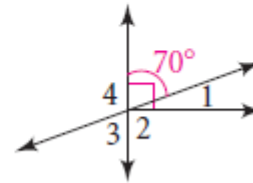Find the measure of each angle.
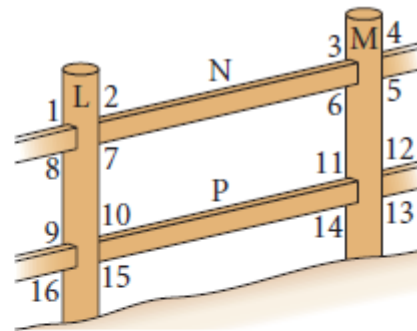
33. an angle with measure 8 less than the measure of its complement **41**

34. one angle of a pair of complementary vertical angles **45**

35. an angle with measure three times the measure of its supplement **135**

Use the diagram at the right to find the measure of each of the following angles.

36. ∠1 **20**   37. ∠2 **90**

38. ∠3 **70**   39. ∠4 **110**

A fence on a hill uses vertical posts L and M to hold parallel rails N and P. Use the diagram for Exercises 37–41.

37. ∠10 and ∠14 are alternate interior angles.
   Which is the transversal? **D**
   A. L   B. M
   C. N   D. P

38. If $m\angle 1 = 115$, what is $m\angle 16$? **G**
   F. 35   G. 65   H. 85   J. 115
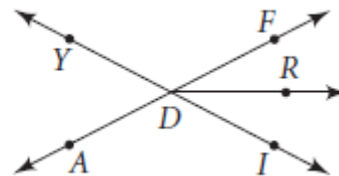
39. If $m\angle 10 = x - 24$, what is $m\angle 7$? **D**
   A. 156 + x   B. 204 + x   C. 156 − x   D. 204 − x

40. If $m\angle 1 = 6x$ and $m\angle 12 = 4x$, what is $m\angle 5$? **J**
   F. 54   G. 60   H. 72   J. 108

Find the measure of each angle if $m\angle YDF = 121$ and $\overrightarrow{DR}$ bisects ∠FDI.

42. ∠IDA   43. ∠YDA   44. ∠RDI
   121   59   29.5

10. *a* ∥ *b;* if two lines and a transversal form same-side in∡ that are suppl., then the lines are ∥.

11. *a* ∥ *b;* if two lines and a transversal form same-side in∡ that are suppl., then the lines are ∥.

12. *a* ∥ *b;* if two lines and a transversal form same side ext∡ that are suppl.,

then the two lines are ∥.

13. none

14. *a* ∥ *b;* Conv. of Corr. ⊿Post.

15. none

16. *a* ∥ *b;* Conv. of Alt. Int. ⊿Thm.

17. ℓ ∥ *m;* Conv. of Corr. 1⊿st.

18. *a* ∥*b;* if two lines and a transversal form alt. ext⊿ that are congruent, then the two lines are ∥.

19. *a* ∥*b;* Conv. of Corr. ⊿ Post.

20. none

21. ℓ∥*m;* Conv. of Alt. Int. ⊿hm.

26. C

30. 2.5; $m\angle 1 = m\angle 2 = 30$

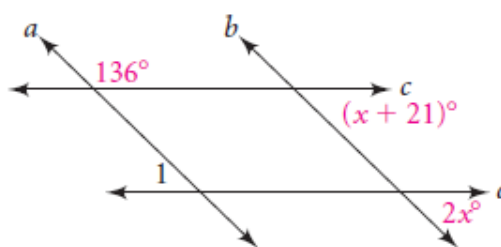**31.** 1.25; $m\angle 1 = m\angle 2 = 10$

47. For what value of *x* is *c* ∥ *d*? **F**
    F. 21   G. 23
    H. 43   J. 53

48. If *c* ∥ *d*, what is $m\angle 1$?   **B**
    A. 24   B. 44
    C. 136   D. 146

49. **[2] a.** 136 + (*x* + 21) = 180 so *x* = 23 (OR equivalent equation resulting in *x* = 23).
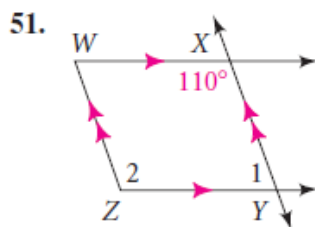
   b. *x* + 21 = 2*x* so *x* = 21. Lines *c* and *d* are not ∥ because *x* cannot = both 21 and 23 (OR equivalent explanation).

Find $m\angle 1$, and then $m\angle 2$. Justify each answer.

51.

$110°$

W X Z Y 2 1

51. $m\angle 1 = 70$ since it is a supp. of the $110°$ ∠. $m\angle 2 = 110$ since same-side int. ∡ are supp.

52. $m\angle 1 = 66$ because alt. int. ∡ are ≅. $m\angle 2 = 180 - 94 = 86$ because same-side int. ∡ are supp.

52.

$94°$ $66°$ A B C D 2 1