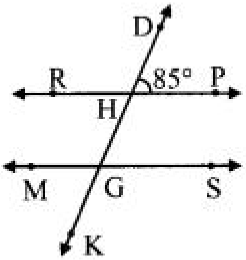
AllGuideSite :
Digvijay
Arjun

Practice Set 2.1 Geometry 9th Std Maths Part 2 Answers Chapter 2 Parallel Lines

Question :
In the given figure, line RP || line MS and line DK is their transversal. ∠DHP = 85°. Find the measures of following angles.



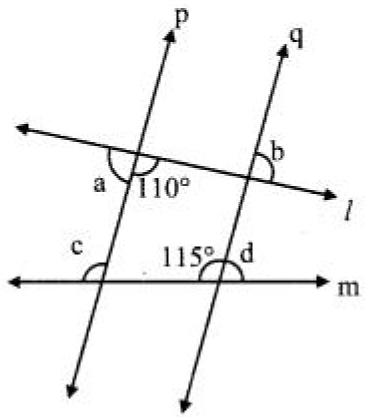
i. ∠RHD
ii. ∠PHG
iii. ∠HGS
iv. ∠MGK
Solution:
i. ∠DHP = 85° .....(i)
∠DHP + ∠RHD = 180° [Angles in a linear pair]
85° + ∠RHD = 180°
∴ ∠RHD = 180°- 85°
∴ ∠RHD = 95° .....(ii)

ii. ∠PHG = ∠RHD [Vertically opposite angles]
∴ ∠PHG = 95° [From (ii)]

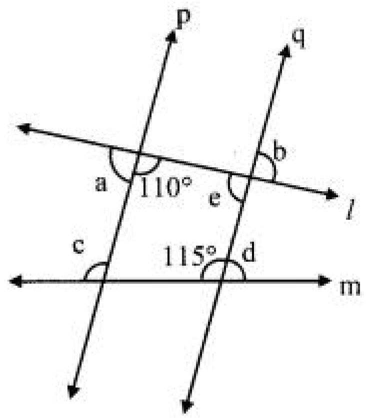
iii. line RP || line MS and line DK is their transversal. [Corresponding angles]
∴ ∠HGS = ∠DHP .....(iii) [From (i)]

iv. ∠HGS = 85° [Vertically opposite angles]
∴ ∠MGK = ∠HGS ∠MGK = 85° [From (iii)]

Question 2.
In the given figure line p line q and line l and line m are tranversals.
Measures of some angles are shown. Hence find the measures of ∠a, ∠b, ∠c, ∠d.



Solution:



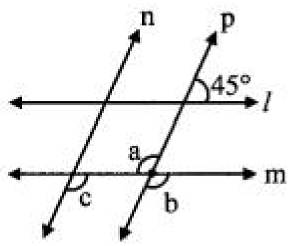
i. 110 + ∠a = 180° [Angles in a linear pair]
∴ ∠a = 180° – 110°
∴ ∠a = 70°

ii. consider ∠e as shown in the figure line p || line q, and line lis their transversal.
∠e + 110° = 180° [Interior angles]
∴ ∠e = 180° – 110°
∴ ∠e = 70°
But, ∠b = ∠e [Vertically opposite angles]
∴ ∠b = 70°

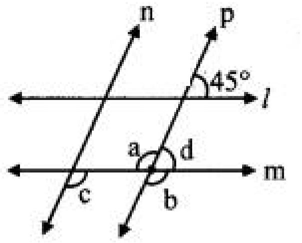
iii. line p || line q, and line m is their transversal.
∴ ∠c = 115° [Corresponding angles]

iv. 115° + ∠d = 180° [Angles in a linear pair]
∴ ∠d = 180° – 115°
∴ ∠d = 65°

Question 3.
In the given figure, line 11| line m and line n || line p. Find ∠a, ∠b, ∠c from the given measure of an angle.



Solution:

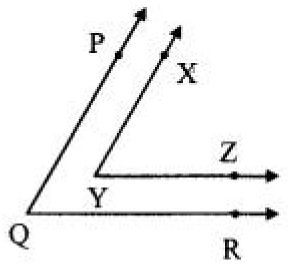


i. consider ∠d as shown in the figure
line l || line m, and line p is their transversal.
∴ ∠d = 45° [Corresponding angles]
Now, ∠d + ∠b = 180° [Angles in a linear pair]
∴ 45° +∠b = 180°
∴ ∠b = 180° – 45°
∴ ∠b = 135° .....(i)

ii. ∠a = ∠b [Vertically opposite angles]
∴ ∠a = 135° [From (i)]

iii. line n || line p, and line m is their transversal.
∴ ∠c = ∠b [Corresponding angles]
∴ ∠c = 135° [From (i)]

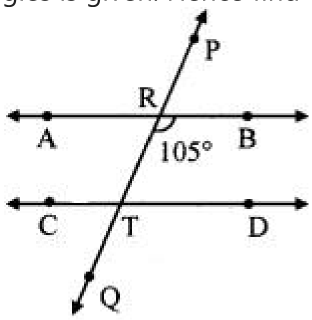
Question 4.
In the given figure, sides of ∠PQR and ∠XYZ are parallel to each other. Prove that, ∠PQR ≅ ∠XYZ.



Given: Ray YZ || ray QRandray YX || ray QP
To prove: ∠PQR ≅ ∠XYZ
Construction: Extend ray YZ in the opposite direction. It intersects ray QP at point S.
Solution:
Proof:

Ray YX || ray QP [Given]
Ray YX || ray SP and seg SY is their transversal [P-S-Q]
∴ ∠XYZ ≅ ∠PSY ......(i) [Corresponding angles]
ray YZ || ray QR [Given]
ray SZ || ray QR and seg PQ is their transversal. [S-Y-Z]
∴ ∠PSY ≅ ∠SQR [Corresponding angles]
∴ ∠PSY ≅ ∠PQR .... (ii) [P-S-Q]
∴ ∠PQR ≅ ∠XYZ [From (i) and (ii)]

Question 5.
In the given figure, line AB || line CD and line PQ is transversal. Measure of one of the angles is given. Hence find the measures of the following angles.



i. ∠ART
ii. ∠CTQ
iii. ∠DTQ
iv. ∠PRB
Solution:
i. ∠BRT = 105° ....(i)
∠ART + ∠BRT = 180° [Angles in a linear pair]
∴ ∠ART + 105° = 180°
∴ ∠ART = 180° – 105°
∴ ∠ART = 75° ...(ii)

ii. line AB || line CD and line PQ is their transversal.
∴ ∠CTQ = ∠ART [Corresponding angles]
∴ ∠CTQ = 75° [From (ii)]

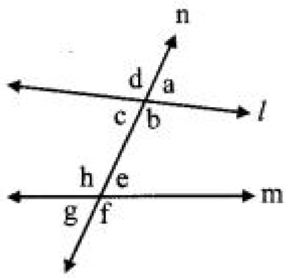
iii. line AB || line CD and line PQ is their transversal.
∴ ∠DTQ = ∠BRT [Corresponding angles]
∴ ∠DTQ = 105° [From (i)]

iv. ∠PRB = ∠ART [Vertically opposite angles]
∴ ∠PRB = 75° [From (ii)]

Maharashtra Board Class 9 Maths Chapter 2 Parallel Lines Practice Set 2.1 Intext Questions and Activities

AllGuideSite :
Digvijay
Arjun

Question 1.
Angles formed by two lines and their transversal. (Textbook pg, no. 13)
When a transversal (line n) intersects two lines (line l and m) in two distinct points, 8 angles are formed as shown in the figure. Pairs of angles formed out of these angles are as follows:



Pairs of corresponding angles
i. ∠d, ∠h
ii. ∠a, ∠e
iii. ∠c, ∠g
iv. ∠b, ∠f

Pairs of alternate interior angles
i. ∠c, ∠e
ii. ∠b, ∠h

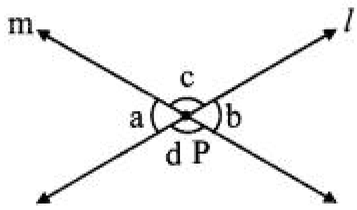
Pairs of alternate exterior angles
i. ∠d, ∠f
ii. ∠a, ∠g

Pairs of interior angles on the same side of the transversal
i. ∠c, ∠h
ii. ∠b, ∠e

Some important properties:
1. When two lines intersect, the pairs of vertically opposite angles formed are congruent.
Example:
In the given diagram,
line l and m intersect at point P.
The pairs of vertically opposite angles that are congruent are:
i. ∠a ≅ ∠b
ii. ∠c ≅ ∠d

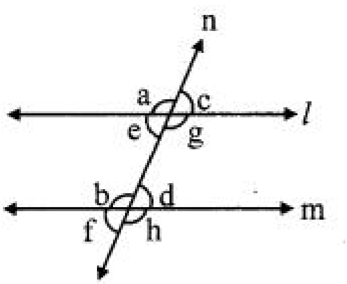
2. The angles in a linear pair are supplementary.
Example:
For the given diagram,
∠a and ∠c are in linear pair
∴ ∠a + ∠c = 180°

Also, ∠d and ∠b are in linear pair
∴ ∠d + ∠b = 180°



3. When one pair of corresponding angles is congruent, then all the remaining pairs of corresponding angles are congruent.
Example:
In the given diagram,
If ∠a ≅ ∠b
then ∠e ≅ ∠f, ∠c ≅ ∠d and ∠g ≅ ∠h

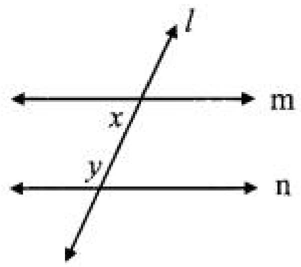
4. When one pair of alternate angles is congruent, then all the remaining pairs of alternate angles are congruent.
Example:
For the given diagram,
If ∠e ≅ ∠d, then ∠g ≅ ∠b
Also, ∠a ≅ ∠h and ∠c ≅ ∠f



5. When one pair of interior angles on one side of the transversal is supplementary, then the other pair of interior angles is also supplementary.
Example:
For the given diagram,
If ∠e + ∠b = 180°, then ∠g + ∠d = 180°.

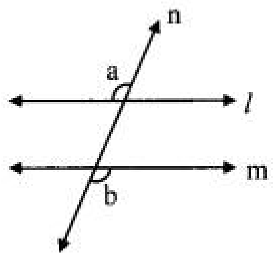
Practice Set 2.2 Geometry 9th Std Maths Part 2 Answers Chapter 2 Parallel Lines

Question 1.
In the given figure, y = 108° and x = 71°. Are the lines m and n parallel? Justify?

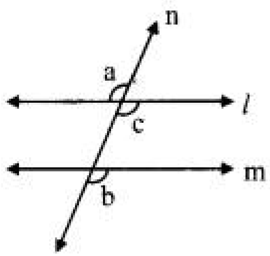


Solution:
y = 108°, x = 71° …[Given]
x + y = 71° + 108°
= 179°
∴ x + y = 180°
∴ The angles x andy are not supplementary.
∴ The angles do not satisfy the interior angles test for parallel lines
∴ line m and line n are not parallel lines.

Question 2.
In the given figure, if ∠a = ∠b then prove that line l || line m.

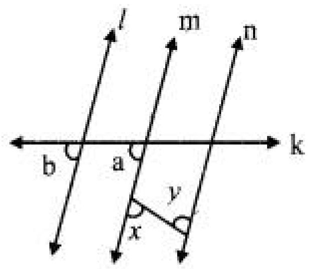


Given: ∠a ≅ ∠b
To prove: line l|| line m
Solution:
Proof:

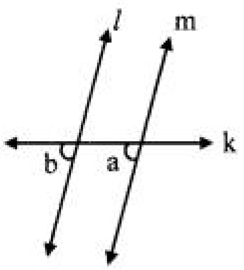


consider ∠c as shown in the figure ∠a ≅ ∠c …….. (i) [Vertically opposite angles]
But, ∠a ≅ ∠b I (ii) [Given]
∴ ∠b ≅ ∠c [From (i) and (ii)]
But, ∠b and ∠c are corresponding angles on lines l and m when line n is the transversal.
∴ line l || line m. [Corresponding angles test]

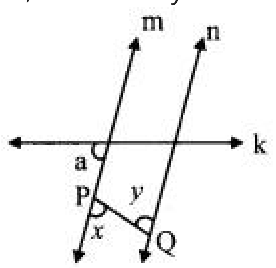
Question 3.
In the given figure, if ∠a ≅ ∠b and ∠x ≅ ∠y, then prove that line l | line n.



Given: ∠a ≅ ∠b and ∠x ≅ ∠y
To prove: line l | line n
Solution:
Proof:

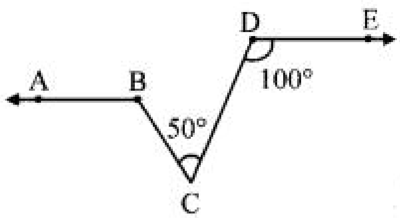


∠a = ∠b [Given]
But, ∠a and ∠b are corresponding angles on lines l and m when line k is the transversal.
∴ line l || line m ….(i) [Corresponding angles test]
∠x ≅ ∠y [Given]
But, ∠x and ∠y are alternate angles on lines m and n when seg PQ is the transversal,



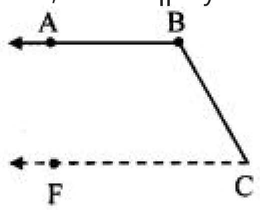
∴ line m || line n ……(ii) [Alternate angles test]
∴ From (i) and (ii),
line l || line m || line n
i.e., line l || line n

Question 4.
In the given figure, if ray BA || ray DE, ∠C = 50° and ∠D = 100°. Find the measure of ∠ABC.
(Hint: Draw a line passing through point C and parallel to line AB.)



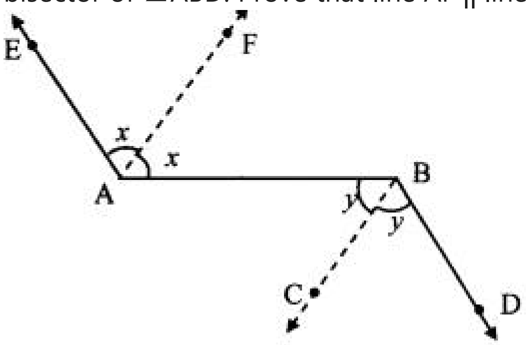
Solution:
Draw a line FG passing through point

C and parallel to line AB
line FG || ray BA …….(i) [Construction]
Ray BA || ray DE ….(ii) [Given]
line FG || ray BA || ray DE …(iii) [From (i) and (ii)]
line FG||rayDE [From (iii)]
and seg DC is their transvensal
∴ ∠ DCF = ∠ EDC [Alternate angles]
∴ ∠ DCF = 100° [∵ ∠D = 100°]
Now, ∠ DCF = ∠ BCF + ∠ BCD [Angle addition property]
∴ 100° = ∠BCF + 50°
∴ 100° – 50° = ∠BCF
∴ ∠BCF = 50° ….(iv)
Now, line FG || ray BA and seg BC is their transversal.



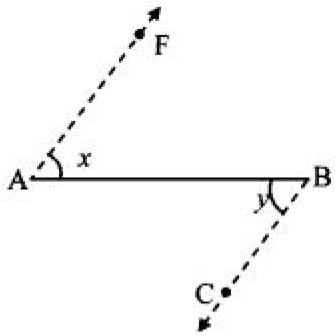
∴ ∠ABC + ∠BCF = 180° [Interior angles]
∴ ∠ABC + 50° = 180° [From (iv)]
∴ ∠ABC = 180°- 50°
∴ ∠ABC = 130°

Question 5.
In the given figure, ray AE || ray BD, ray AF is the bisector of ∠EAB and ray BC is the bisector of ∠ABD. Prove that line AF || line BC.



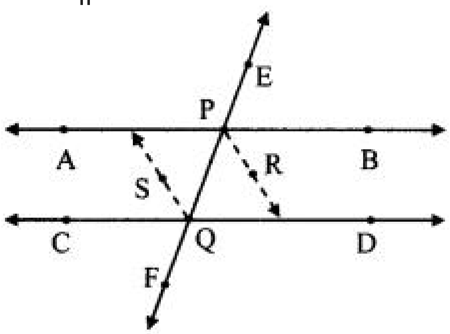
Given: Ray AE || ray BD, and
ray AF and ray BC are the bisectors of ∠EAB and ∠ABD respectively.
To prove: line AF || line BC
Solution:
Proof:
Ray AE || ray BD and seg AB is their transversal.
∴ ∠EAB = ∠ABD ….(i) [Alternate angles]
∠FAB = 12∠EAB [Ray AF bisects ∠EAB]
∴ 2∠FAB = ∠EAB …..(ii)
∠CBA = 12∠ABD [Ray BC bisects ∠ABD]
∴ 2∠CBA = ∠ABD …(iii)

∴ 2∠FAB = 2∠CBA [From (i), (ii) and (iii)]
∴ ∠FAB = ∠CBA
But, ∠FAB and ∠ABC are alternate angles on lines AF and BC when seg AB is the transversal.

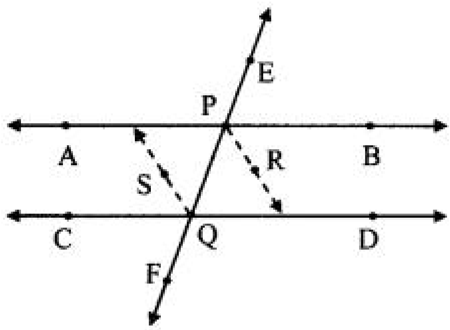


∴ line AF || line BC [Alternate angles test]

Question 6.
A transversal EF of line AB and line CD intersects the lines at points P and Q respectively. Ray PR and ray QS are parallel and bisectors of ∠BPQ and ∠PQC respectively. Prove that line AB || line CD.



Given: Ray PR || ray QS
Ray PR and ray QS are the bisectors of ∠BPQ and ∠PQC respectively.
To prove: line AB || line CD
Solution:

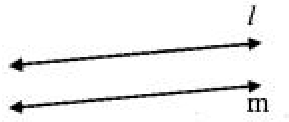


Proof:
Ray PR || ray QS and seg PQ is their transversal.
∠RPQ = ∠SQP ….(i) [Alternate angles]
∠RPQ = 12∠BPQ …. (ii) [Ray PR bisects ∠BPQ]
∠SQP = 12∠PQC [Ray QS bisects ∠PQC]
∴ 12∠BPQ = 12∠PQC

∴ ∠BPQ = ∠PQC
But, ∠BPQ and ∠PQC are alternate angles on lines AB and CD when line EF is the transversal.
∴ line AB || line CD [Alternate angles test]

Maharashtra Board Class 9 Maths Chapter 2 Parallel Lines Practice Set 2.2 Intext Questions and Activities

Question 1.
In the given figure, how will you decide whether line ¡ and line m are parallel or not? (Textbook pg. no. 19)



Answer:
In the figure, we observe that line l and line m are coplanar and do not intersect each other.
∴ Line l and line m are parallel lines.

Problem Set 2 Geometry 9th Std Maths Part 2 Answers Chapter 2 Parallel Lines

Question 1.
Select the correct alternative and fill in the blanks in the following statements.

i. If a transversal intersects two parallel lines then the sum of interior angles on the same side of the transversal is ____.
(A) 0°
(B) 90°
(C) 180°
(D) 360°
Answer:
(C) 180°

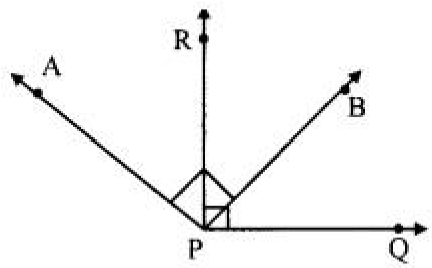
ii. The number of angles formed by a transversal of two lines is _____.
(A) 2
(B) 4
(C) 8
(D) 16
Answer:
(C) 8

iii. A transversal intersects two parallel lines. If the measure of one of the angles is 40°, then the measure of its corresponding angle is ______.
(A) 40°
(B) 140°
(C) 50°
(D) 180°
Answer:
(A) 40°

iv. In ΔABC, ∠A = 76°, ∠B = 48°, then ∠C = _____.
(A) 66°
(B) 56°
(C) 124°
(D) 28°
Answer:
In ΔABC, ∠A + ∠B + ∠C = 180°
∴ ∠C = 180° – 76° – 48° = 56°
(B) 56°

v. Two parallel lines are intersected by a transversal. If measure of one of the alternate interior angles is 75° then the measure of the other angle is _____.
(A) 105°
(B) 15°
(C) 75°
(D) 45°
Answer:
(C) 75°

Question 2.
Ray PQ and ray PR are perpendicular to each other. Points B and A are in the interior and exterior of ∠QPR respectively. Ray PB and ray PA are perpendicular to each other.
Draw a figure showing all these rays and write –
i. A pair of complementary angles
ii. A pair of supplementary angles
iii. A pair of congruent angles.
Solution:



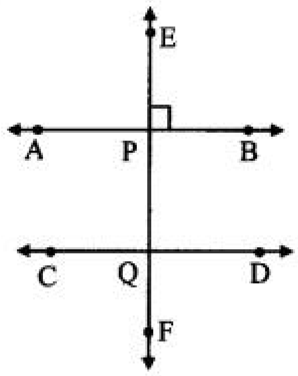
i. Complementary angles:
∠RPQ = 90° [Ray PQ ⊥ ray PR]
∴ ∠RPB + ∠BPQ = 90° [Angle addition property]

∠RPB and ∠BPQ are pair of complementary angles
∠APB = 90° [Ray PA ⊥ ray PB]
∴ ∠APR + ∠RPB = 90°
∠APR and ∠RPB are pair of complementary angles.

ii. Supplementary angles:
∠APB + ∠RPQ = 90° + 90° = 180°
∴ ∠APB and ∠RPQ are a pair of supplementary angles.

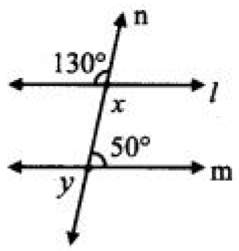
iii. Congruent angles:
a. ∠APB = ∠RPQ [Each is of 90°]
b. ∠APB = ∠RPQ
∴ ∠APR + ∠RPB = ∠RPB + ∠BPQ [Angle addition property]
∴ ∠APR = ∠BPQ
∴ ∠APR ≅ ∠BPQ

Question 3.
Prove that, if a line is perpendicular to one of the two parallel lines, then it is perpendicular to the other line also.

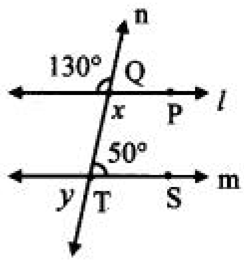


Given: line AB || line CD and line EF intersects them at P and Q respectively.
line EF ⊥ line AB
To prove: line EF ⊥ line CD
Solution:
Proof:
line EF ⊥ line AB [Given]
∴ ∠APR = 90° ….(i)
line AB || line CD and line EF is their transversal.
∴ ∠EPB ≅ ∠PQD …..(ii) [Corresponding angles]
∴ ∠PQD = 90° [From (i) and (ii)]
∴ line EF ⊥ line CD

Question 4.
In the given figure, measures of some angles are shown. Using the measures find the measures of ∠x and ∠y and hence show that line l || line m.

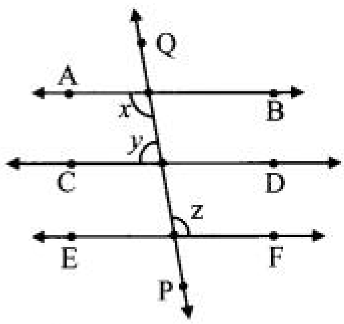


Solution:
Proof:
∠x = 130°
∠y = 50° [Vertically opposite angles]
Here, m∠PQT + m∠QTS = 130° + 50° = 180°
But, ∠ PQT and ∠ QTS are a pair of interior angles on lines l and m when line n is the transversal,



∴ line l || line m [Interior angles test]

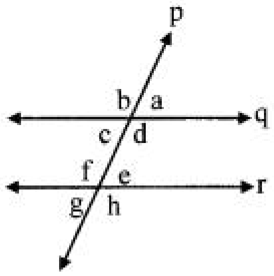
Question 5.
In the given figure, Line AB || line CD || line EF and line QP is their transversal. If y : z = 3 : 7 then find the measure of ∠x.



Solution:
y : z = 3 : 7 [Given]
Let the common multiple be m
∴ ∠j = 3m and ∠z = 7m ….(i)
line AB || line EF and line PQ is their transversal [Given]
∠x = ∠z
∴ ∠x = 7m …..(ii) [From (i)]
line AB || line CD and line PQ is their transversal [Given]
∠x + ∠y = 180°
∴ 7m + 3m = 180°
∴ 10m = 180°
∴ m = 18°

∴ ∠x = 7m = 7(18°) [From (ii)]
∴ ∠x = 126°

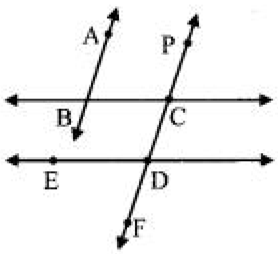
Question 6.
In the given figure, if line q || line r, line p is their transversal and if a = 80°, find the values of f and g.



Solution:
i. ∠a = 80° [Given]
∠g = ∠a [Alternate exterior angles]
∴ ∠g = 80° .....(i)

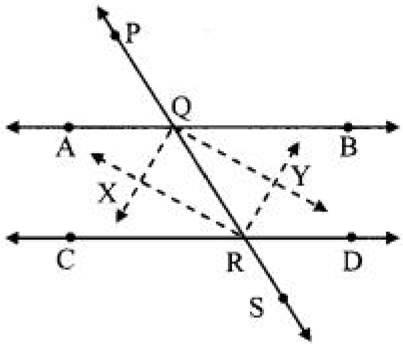
ii. Now, line q || line r and line p is their transversal.
∴ ∠f + ∠g = 180°
∴ ∠f + 80° = 180° [Interior angles]
∴ ∠f = 180° – 80° [From (i)]
∴ ∠f=100°

Question 7.
In the given figure, if line AB || line CF and line BC || line ED then prove that ∠ABC = ∠FDE.



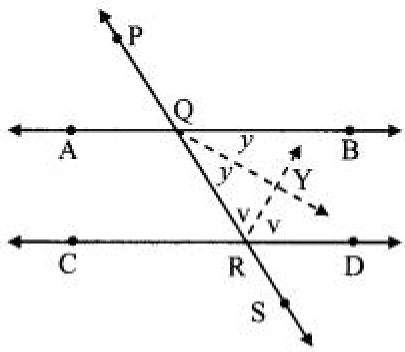
Given: line AB || line CF and line BC || line ED
To prove: ∠ABC = ∠FDE
Solution:
Proof:
line AB || line PF and line BC is their transversal.
∴ ∠ABC = ∠BCD ....(i) [Alternate angles]
line BC || line ED and line CD is their transversal.
∴ ∠BCD = ∠FDE ....(ii) [Corresponding angles]
∴ ∠ABC = ∠FDE [From (i) and (ii)]

Question 8.
In the given figure, line PS is a transversal of parallel line AB and line CD. If Ray QX, ray QY, ray RX, ray RY are angle bisectors, then prove that □ QXRY is a rectangle.



Given: line AB || line CD
Rays QX, RX, QY, RY are the bisectors of ∠AQR, ∠QRC, ∠BQR and ∠QRD respectively.
To prove: □QXRY is a rectangle.
Proof:
∠XQA = ∠XQR = x° ......(i) [Ray QX bisects ∠AQR]
∠YQR = ∠YQB =y° ....(ii) [Ray QY bisects ∠BQR]
∠XRQ = ∠XRC = u° .... (iii) [Ray RX bisects ∠CRQ]
∠YRQ = ∠YRD = v° ......(iv) [Ray RY bisects ∠DRQ]
line AB || line CD and line PS is their transversal.

∠AQR+ ∠CRQ= 180° [Interior angles]
(∠XQA + ∠XQR) + (∠XRQ + ∠XRC) = 180° [Angle addition property]
∴ (x + x) + (u + u) = 180° [From (i) and (ii)]
∴ 2x + 2u = 180°
∴ 2(x + u) = 180°
∴ x + u = 90° ....(v)
In ΔXQR
∠XQR + ∠XRQ + ∠QXR = 180° [Sum of the measures of the angles of triangle is 180°]
∴ x + u + ∠QXR = 180° [From (i) and (iii)]
∴ 90 + ∠QXR = 180° [From (v)]
∴ ∠QXR = 180°- 90°
∴ ∠QXR = 90° .....(vi)
Similarily we can prove that,



∴ y + v = 90°
Hence ∠QYR = 90° ……(vii)
Now, ∠AQR + ∠BQR = 180° [Angles is linear pair]
(∠XQA + ∠XQR) + (∠YQR + ∠YQB) = 180° [Angle addition property]
∴ (x + x) + (y + y) = 180° [From (i) and (ii)]
∴ 2x + 2y = 180°
∴ 2(x+y) = 180°
∴ x +y = 90°
i.e. ∠XQR + ∠YQR = 90° [From (i) and (ii)]
∴ ∠XQY = 90° ….(viii) [Angle addition property]
Similarly we can prove that,
∠XRY = 90° …(ix)
In □QXRY
∠QXR = ∠QYR = ∠XQY = ∠XRY = 90° [From (vi), (vii), (viii) and (ix)]
∴□ QXRY is a rectangle.

Maharashtra Board Class 9 Maths Chapter 2 Parallel Lines Problem Set 2 Intext Questions and Activities

Question 1.
To verify the properties of angles formed by a transversal of two parallel lines. (Textbook pg. no. 14)
Take a piece of thick coloured paper. Draw a pair of parallel lines and a transversal on it. Paste straight sticks on the lines. Eight angles will be formed. Cut pieces of coloured paper, as shown in the figure, which will just fit at the comers of ∠1 and ∠2. Place the pieces near different pairs of corresponding angles, alternate angles and interior angles and verify their properties.