Chapter 10: Angles

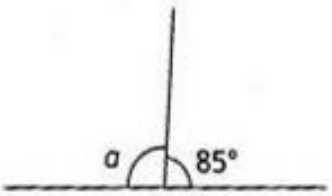
10.1

Calculators can be used only for questions with '*'.

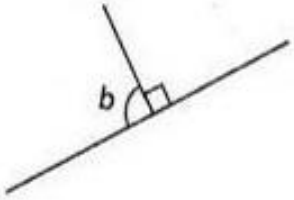
Level 1

Exercise 1

1. $\angle a =$ _____

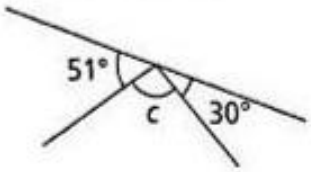


2. $\angle b =$ _____

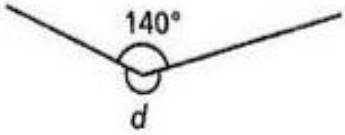


(1) 95°
(2) 90°
(3) 99°
(4) 220°
(5) 145°
(6) 52°

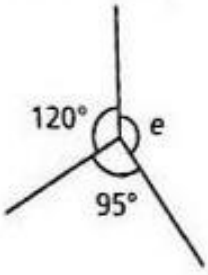
3. $\angle c =$ _____



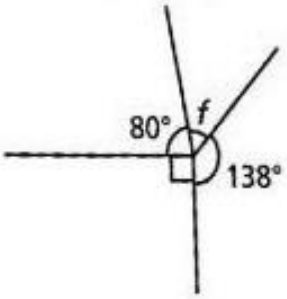
4. $\angle d =$ _____



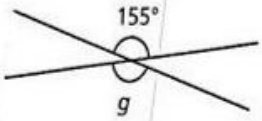
5. $\angle e =$ _____



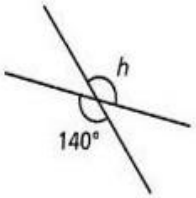
6. $\angle f =$ _____



7. $\angle g =$ _____



8. $\angle h =$ _____



(7) 155°

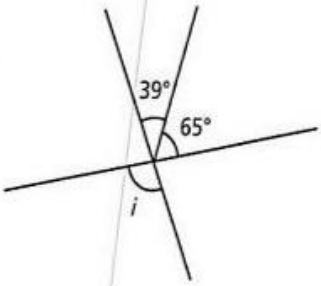
(8) 140°

(9) 104°

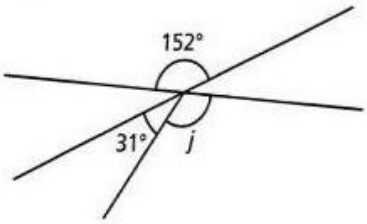
(10) 121°

Exercise 2:

9. $\angle i =$ _____



10. $\angle j =$ _____

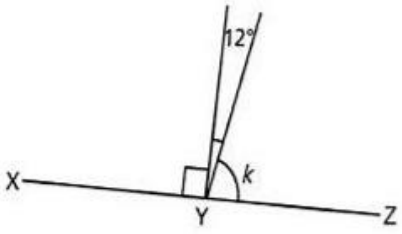


(1) 78°

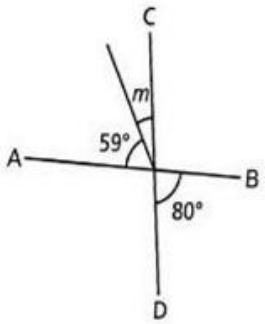
(2) 21°

Exercise 2

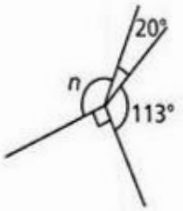
1. XYZ is a straight line. Find $\angle k$.



2. AB and CD are straight lines. Find $\angle m$.



3. Find $\angle n$.



(3) 137°

(4) 163°

(5) 15°

(6) 45°

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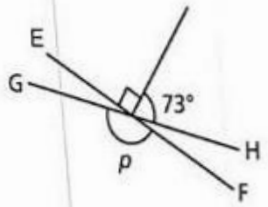
4. EF and GH are straight lines. Find $\angle p$.



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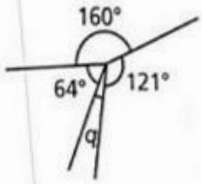
5. Find $\angle q$.



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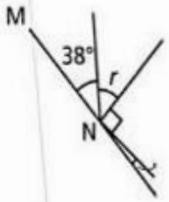
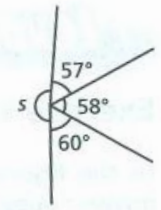
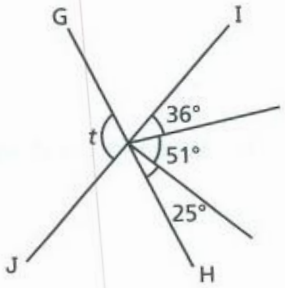
6. MNO is a straight line. Find $\angle r$.



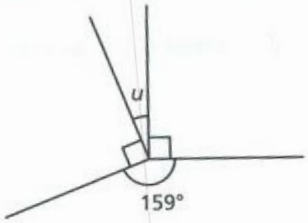
7. Find $\angle s$.



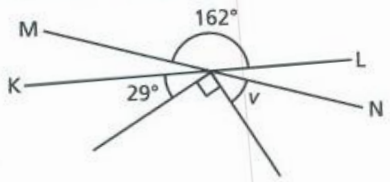
8. GH and IJ are straight lines. Find $\angle t$.



9. Find $\angle u$.



10. KL and MN are straight lines. Find $\angle v$.



(7) 185°

(8) 112°

(9) 21°

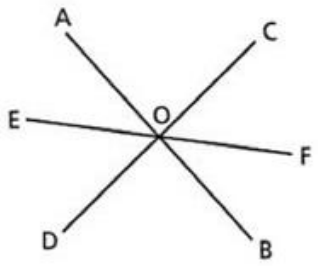
(10) 43°

Level 2

10.2

Exercise 1

In the figure below, AOB, COD and EOF are straight lines. Use the figure to answer questions 1 to 3.



1. Which angle is equal to ∠COF?

(1) < DOE (vertically opposite angles)

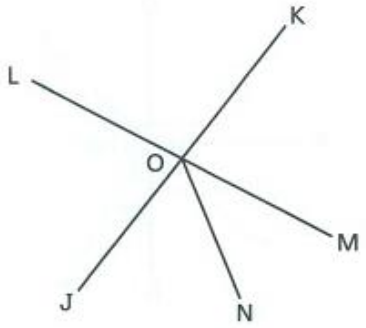
(2) 180° (< on a straight line)

(3) < AOC, <AOD, <BOC, <BOD any 2

2. What is the sum of ∠AOC, ∠COF and ∠FOB?

3. Given that AOB is perpendicular to COD, name any two right angles.

In the figure below, JOK and LOM are straight lines. Use the figure to answer questions 4 and 5.



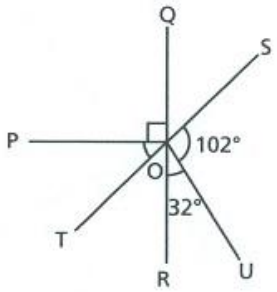
(4) 46°

(5) 80°

4. Given that ∠LOK = 100° and ∠JON = 54°, find ∠MON.

5. What is the value of ∠JOL?

In the figure below, SOT and QOR are straight lines. Use the figure to answer questions 6 to 8.



6. Find ∠SOR.

(6) 134°

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7. Name the angle which is equal to ∠SOR.

(7) <QOT (vertically opposite angles)

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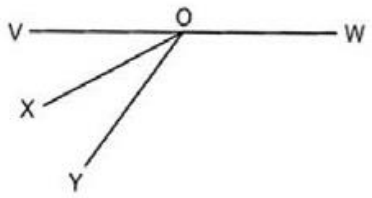
8. Hence, find ∠POT.

(8) 44°

In the figure below, VOW is a straight line. Use the figure to answer questions 9 and 10.



(9) 52°

(10) 26°

Exercise 2:

9. Given that ∠YOW = 128°, find ∠VOY.

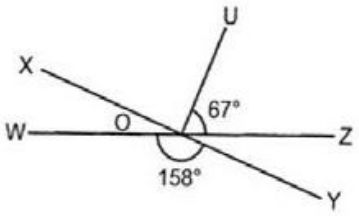
(1) 2

10. Given that ∠VOX = ∠XOY, find ∠XOY.

Exercise 2

In the figure below, XOY and WOZ are straight lines. Use the figure to answer questions 1 and 2.

1. Find ∠UOX.

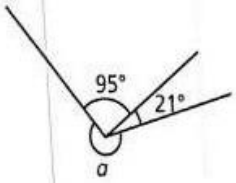


(1) 22°
(2) 91°
(3) 113°
(4) 225°

( )

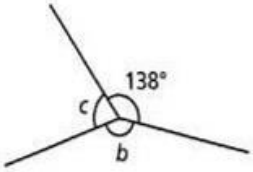
2. Find ∠UOY.
   (1) 22° (2) 69°
   (3) 89° (4) 91° ( )

3. Find ∠a.



   (1) 64° (2) 85°
   (3) 116° (4) 244° ( )

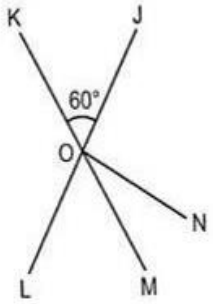
In the figure below, ∠b is twice as large as ∠c. Use the figure to answer questions 4 and 5.



4. Find the sum of ∠b and ∠c.
   (1) 42° (2) 84°
   (3) 111° (4) 222° ( )

5. Find ∠b.
   (1) 42° (2) 74°
   (3) 111° (4) 148° ( )

In the figure below, JOL and KOM are straight lines. Use the figure to answer questions 6 and 7.

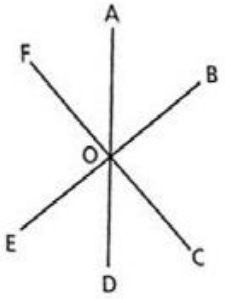


6. Given that ∠JON is thrice as large as ∠MON, find ∠MON.
   (1) 20° (2) 30°
   (3) 40° (4) 60° ( )

(2) 3
(3) 4
(4) 4
(5) 4
(6) 2

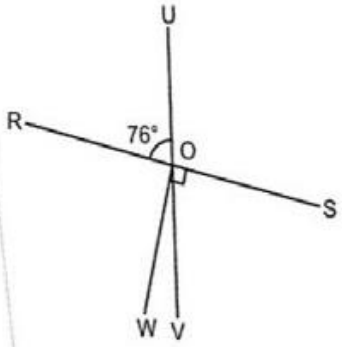
7. What is the ratio of ∠JOK : ∠JON : ∠MON?
(1) 2 : 3 : 1 (2) 2 : 3 : 2
(3) 2 : 4 : 3 (4) 1 : 3 : 2 ( )

8. In the figure below, all the three lines are straight lines. Which of the following two angles when added to ∠DOE will give a sum of 180°?



(1) ∠AOB and ∠BOC (2) ∠BOC and ∠COD
(3) ∠EOF and ∠AOB (4) ∠COD and ∠AOF ( )

In the figure below, ROS and UOV are straight lines. Use the figure to answer questions 9 and 10.



9. Which of the following angles is also a right angle?
(1) ∠SOU (2) ∠UOW
(3) ∠SOV (4) ∠ROW ( )

10. Find ∠VOW.
(1) 14° (2) 24°
(3) 90° (4) 104° ( )

(7) 1
(8) 2
(9) 4
(10) 1

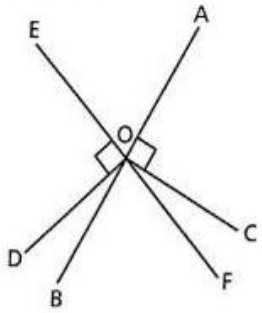
Level 3

10.3

Exercise 1

In the figure below, AOB and EOF are straight lines. ∠AOC and ∠DOE are right angles. ∠AOE = 71°.

Use the figure to answer questions 1 to 3.



1. Find ∠BOD.

(1) 19°

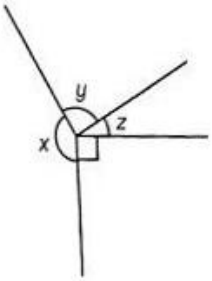
(2) 71°

(3) 109°

2. Find ∠BOF.

3. Hence, find ∠COD.

In the figure below, the ratio of $\angle x$ to $\angle y$ to $\angle z$ is 5 : 3 : 1.
Use the figure to answer questions 4 to 6.



(4) 270°

(5) 30°

(6) 240°

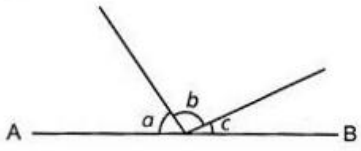
4. Find the sum of $\angle x$, $\angle y$ and $\angle z$.

5. Hence, find $\angle z$.

6. Find the sum of $\angle x$ and $\angle y$.

In the figure below, AB is a straight line.
$\angle a$ is 45° smaller than $\angle b$. $\angle a$ is 30° greater than $\angle c$.

Use the figure to answer questions 7 to 10.



7. Find $\angle c$.

8. Hence, find $\angle b$.

9. What is the ratio of $\angle a$ to $\angle b$ to $\angle c$?

10. Express $\angle a$ as a fraction of 180°.

(7) 25°

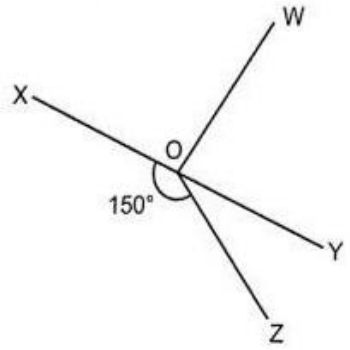
(8) 100°

(9) 55°
11 : 20 : 5

(10) $\frac{11}{36}$

Exercise 2

In the figure below, XOY is a straight line and the ratio of ∠YOZ to ∠WOX is 3 : 10. Use the figure to answer questions 1 to 5.



(1) 50°

(2) 128°

(3) 122°

1. What is the value of ∠YOZ?

2. What is the value of ∠WOX?

3. Hence, find ∠WOY.

4. What is the ratio of ∠WOX to ∠XOZ?

(4) 120°

(5) 35°

(6) 34°

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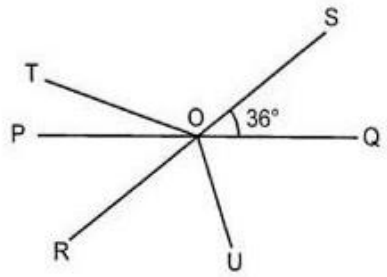
5. Express ∠WOY as a fraction of 360°.

In the figure below, POQ and ROS are straight lines.
∠POT is $\frac{1}{4}$ of ∠ROU and ∠ROU = ∠QOU.

Use the figure to answer questions 6 to 10.



6. Find ∠POS.

7. Find ∠POT.

(7) 61°

(8) 44°

(9) 18°

(10) 36°

8. What is the ratio of ∠POT to ∠POS?

9. (a) Express ∠POT as a percentage of 180°.

(b) Express ∠POS as a fraction of 360°.

10. Write down the ratio of ∠POT to ∠ROU to ∠QOS.