



MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

LINES AND ANGLES

Others

1. The measure of an angle is twice the measure of its supplementary angle. Find its measure.

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2. In Figure, if $x + y = w + z$, then prove that AOB is a line

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3. In Fig. 6.11, OP , OQ , OR and OS are four rays. Prove that $\angle POQ + \angle QOR + \angle SOR + \angle POS = 360^\circ$

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4. Two supplementary angles are in the ratio 2:3. Find the angles.

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5. An angle is equal to one-third of its supplement. Find the measure.

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6. Two supplementary angles differ by 34° . Find the angles.

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7. In Fig. 6.10, ray OS stands on a line POQ. Ray OR and ray OT are angle bisectors of $\angle POS$ and $\angle SOQ$, respectively. If $\angle POS = x$, find $\angle ROT$.

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8. If the angles $(2x - 10)^\circ$ and $(x - 5)^\circ$ are complementary angles, find x .

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9. Two supplementary angles are in the ratio 4:5 . Find the angles.

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10. If an angle is 28° less than its complement, find its measure.

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11. The supplement of an angle is one-third of itself.
Determine the angle and its supplement.

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12. Lines PQ and RS intersect each other at point O . If $\angle POR : \angle ROQ = 5 : 7$, find all the angles.

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13. An angle is 14° more than its complementary angle.
What is its measure?

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14. If an angle differs from its supplement by 10° , find the angle.

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15. In Fig. 6.17, POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$.

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16. Find the angle which is equal to its complement

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17. Find the measure of an angle which forms a pair of supplementary angles with itself.

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18. Two supplementary angles differ by 34° . Find the angles.

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19. An angle is equal to five times its complement. Determine its measure.

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20. An angle is equal to one-third of its supplement. Find its measure.

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21. Two supplementary angles are in the ratio 2:3. Find the angles.

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22. The supplement of an angle is one-third of itself. Determine the angle and its supplement.

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23. Write the complement of each of the following angles: (i)

20° (ii) 35° (iii) 90° (iv) 77° (v) 30°

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24. Write the supplement of each of the following angles: (i)

54° (ii) 132° (iii) 138°

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25. If an angle is 28° less than its complement, find its measure.

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26. If an angle is 30° more than one half of its complement, find the measure of the angle.

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27. Two supplementary angles are in the ratio $4:5$. Find the angles.

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28. Two supplementary angles differ by 48° . Find the angles.

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29. An angle is equal to 8 times its complement. Determine its measure.

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30. If the angles $(2x - 10)^\circ$ and $(x - 5)^\circ$ are complementary angles, find x .

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31. If the complement of an angle is equal to the supplement of the thrice of it. Find the measure of the angle.

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32. If an angle differs from its complement by 10° , find the angle.

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33. If the supplement of an angle is three times its complement, find the angle.

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34. If the supplement of an angle is two-third of itself. Determine the angle and its supplement.

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35. An angle is 14° more than its complementary angle.

What is its measure?

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36. The measure of an angle is twice the measure of its supplementary angle. Find its measure.

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37. In Figure OA and OB are opposite rays: (i) if $x = 75$, what is the value of y ? (ii) If $y = 110$, what is the value of x ?

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38. In Fig. $\angle AOC$ and $\angle BOC$ form a linear pair. Determine the value of x

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39. In Fig. $\angle POR$ and $\angle QOR$ form a linear pair. If $a - b = 80$, find the values of a and b

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40. In Fig, OA, OB are opposite rays and $\angle AOC + \angle BOD = 90^\circ$, Find $\angle COD$.

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41. In Figure, OP bisects $\angle BOC$ and OQ bisects $\angle AOC$.

Show that $\angle POQ = 90^\circ$

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42. In Figure, ray OE bisects $\angle AOB$ and OF is a ray opposite to OE . Show that $\angle FOB = \angle FOA$

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43. In Figure, lines XY and MN intersect at O . If $\angle POY = 90^\circ$ and $a : b = 2 : 3$, find c

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44. In Figure, $\angle PQR = \angle PRQ$, then prove that $\angle PQS = \angle PRT$.

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45. If ray OC stands on line AB such that $\angle AOC = \angle COB$, then show that $\angle AOC = 90^\circ$

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46. In Figure, if $x + y = w + z$, then prove that AOB is a line.

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47. It is given that $\angle XYZ = 64^\circ$ and XY is produced to point P . Draw a figure from the given information. If ray YQ bisects $\angle ZYP$, find $\angle XYQ$ and *reflex* $\angle QYP$.

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48. In figure, OA and OB are opposite rays:

(i) If $x = 25^\circ$, what is the value of y ?

(ii) If $y = 35^\circ$, what is the value of x ?

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49. In Figure, write all pairs of adjacent angles and all the linear pairs.

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50. In Figure, find x . Further find $\angle BOC$, $\angle COD$ and $\angle AOD$.

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51. In Figure, rays OA , OB , OC , OD and OE have the common end point O . Show that $\angle AOB + \angle BOC + \angle COD + \angle DOE + \angle EOA = 360^\circ$

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52. In Figure, $\angle AOC$ and $\angle BOC$ form a linear pair. If $a - 2b = 30^\circ$, find a and b .



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53. How many pairs of adjacent angles are formed when two lines intersect at a point?

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54. How many pairs of adjacent angles, in all, can you name in Figure.

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55. In Figure, determine the value of x

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56. In Figure, AOC is a line, find x

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57. In Figure, POS is a line, find x

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58. In Figure, ACB is a line such that $\angle DCA = 5x$ and $\angle DCB = 4x$. Find the value of x

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59. Given $\angle POR = 3x$ and $\angle QOR = 2x + 10$, find the value of x for which POQ will be a line. (In figure)

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60. In Figure, a is a greater than b by one third of a right-angle. Find the values of a and b .

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61. What value of y would make AOB a line in Figure, if $\angle AOC = 4y$ and $\angle BOC = (6y + 30)$

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62. In Figure, OP , OQ , OR and OS are four rays. Prove that $\angle POQ + \angle QOR + \angle SOR + \angle POS = 360^\circ$

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63. In Figure, ray OS stand on a line POQ . Ray OR and ray OT are angle bisectors of $\angle POS$ and $\angle SOQ$ respectively. If $\angle POS = x$, find $\angle ROT$

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64. Lines PQ and RS intersect each other at point O . If $\angle POR : \angle ROQ = 5 : 7$, find all the angles.

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65. In Figure, POQ is a line. Ray OR is perpendicular to line PQ . OS is another ray lying between rays OP and OR .

Prove that $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$

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66. In Figure, lines l_1 and L_2 intersect at O , forming angles as shown in the figure. If $a = 35^\circ$, find the values of b , c and d .

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67. In Figure, determine the value of y .

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68. In Figure, three coplanar lines intersect in a common point, forming angles as shown. Given $\angle DOF = 50^\circ$ and $\angle BOD = 90^\circ$; find the values of x , y , z and u .

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69. In figure, AB and CD are straight lines and OP and OQ are respectively the bisectors of angles $\angle BOD$ and $\angle AOC$. Show that the rays OP and OQ are in the same line.

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70. In Figure, two straight lines PQ and RS intersect each other at O . If $\angle POT = 75^\circ$, find the values of a , b and c

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71. In figure, lines l_1 and l_2 intersect at O , forming angles as shown in the figure. If $x = 45^\circ$, find the values of y , z and u .

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72. In Figure, three coplanar lines intersect at a point O , forming angles as shown in the figure. Find the values of x , y , z and u .

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73. In Figure, find the value of x , y and z

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74. In Figure, find the value of x

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75. Prove that the bisectors of a pair of vertically opposite angles are in the same straight line.

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76. If two straight lines intersect each other, prove that the ray opposite to the bisector of one of the angles thus formed bisects the vertically opposite angle.

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77. If one of the four angles formed by two intersecting lines is a right angle, then show that each of the four angles is a right angle.

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78. In figure, rays AB and CD intersect at O . (i) Determine y when $x = 60^\circ$ (ii) Determine x when $y = 40^\circ$

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79. In Figure, lines AB , CD and EF intersect at O . Find the measures of $\angle AOC$, $\angle COF$, $\angle DOE$ and $\angle BOF$.

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80. AB , CD , and EF are three concurrent lines passing through the point O such that OF bisects $\angle BOD$. If $\angle BOF = 35^\circ$, find $\angle BOC$ and $\angle AOD$.

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81. In Figure, lines AB and CD intersect at O . If $\angle AOC + \angle BOE = 70^\circ$ and $\angle BOD = 40^\circ$, find $\angle BOE$

and reflex $\angle COE$



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82. Which of the following statements are true (T) and which are false(F) (i) Angles forming a linear pair are supplementary. (ii) If two adjacent angles are equal, then each angle measures 90^0 . (iii) Angles forming a linear pair can both be acute angles. (iv) If angles forming a linear pair are equal, then each of these angles is of measure 90^0 .



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83. Fill in the blanks so as to make the following statements true: (i) If one angle of a linear pair is acute, then its other

angle will be (ii) A ray stands on a line, then the sum of the two adjacent angles so formed is (iii) If the sum of two adjacent angles is 180° , then the arms of the two angles are opposite rays.

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84. In Figure, $m \parallel n$ and $\angle 1 = 65^{\circ}$. Find $\angle 5$ and $\angle 8$

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85. In Figure, find the values of x and y and then show that $AB \parallel CD$.

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86. In Figure, if $AB \parallel CD$, $CD \parallel EF$ and $y:z = 3:7$, find x .

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87. In Figure, $m \parallel n$ and angles 1 and 2 are in the ratio 3:2. Determine all the angles from 1 to 8.

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88. In Figure, l , m and n are parallel lines intersected by a transversal at X , Y , and Z respectively. Find $\angle 1$, $\angle 2$ and $\angle 3$. Give reasons.

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89. In Figure, given that $AB \parallel CD$. If $\angle 1 = (120 - x)^\circ$ and $\angle 5 = 5x^\circ$, find the measures of $\angle 1$ and $\angle 5$.

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90. In Figure, given that $AB \parallel CD$. If $\angle 4 = (x + 20)^\circ$ and $\angle 5 = (x + 8)^\circ$, find the measures of $\angle 4$ and $\angle 5$.

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91. In Figure, given that $AB \parallel CD$. If $\angle 2 = (3x - 10)^\circ$ and $\angle 8 = (5x - 30)^\circ$, determine the measures of $\angle 2$ and $\angle 8$.



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92. In Figure, given that $AB \parallel CD$ If $\angle 1 = (2x + y)^{\circ}$ and $\angle 6 = (3x - y)^{\circ}$, determine the measures of $\angle 2$ in terms of y



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93. In Figure, given that $AB \parallel CD$. If $\angle 2 = (2x + 30)^{\circ}$, $\angle 4 = (x + 2y)^{\circ}$ and $\angle 6 = (3y + 10)^{\circ}$, find the measure of $\angle 5$.



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94. In Figure, given that $AB \parallel CD$ If $\angle 2 = 2(\angle 1)$, determine $\angle 7$.

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95. In Figure, given that $AB \parallel CD$ If the ratio of the measures of $\angle 3$ and $\angle 8$ is 4:5, find the measures of $\angle 3$ and $\angle 8$.

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96. In Figure, given that $AB \parallel CD$ If the complement of $\angle 5$ equals the supplement of $\angle 4$, find the measures of $\angle 4$ and $\angle 5$.

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97. In Figure, if $AB \parallel CD$, $EF \perp CD$ and $\angle GED = 126^\circ$, find $\angle AGE$, $\angle GEF$ and $\angle FGE$



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98. In Figure, if $AB \parallel CD$, $\angle APQ = 50^\circ$ AND $\angle PRD = 127^\circ$, find x and y



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99. In Figure $ABDC$ and $ADBC$. Prove that $\angle DAB = \angle DCB$



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100. In Figure, $AB \parallel CD$. Determine $\angle 1$



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101. In Figure, $AB \parallel CD$. Determine x



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102. In Figure, $AB \parallel CD$. Find the value of x



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103. In Figure, $AB \parallel CD$ and $EF \parallel DQ$. Determine $\angle PDQ$, $\angle AED$ and $\angle DEF$.

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104. In figure, $PQ \parallel RS$, $\angle PAB = 70^\circ$ and $\angle ACS = 100^\circ$. Determine $\angle ABC$, $\angle BAC$ and $\angle CAQ$.

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105. In Figure, $AB \parallel CD$ and $\angle F = 30^\circ$. Find $\angle ECD$.

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106. In Figure, $OP \parallel RS$. Determine $\angle PQR$

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107. In Figure, if $\angle 2 = 120^\circ$ and $\angle 5 = 60^\circ$, show that $m \parallel n$.

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108. In Figure, show that $AB \parallel EF$

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109. In Figure, if $\angle 3 = 61^\circ$ and $\angle 7 = 118^\circ$. Is $m \parallel n$?





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110. In Figure, given that $\angle AOC = \angle ACO$ and $\angle BOD = \angle BDO$. Prove that $AC \parallel DB$



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111. In Figure, $AB \parallel CF$ and $BC \parallel ED$. Prove that $\angle ABC = \angle FDE$



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112. In Figure, lines AB and CD are parallel and P is any point between the two lines. Prove that

$$\angle ABP + \angle CDP = \angle DPB$$



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113. Prove that two lines perpendicular to the same line are parallel to each other.



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114. If the bisectors of a pair of alternate angles formed by a transversal with two given lines are parallel, prove that the given lines are parallel.



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115. In Figure, $ABCD$ & $CDEF$. Also, $EA \perp AB$. If $\angle BEF = 55^\circ$, find the values of x , y and z .

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116. In Figure, if $PQ \parallel RS$, $\angle MXQ = 135^\circ$ and $\angle MYR = 40^\circ$, find $\angle XMY$

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117. In Figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B , the reflected ray moves along the path BC and strikes the

mirror RS and C and again reflects back along CD . Prove that $AB \parallel CD$.

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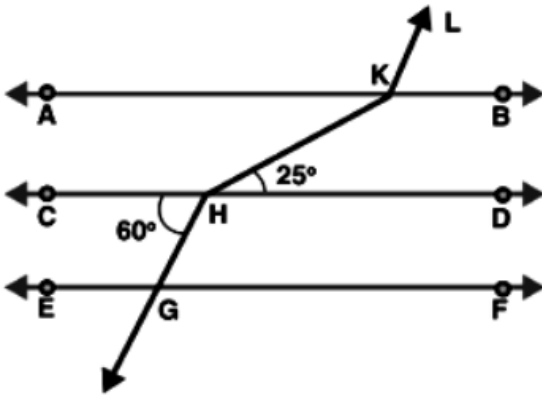
118. In the figure $p \parallel q$ and r is a transversal if $\angle 1$ and $\angle 2$ are in the ratio $3:2$, determine the angles from $\angle 1$ to $\angle 8$

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119. In Fig. l, m and n are parallel lines intersected by transversal P at X, Y and Z respectively. Find $\angle 1, \angle 2$ and $\angle 3$

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120. In figure, $AB \parallel CD \parallel EF$ and $GH \parallel KL$. Find $\angle HKL$



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121. In Fig given below, Show that $CD \parallel EF$

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122. In Figure, If $AB \parallel CD$ and $CD \parallel EF$, Find $\angle ACE$.

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123. In Figure, $PQ \parallel AB$ and $PR \parallel BC$. If $\angle QPR = 102^\circ$, determine $\angle ABC$. Give reasons.

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124. In Figure , State which lines are parallel and why.

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125. In Figure, if $l \parallel m$, $n \parallel p$ and $\angle 1 = 85^\circ$, find $\angle 2$

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126. Prove that two lines perpendicular to the same line are parallel to each other.

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127. Prove that if the two arms of an angle are parallel to the two arms of another angle, then the angles are either equal or supplementary.

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128. In Figure, $AB \parallel CD$ and P is any point shown in the figure. Prove that: $\angle ABP + \angle BPD + \angle CDP = 360^\circ$

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129. Two unequal angles of a parallelogram are in the ratio 2:3. Find all its angles in degrees.

A. 72° and 108°

B. 70° and 110°

C. 60° and 120°

D. none of these

Answer: A



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130. If each of the two lines is perpendicular to the same line, what kind of lines are they to each other?



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131. In Figure, $\angle 1 = 60^\circ$ and $\angle 2 = \left(\frac{2}{3}\right)^{rd}$ of a right angle.

Prove that $l \parallel m$



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132. In Fig., if $l \parallel m \parallel n$ and $\angle 1 = 60^\circ$, find $\angle 2$.



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133. Prove that two lines perpendicular to the same line are parallel to each other.



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134. The opposite sides of a quadrilateral are parallel. If one angle of the quadrilateral is 60° , find the other angles.

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135. Two lines AB and CD intersect at O . If $\angle AOC + \angle COB + \angle BOD = 270^{\circ}$, find the measures of $\angle AOC$, $\angle COB$, $\angle BOD$ and $\angle DOA$.

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136. In Figure, p is a transversal to lines m and n and , $\angle 2 = 120^{\circ}$ and $\angle 5 = 60^{\circ}$. Prove that $m \parallel n$

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137. In Figure, transversal l intersects two lines m and n ,
 $\angle 4 = 110^\circ$ and $\angle 7 = 65^\circ$. Is $m \parallel n$?

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138. Which pair of lines in Fig. are parallel? Given reasons.

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139. If l, m, n are three lines such that $l \parallel m$ and $n \perp l$,
prove that $n \perp m$.

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140. In Figure, arms BA and BC of $\angle ABC$ are respectively parallel to arms ED and EF of $\angle DEF$. Prove that $\angle ABC = \angle DEF$.



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141. Which of the following statements are true (T) and which are false (F)? Give reasons.

(i) If two lines are intersected by a transversal, then corresponding angles are equal.

(ii) If two parallel lines are intersected by a transversal, then alternate interior angles are equal.

(iii) Two lines perpendicular to the same line are perpendicular to each other.

(iv) Two lines parallel to the same line are parallel to each other.

other.

(v) If two parallel lines are intersected by a transversal, then the interior angles on the same side of the transversal are equal.



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142. Fill in the blanks in each of the following to make the statement true: (i) If two parallel lines are intersected by a transversal, then each pair of corresponding angles are.... (ii) If two parallel lines are intersected by a transversal, then interior angles on the same side of the transversal are...



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143. Define complementary angles.

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144. Define supplementary angles.

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145. Define Adjacent angles.

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146. The complement of an acute angle is

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147. The supplement of an acute angle is



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148. The supplement of a right angle is

A. 80°

B. 90°

C. 30°

D. 70°

Answer: B



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149. Write the Supplement of an angle of measure 60° .

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150. Write the supplement of an angle of measure 45° .

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151. If a wheel has six spokes equally spaced, then find the measure of the angle between two adjacent spokes.

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152. An angle is equal to its supplement. Determine its measure.

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153. An angle is equal to five times its complement. Determine its measure.

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154. How many pairs of adjacent angles are formed when two lines intersect at a point?

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155. One angle is equal to three times its supplement. The measure of the angle is (a) 130° (b) 135° (c) 90° (d) 120°

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156. Two complementary angles are such that two times the measure of one is equal to three times the measure of the other. The measure of the smaller angle is (a) 45° (b) 30° (c) 36° (d) none of these

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157. Two straight lines AB and CD intersect one another at the point O . If $\angle AOC + \angle COB + \angle BOD = 274^{\circ}$, then $\angle AOD =$

A. 86°

B. 90°

C. 94°

D. 127°

Answer: A

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158. Two straight lines AB and CD cut each other at O . If $\angle BOD = 63^\circ$, then $\angle BOC =$ (a) 63° (b) 117° (c) 17° (d) 153°

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159. Consider the following statements: When two straight lines intersect:

(i) adjacent angles are complementary

(ii) adjacent angles are supplementary

(iii) opposite angles are equal

(iv) opposite angles are supplementary

Of those statements which is correct

A. (i) and (iii) are correct

B. (ii) and (iii) are correct

C. (i) and (iv) are correct

D. (ii) and (iv) are correct

Answer: B



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160. Given $\angle POR = 3x$ and $\angle QOR = 2x + 10^\circ$. If POQ is a straight line, then the value of x is 30° (b) 34° (c) 36° (d) none of these



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161. AOB is a straight line and OC and OD are the two rays on it. If $\angle AOC + \angle BOD = 85^\circ$, then $\angle COD =$

A. 85°

B. 95°

C. 105°

D. 5°

Answer: B



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162. In Figure, the value of y is

(a) 20°

(b) 30°

(c) 45°

(d) 60°



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163. In Figure, if $\frac{y}{x} = 5$ and $\frac{z}{x} = 4$, then the value of x is

A. (a) 8°

B. (b) 18°

C. (c) 12°

D. (d) 15°

Answer: null



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164. In Figure, the value of x is (a) 12 (b) 15 (c) 20 (d) 30



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165. In Figure, which of the following statements must be true?

(i) $a + b = d + c$

(ii) $a + c + e = 180^\circ$

(iii) $b + f = c + e$

(a) (i) only

(b) (ii) only

(c) (iii) only

(d) (ii) and (iii) only



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166. If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 2:3, then the measure of the larger angle is

A. 36°

B. 72°

C. 108°

D. 54°

Answer: C



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167. In Figure, if $AB \parallel CD$, then the value of x is (a) 20°
(b) 30° (c) 55° (d) 60°



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168. AB and CD are two parallel lines. PQ cuts AB and CD at E and F respectively. EL is the bisector of

$\angle FEB$. If $\angle LEB = 35^\circ$, then $\angle CFQ$ will be 55° (b) 70° (c) 110° (d) 130°

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169. Two lines AB and CD intersect at O . If $\angle AOC + \angle COB + \angle BOD = 270^\circ$, find the measures of $\angle AOC$, $\angle COB$, $\angle BOD$ and $\angle DOA$.

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170. In Figure, $PQ \parallel RS$, $\angle AEF = 95^\circ$, $\angle BHS = 110^\circ$ and $\angle ABC = x^\circ$. Then the value of x is (a) 15° (b) 25° (c) 70° (d) 35°

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171. In Figure, if $l_1 \parallel l_2$, what is the value of x ? (a) 90° (b) 85° (c) 75° (d) 70°

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172. In Figure, if $l_1 \parallel l_2$, what is $x + y$ in terms of w and z ? (a) $180 - w + z$ (b) $180 + w - z$ (c) $180 - w - z$ (d) $180 + w + z$

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173. In Figure, if $l_1 \parallel l_2$, what is the value of y ? (a) 100 (b) 120 (c) 135 (d) 150

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174. In Figure, if $l_1 \parallel l_2$ and $l_3 \parallel l_4$, what is y in terms of x ?

(a) $90 + x$

(b) $90 + 2x$

(c) $90 - \frac{x}{2}$

(d) $90 - 2x$

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175. In Figure, if $l \parallel m$, what is the value of x ?

(a) 60

(b) 50

(c) 45

(d) 30

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176. In Figure, if line segment AB is parallel to the line segment CD , what is the value of y ? (a) 12 (b) 15 (c) 18 (d) 20

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177. In Figure, if $CP \parallel BQ$, then the measure of x is (a) 130° (b) 105° (c) 175° (d) 125°

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178. In Figure, if $AB \parallel HF$ and $DE \parallel FG$, then the measure of $\angle FDE$ is (a) 108° (b) 80° (c) 100° (d) 90°

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179. In Figure, if lines l and m are parallel, then $x =$ (a) 20°
(b) 45° (c) 65° (d) 85°

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180. In Figure, if $AB \parallel CD$, then $x =$ (a) 100° (b) 105° (c)
 110° (d) 115°

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181. In Figure, if lines l and m are parallel lines, then $x =$
(a) 70°
(b) 100°

(c) 40°

(d) 30°



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182. In Figure, if $l \parallel m$, then $x =$ (a) 105° (b) 65° (c) 40°

(d) 25°



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183. In Figure, if lines l and m are parallel, then the value of

x is (a) 35° (b) 55° (c) 65° (d) 75°



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