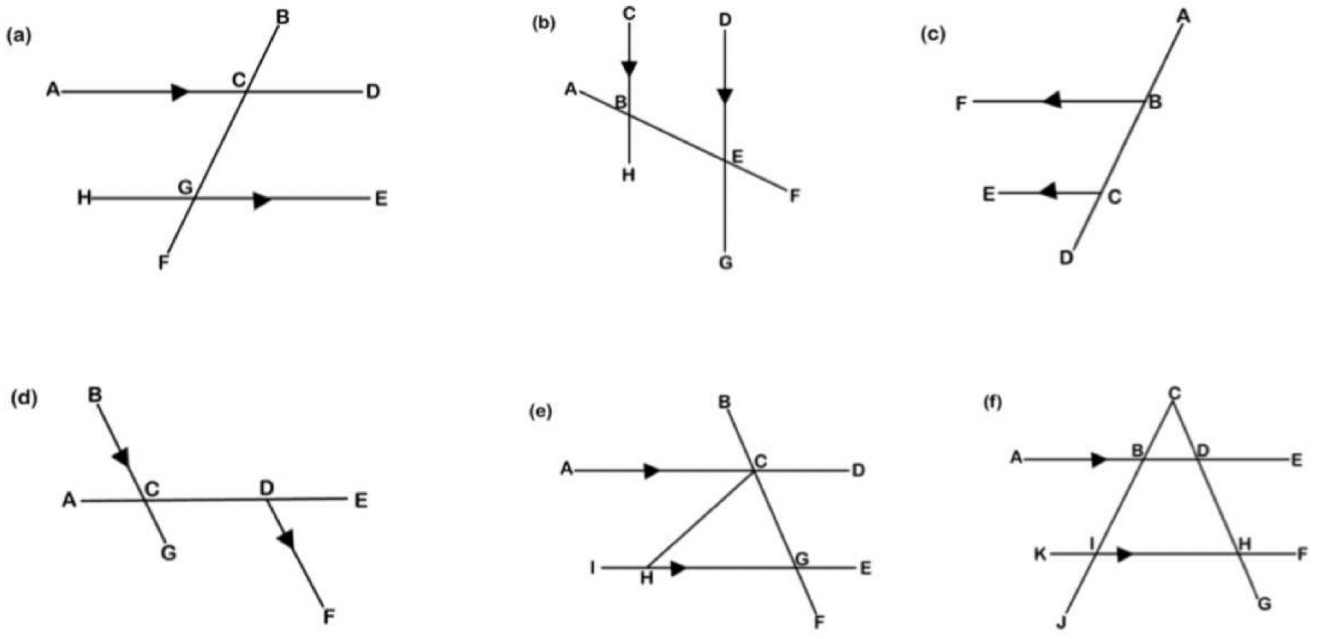
These angles are \_\_\_\_\_.

# Fluency Practice

Each diagram has one angle shaded in.  
Mark and shade in their alternate angles.

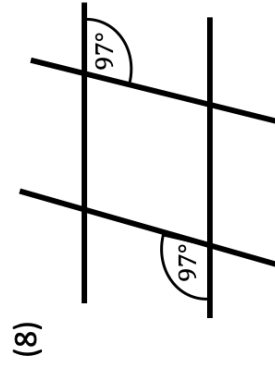
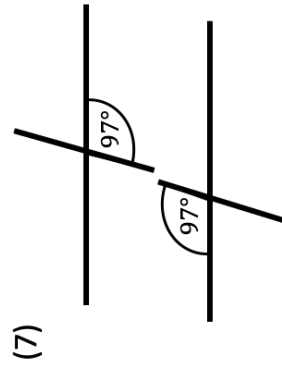
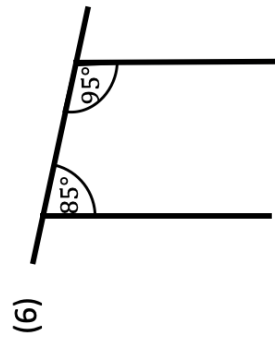
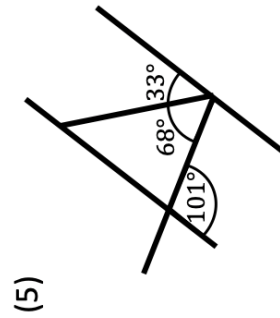
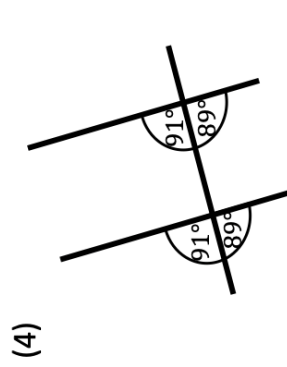
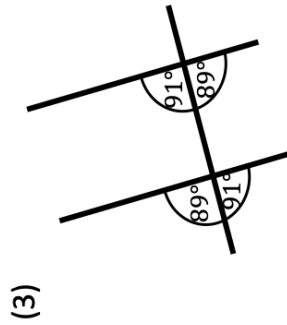
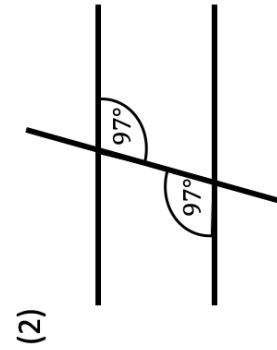
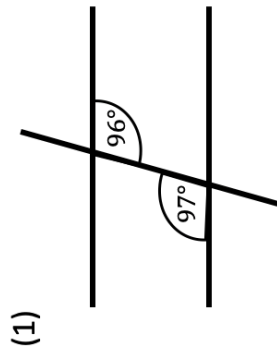


Find all the pairs of alternate angles in each diagram.  
Use three letter notation to identify the angles (e.g. " $\angle DCG$  and  $\angle HGC$ ").



# Fluency Practice

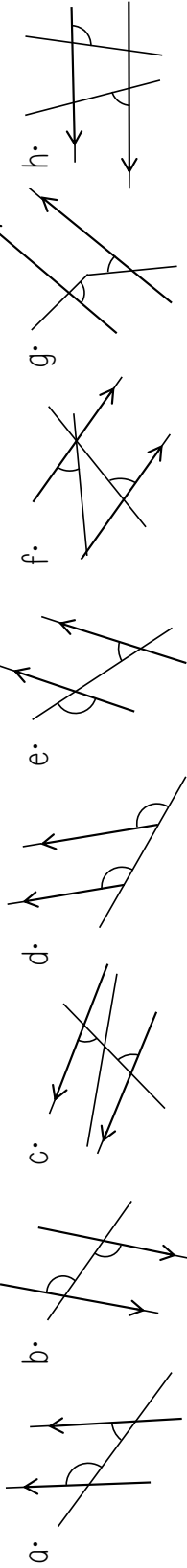
Use your knowledge of alternate angles to decide which diagrams contain parallel lines.  
Explain how you made your decision for each question.



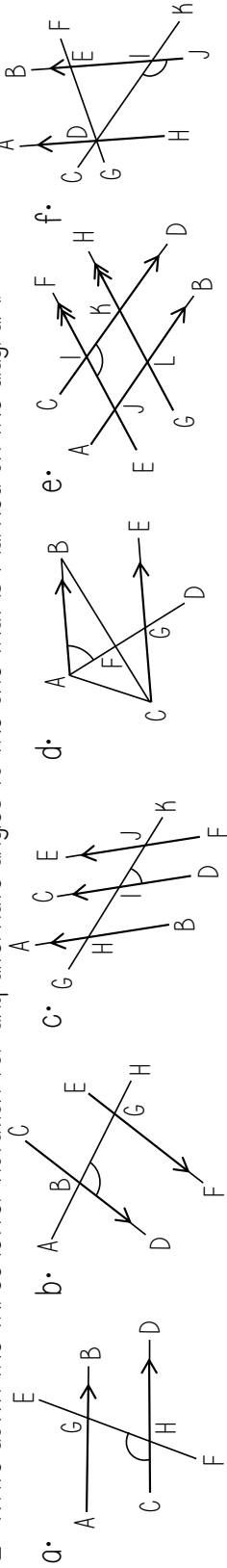
# Fluency Practice

The diagrams are not drawn accurately

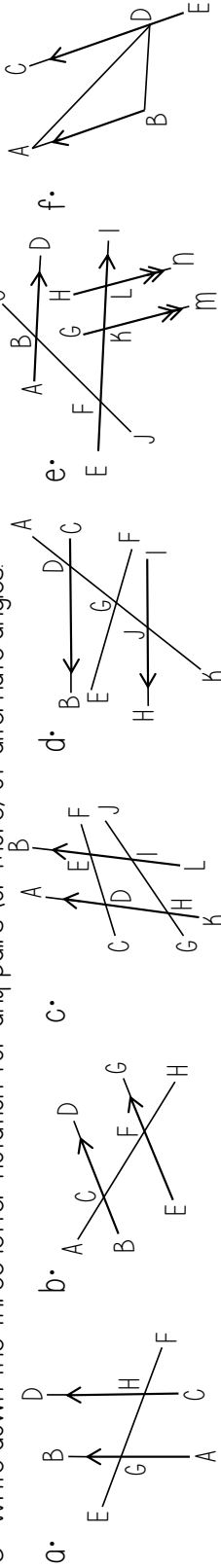
1. Do the diagrams show alternate angles? Provide a reason for your answer.



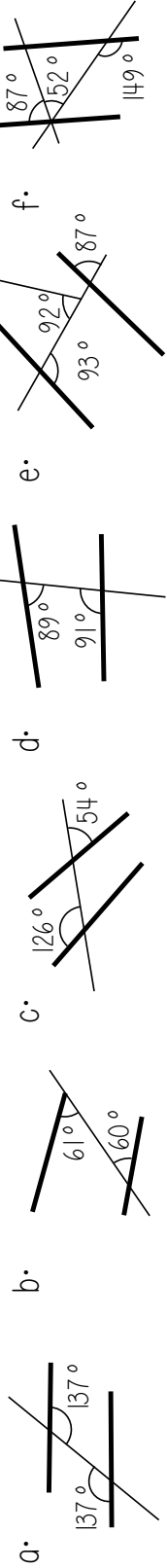
2. Write down the three letter notation for any alternate angles to the one that is marked on the diagram.



3. Write down the three letter notation for any pairs (or more) of alternate angles.



4. Are the bold lines parallel? Provide a reason for your answer.



## 3.4 Co-Interior Angles

# Frayer Model – Co-Interior Angles

Definition

Characteristics

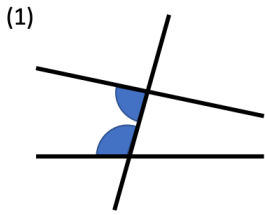
Examples

Non-Examples

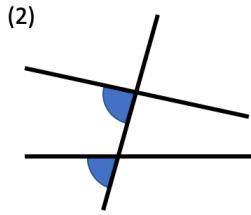


# Fluency Practice

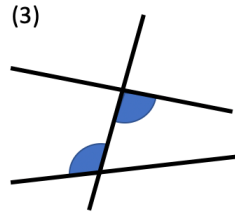
For each question, write either *'co-interior'* or *'not co-interior'* on the line.



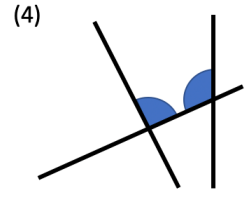
These angles are \_\_\_\_\_.



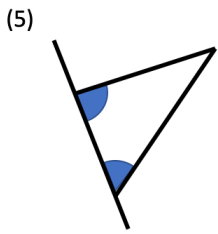
These angles are \_\_\_\_\_.



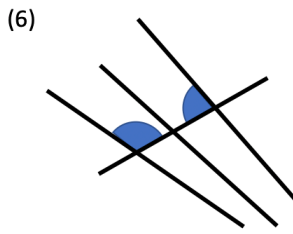
These angles are \_\_\_\_\_.



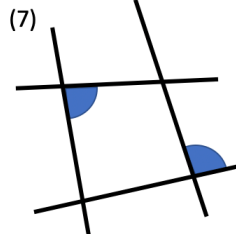
These angles are \_\_\_\_\_.



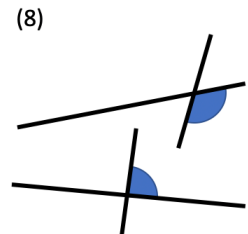
These angles are \_\_\_\_\_.



These angles are \_\_\_\_\_.

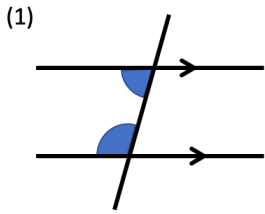


These angles are \_\_\_\_\_.

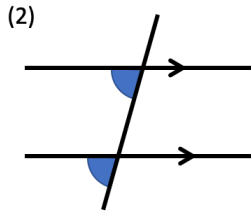


These angles are \_\_\_\_\_.

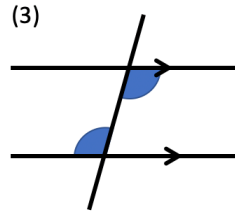
For each question, write either *'co-interior'* or *'not co-interior'* on the line.



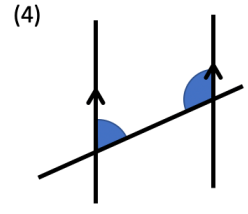
These angles are \_\_\_\_\_.



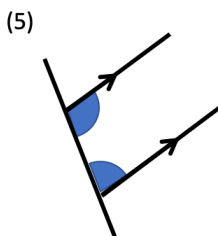
These angles are \_\_\_\_\_.



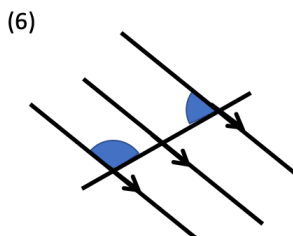
These angles are \_\_\_\_\_.



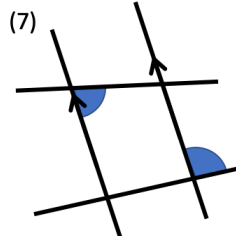
These angles are \_\_\_\_\_.



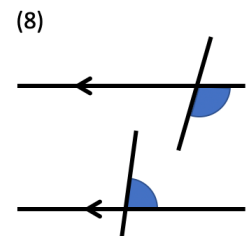
These angles are \_\_\_\_\_.



These angles are \_\_\_\_\_.



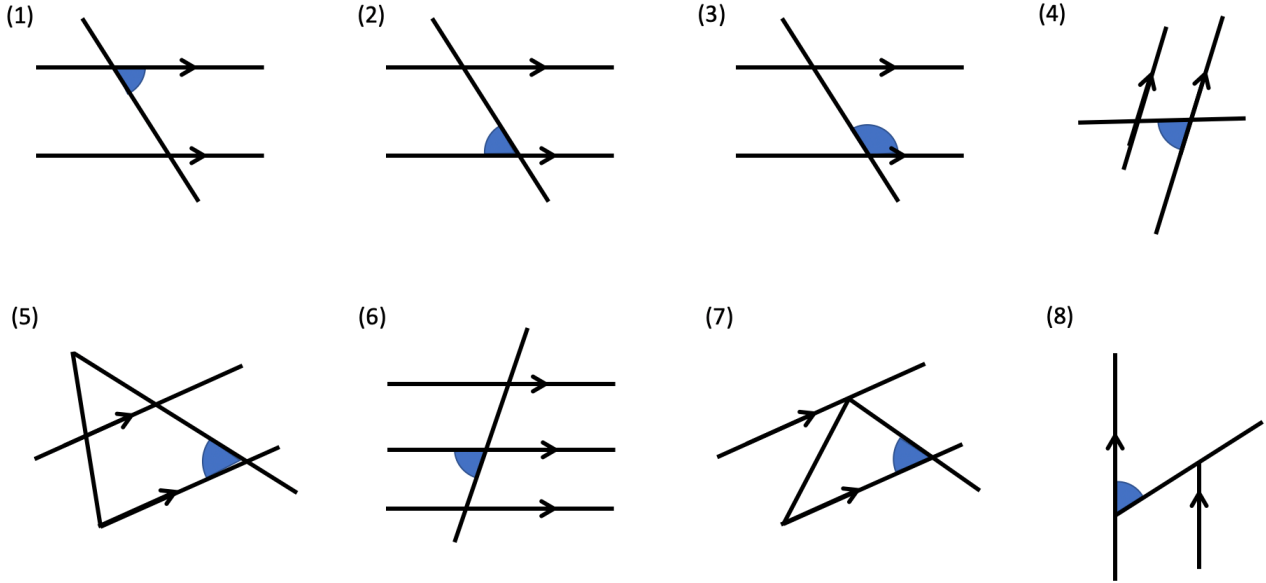
These angles are \_\_\_\_\_.



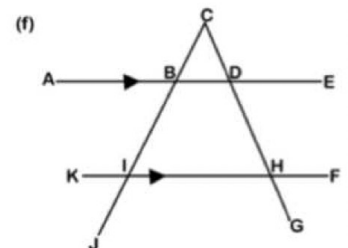
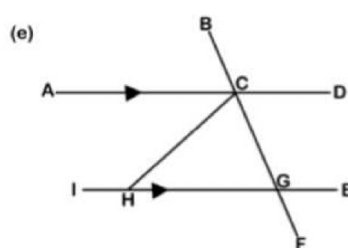
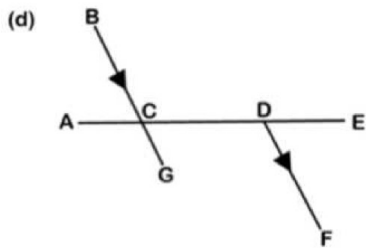
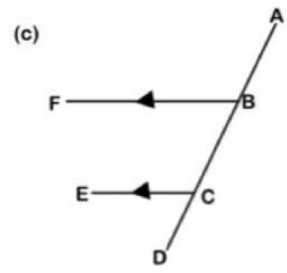
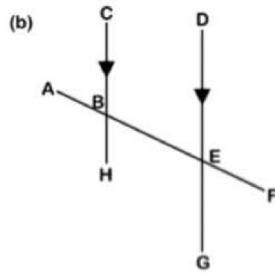
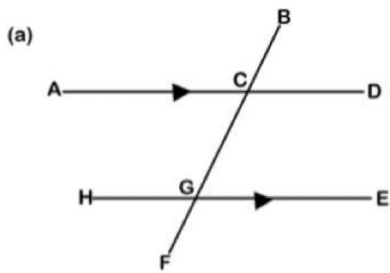
These angles are \_\_\_\_\_.

# Fluency Practice

Each diagram has one angle shaded in.  
Mark and shade in their co-interior angles.

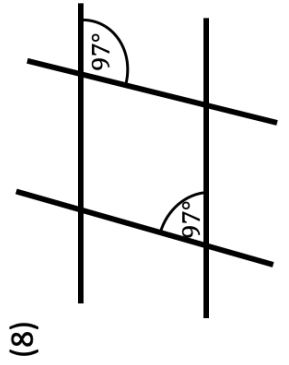
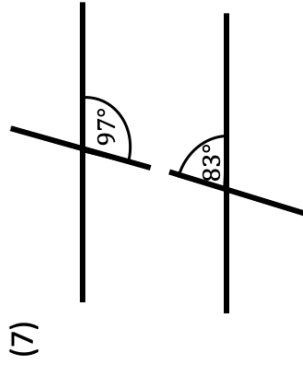
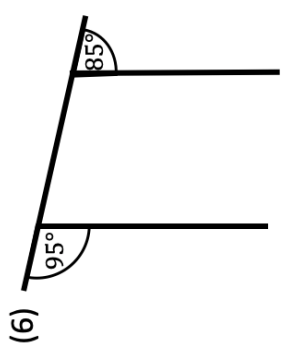
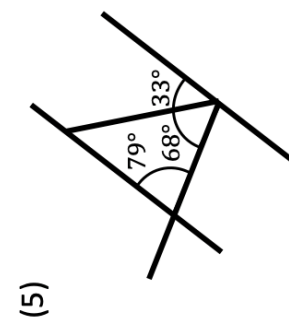
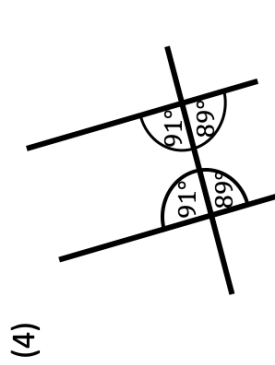
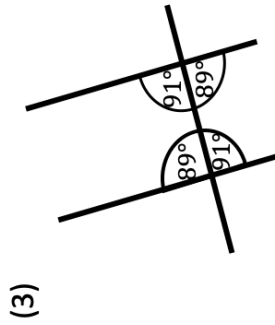
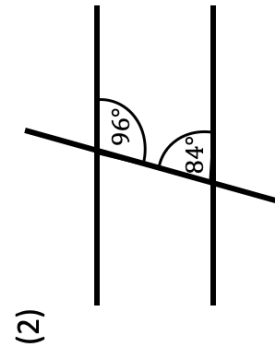
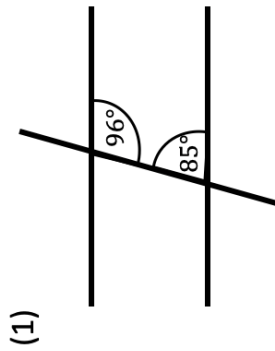


Find all the pairs of co-interior angles in each diagram.  
Use three letter notation to identify the angles (e.g. " $\angle ACG$  and  $\angle HGC$ ").



# Fluency Practice

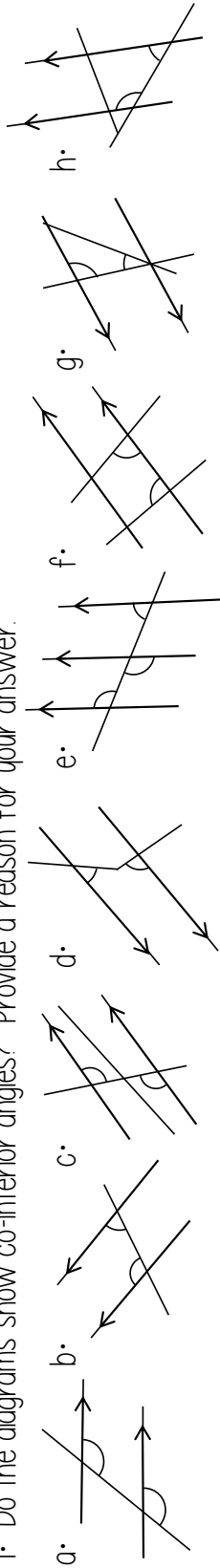
Use your knowledge of co-interior angles to decide which diagrams contain parallel lines. Explain how you made your decision for each question.



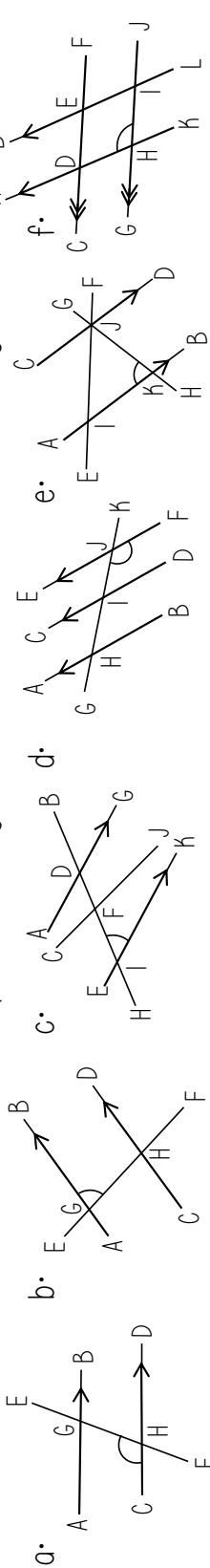
# Fluency Practice

The diagrams are not drawn accurately

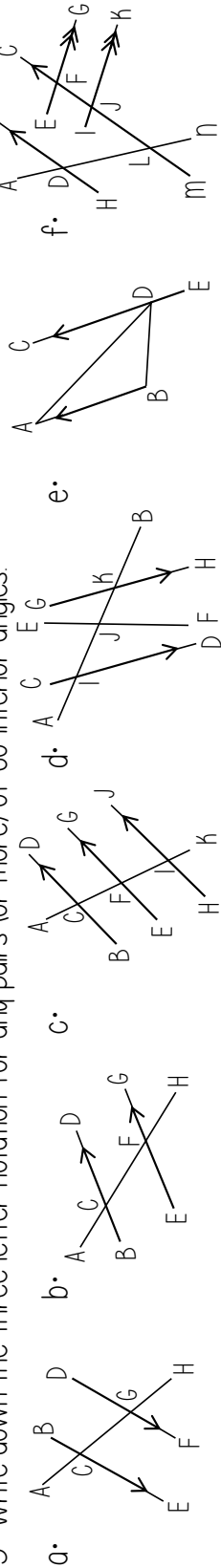
1. Do the diagrams show co-interior angles? Provide a reason for your answer.



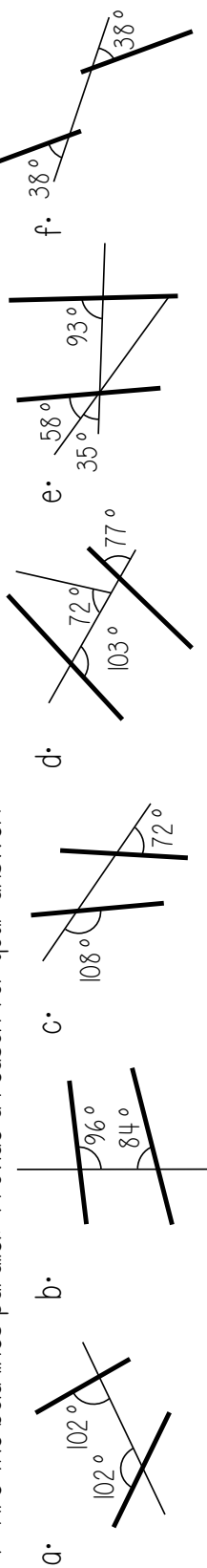
2. Write down the three letter notation for any co-interior angles to the one that is marked on the diagram.



3. Write down the three letter notation for any pairs (or more) of co-interior angles.



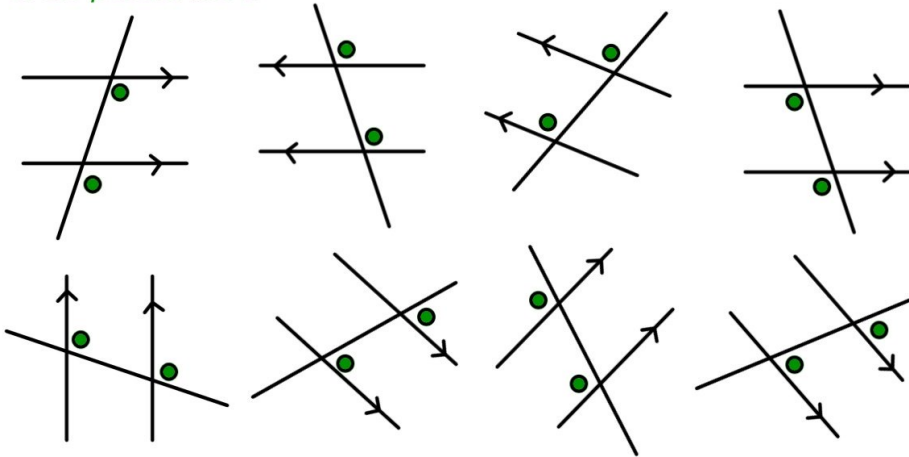
4. Are the bold lines parallel? Provide a reason for your answer.



# 3.5 Mixed

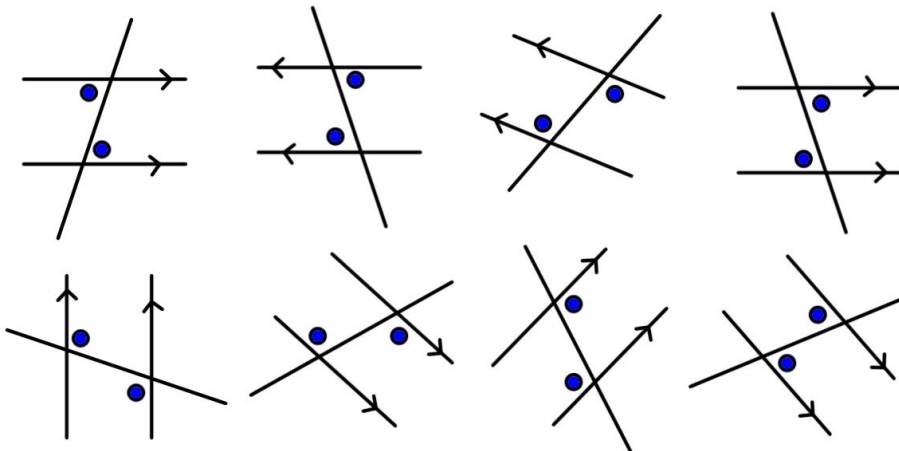
**Angle Facts in Parallel Lines: *Corresponding angles are equal.***

*On the same side of the transversal and in the same position in relation to the parallel lines.*



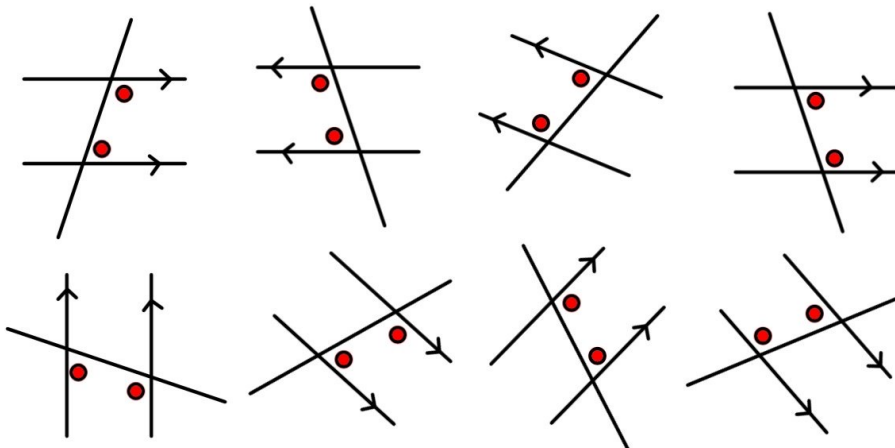
**Angle Facts in Parallel Lines: *Alternate angles are equal.***

*Between the parallel lines, on opposite sides of the transversal.*



**Angle Facts in Parallel Lines: *Co-interior angles add up to 180°.***

*Between the parallel lines and on the same side of the transversal.*



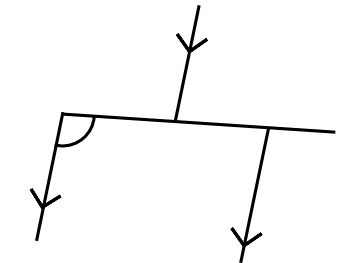
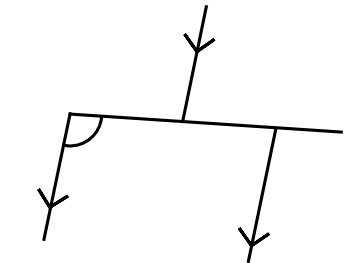
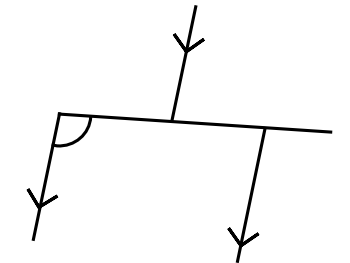
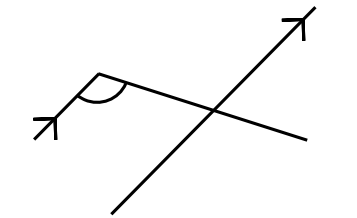
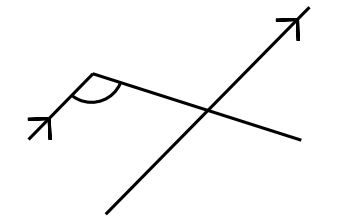
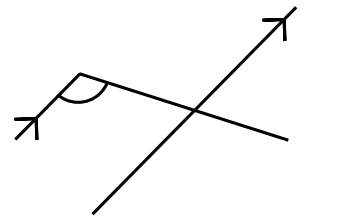
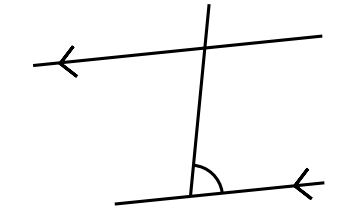
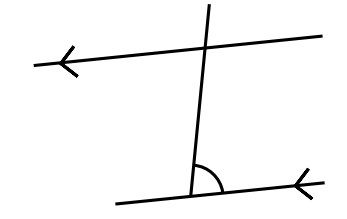
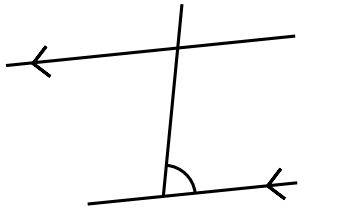
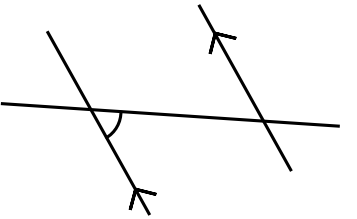
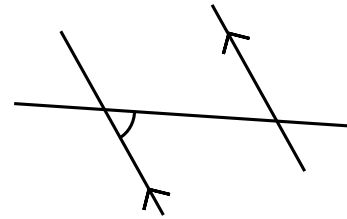
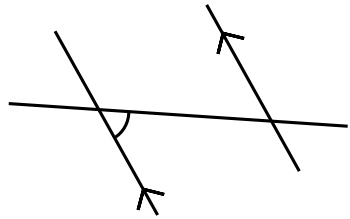
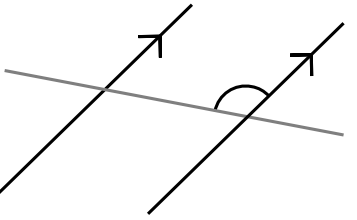
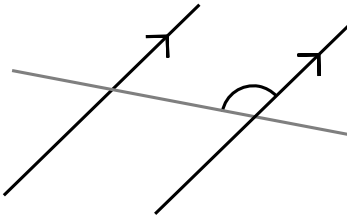
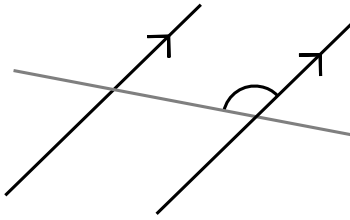
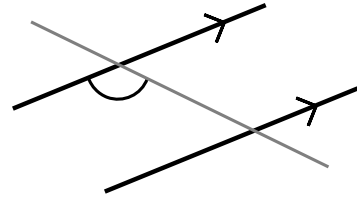
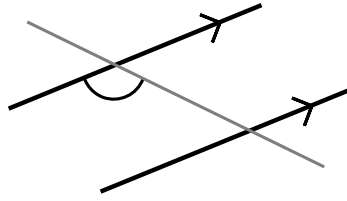
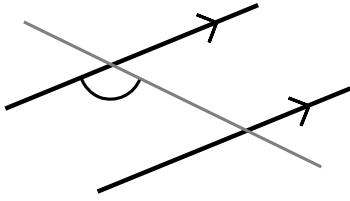
# Fluency Practice

On each diagram, label an angle according to each rule.

**Corresponding**

**Alternate**

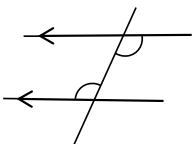
**Co-Interior**



# Fluency Practice

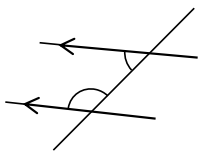
The diagrams are not drawn accurately  
Decide whether the diagrams show corresponding, alternate or co-interior angles

Corresponding	
Alternate	
Co-Interior	
None	



Explain how you know

Corresponding	
Alternate	
Co-Interior	
None	



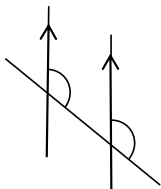
Explain how you know

Corresponding	
Alternate	
Co-Interior	
None	



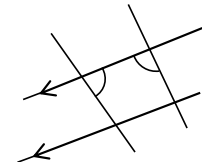
Explain how you know

Corresponding	
Alternate	
Co-Interior	
None	



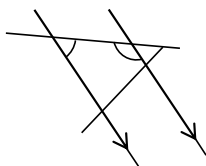
Explain how you know

Corresponding	
Alternate	
Co-Interior	
None	



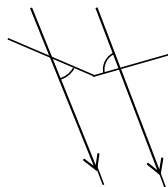
Explain how you know

Corresponding	
Alternate	
Co-Interior	
None	



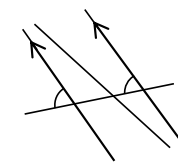
Explain how you know

Corresponding	
Alternate	
Co-Interior	
None	



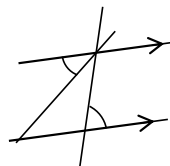
Explain how you know

Corresponding	
Alternate	
Co-Interior	
None	



Explain how you know

Corresponding	
Alternate	
Co-Interior	
None	

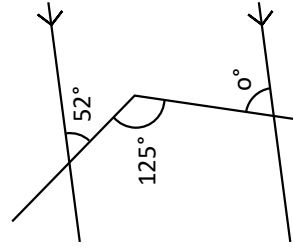
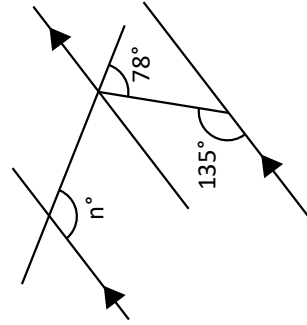
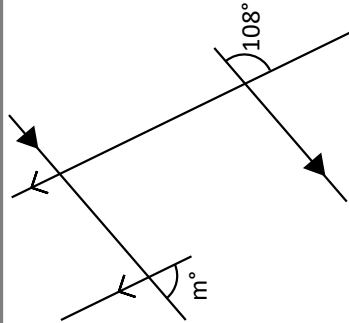
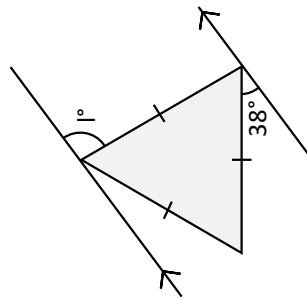
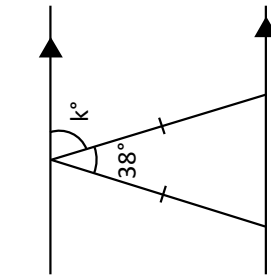
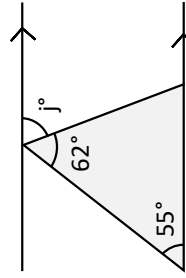
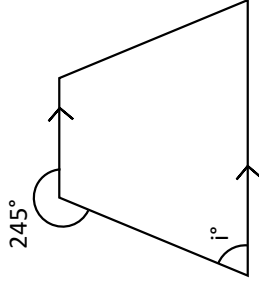
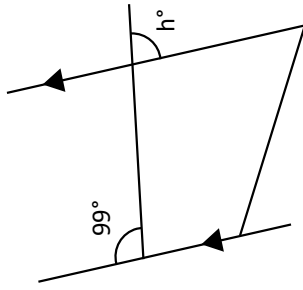
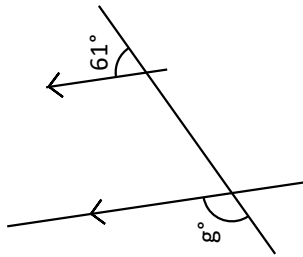
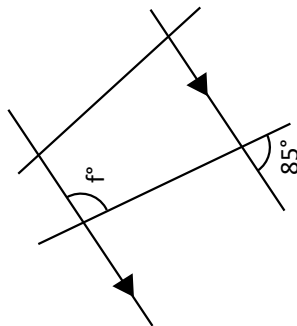
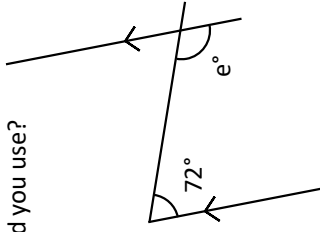
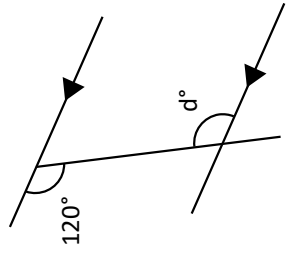
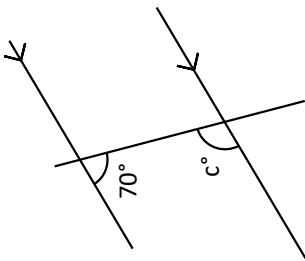
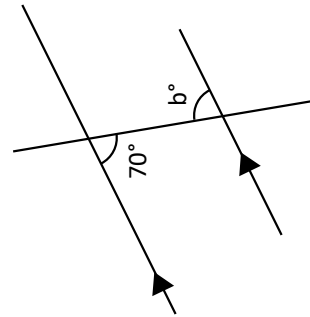
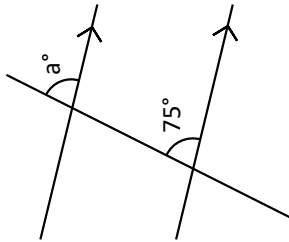


Explain how you know

# Fluency Practice

Finding Angles around Parallel Lines

You must be able to explain to someone **why** ... What angle rules did you use?



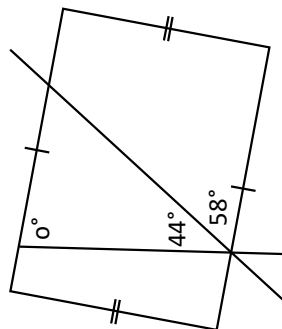
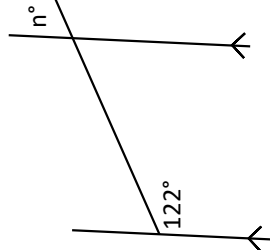
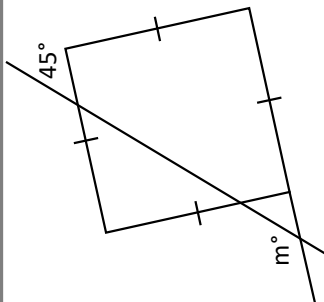
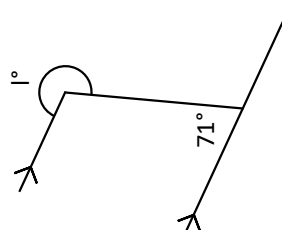
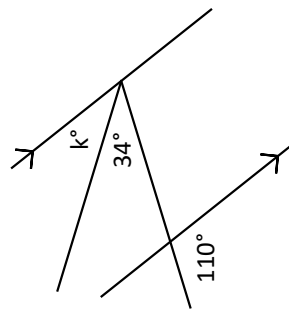
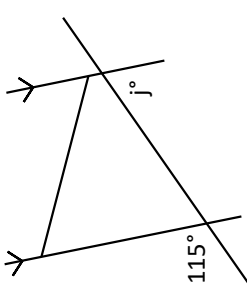
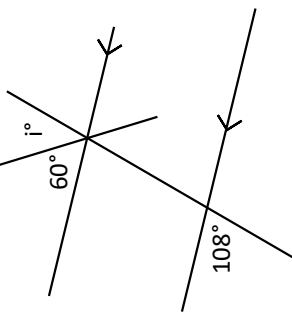
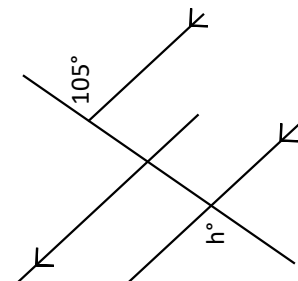
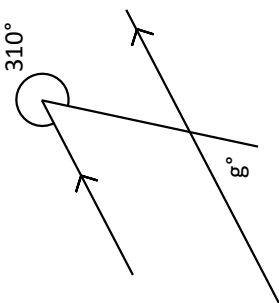
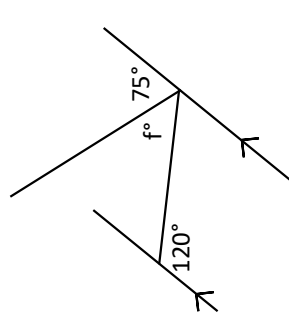
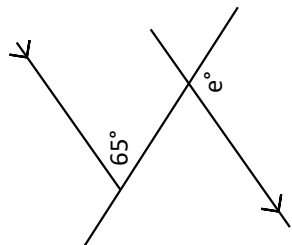
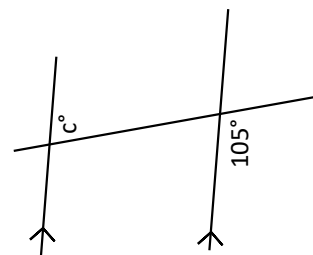
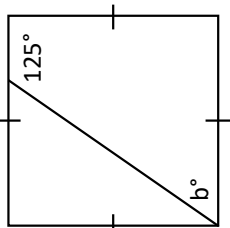
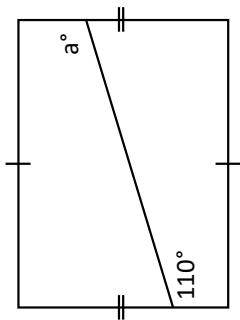
13 Answers	70	65	119	98	120	63	95
		110	71	108	81	75	72



# Fluency Practice

**Angles Around Parallel Lines: With Angle Rules**

You must be able to state the angle rules you used to find each missing angle.



Angles around a point total  $360^\circ$ .  
 Angles on one side of a straight line total  $180^\circ$ .  
 Vertically opposite angles are equal.

Rectangles have parallel sides.  
 Rectangles have equal angles.

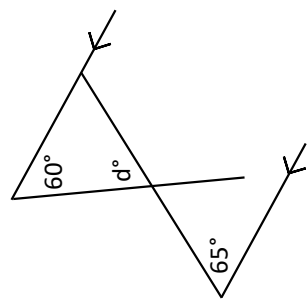
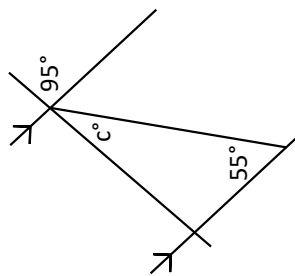
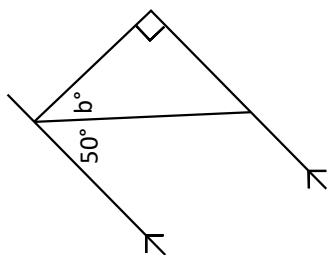
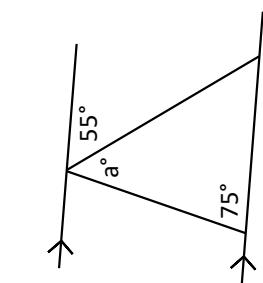
Alternate angles are equal.  
 Corresponding angles are equal.  
 Co-Interior angles total  $180^\circ$ .

some answers:

110	105	65	70	115	50
36	55	45	48	251	75

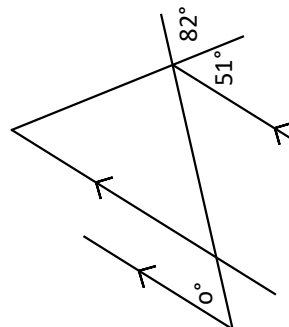
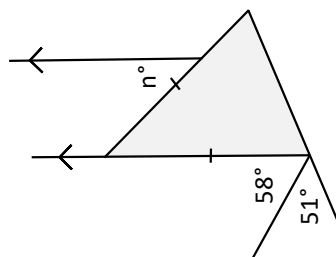
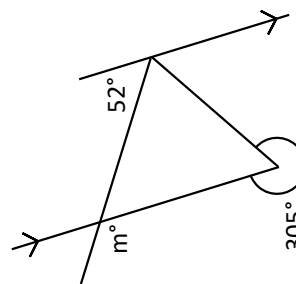
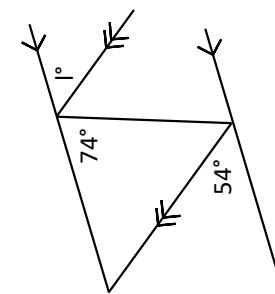
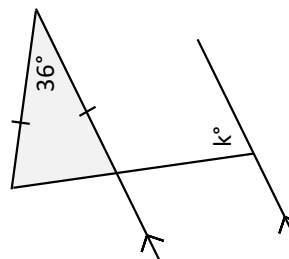
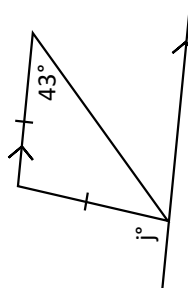
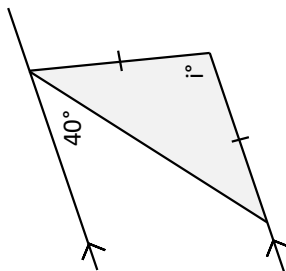
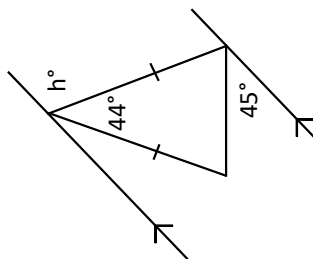
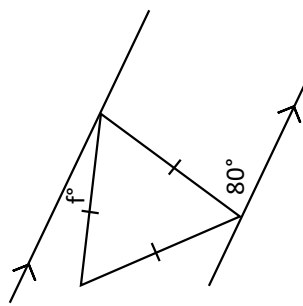
# Fluency Practice

**Angles Around Parallel Lines: With Triangles**



Are there multiple ways to find the missing angle?

What other angle rules can or must we use?



Interior angles of a triangle total  $180^\circ$ .

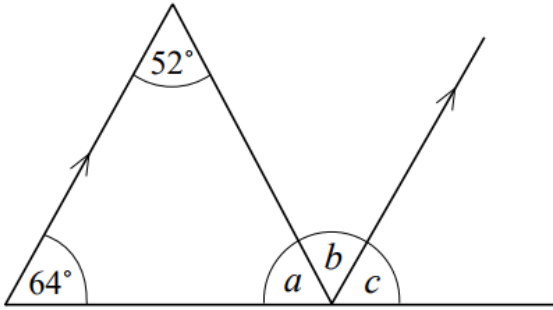
Base angles of an isosceles triangle are equal.

Equilateral triangles have equal interior angles.

70	40	20	100	60	72
55	94	54	50	113	30

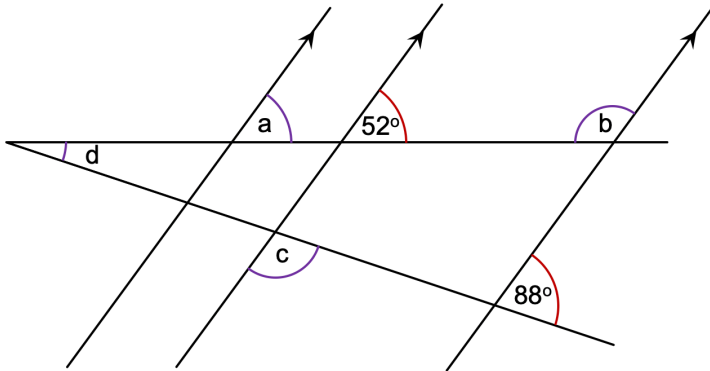
## Worked Example

Work out the missing angles in the diagram below. Give reasons for your answer.



# Your Turn

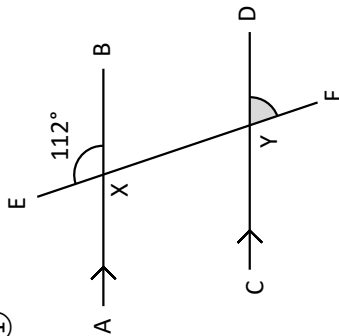
Work out the missing angles in the diagram below. Give reasons for your answer.



# Fluency Practice

## Angle Reasoning

①

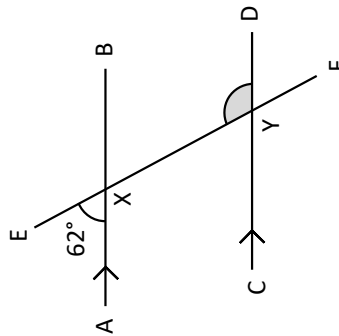


Angle **BXF** =  
because...

Angle **DYF** =  
because...

②

Here are two methods  
to find angle **EYD**:



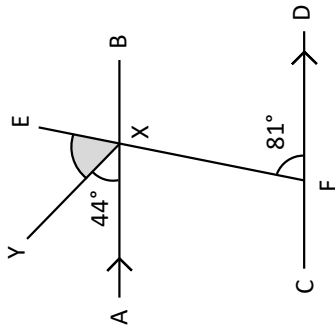
Angle **BXF** =  
because...

Angle **EYD** =  
because...  
\_\_\_\_\_

Angle **AXF** =  
because...

Angle **EYD** =  
because...

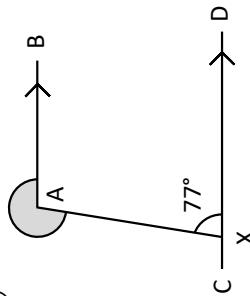
③



Angle **EXB** =  
because...

Angle **EXY** =  
because...

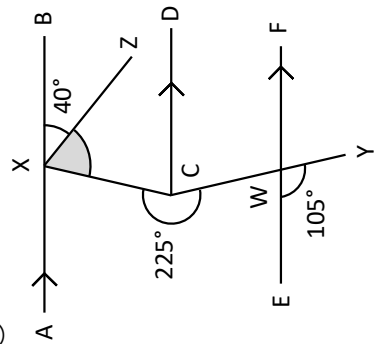
④



Obtuse Angle **BAX** =  
because...

Reflex Angle **BAX** =  
because...

⑤

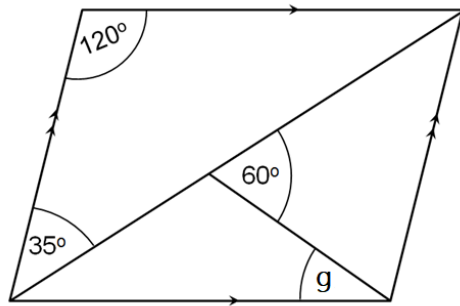
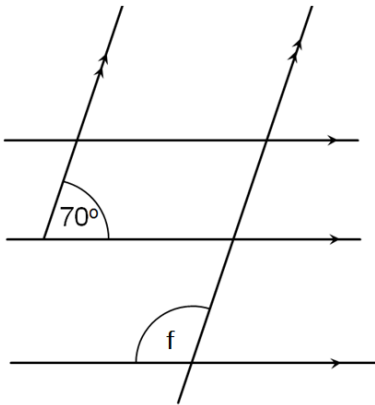
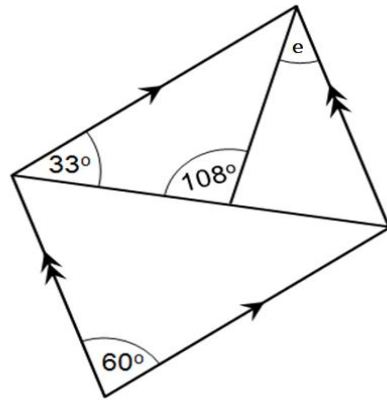
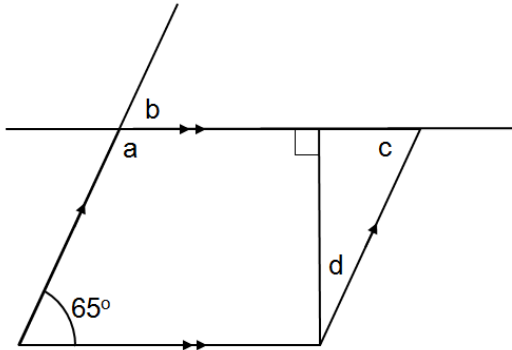


Angle **CXZ** =  
because...

# Fluency Practice

Write your answers in the grid and tick **all** the angle facts you used in each case.

Compare your grid to your partner's grid - did you use the same methods? If not, explain your methods and see if they can follow your thinking.

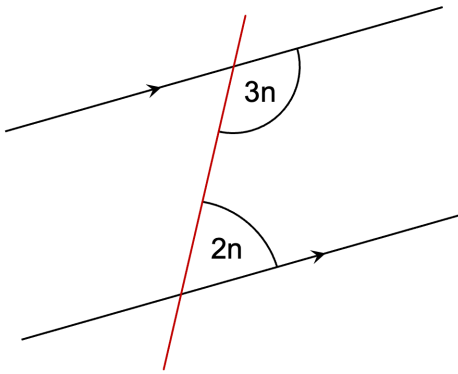


		Angle facts used							
Angle	Size	Alternate angles are equal	Corresponding angles are equal	Co-interior angles are supplementary	Vertically opposite angles are equal	Angles in a triangle sum to 180°	Adjacent angles on a straight line sum to 180°	Angles at a point sum to 360°	Opposite angles in a parallelogram are equal
a									
b									
c									
d									
e									
f									
g									

## 3.6 Angles in Parallel Lines with Equations

## Worked Example

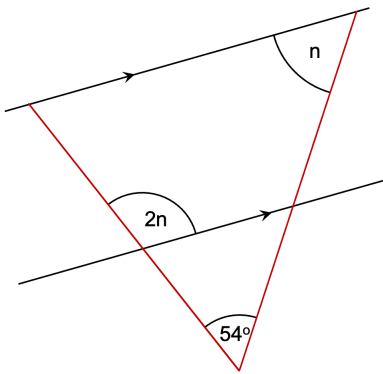
State what the angle  $n$  is, giving reasons for your answer.





# Your Turn

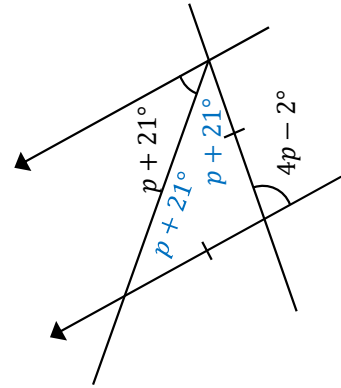
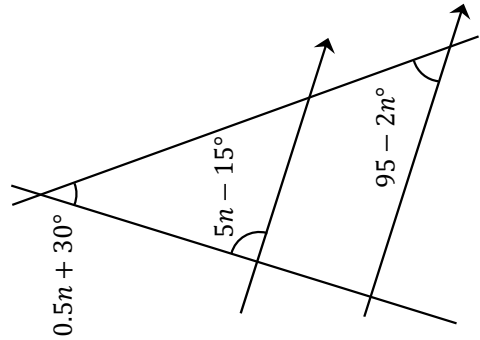
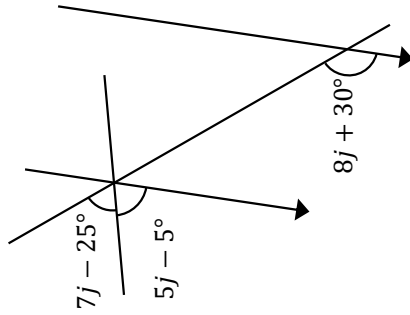
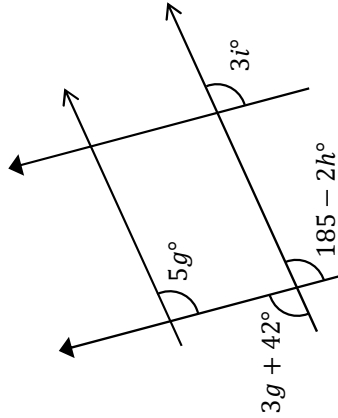
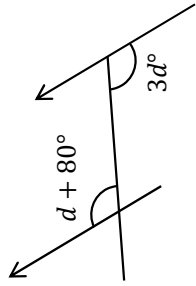
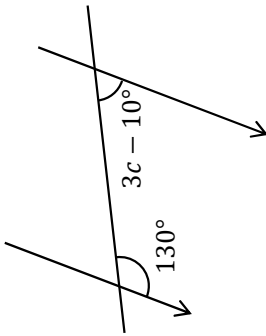
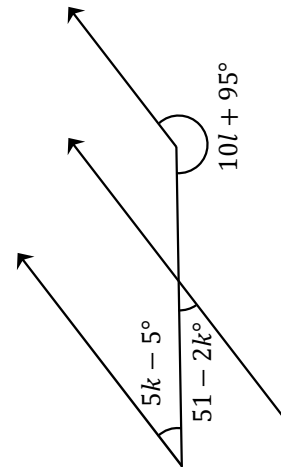
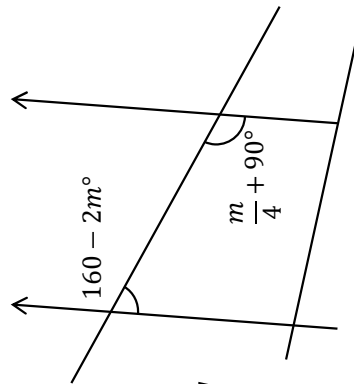
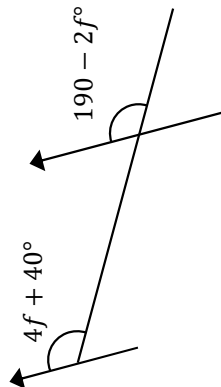
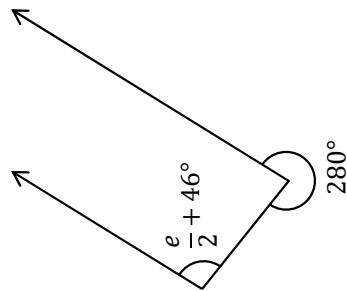
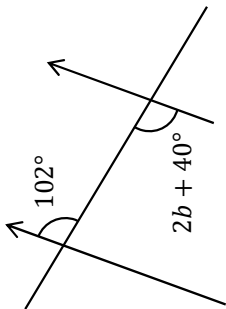
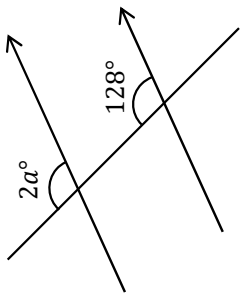
State what the angle  $n$  is, giving reasons for your answer.



# Fluency Practice

## Equations & Parallel Lines

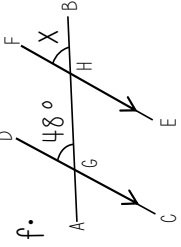
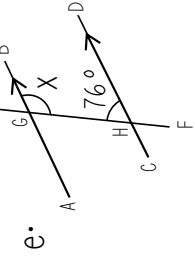
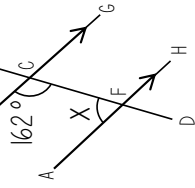
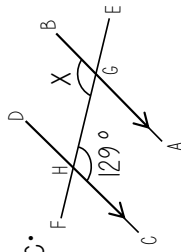
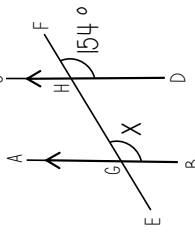
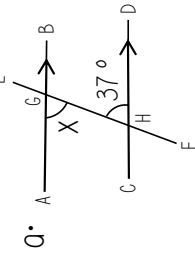
Use angle facts for parallel lines to find the value of the variables  $a$  to  $p$ .  
For each question, state **all** the angle rules you have used.



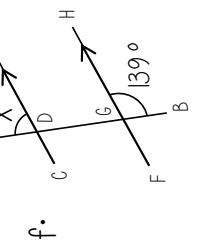
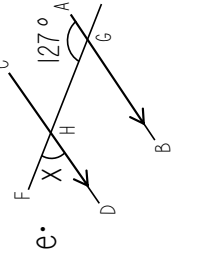
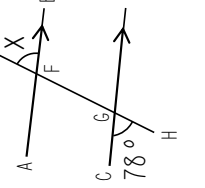
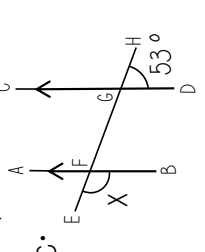
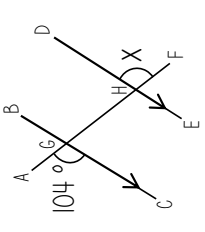
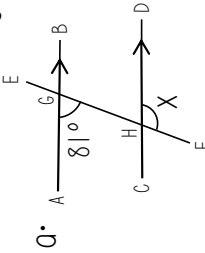
# Fluency Practice

The diagrams are not drawn accurately

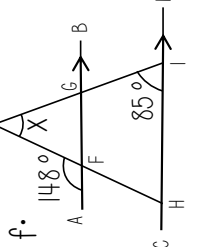
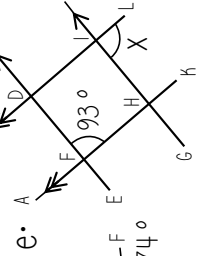
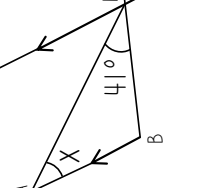
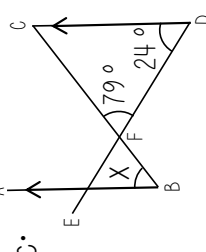
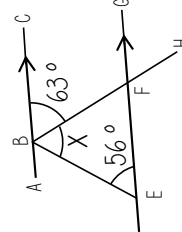
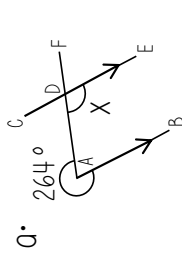
1. Find the missing angle and state what rule you used.



2. Find the missing angle and state what rules you used.



3. Find the missing angle and state what rules you used.



4. Find the value of x.

