## EXERCISES

**Practice**

Complete Circled Problems

Determine whether the graphs of each pair of equations are *parallel, coinciding, perpendicular,* or *none of these.*

12. $y = 5x - 18$
$2x + 10y + 10 = 0$

13. $y - 7x + 5 = 0$
$y - 7x - 9 = 0$

14. $y = \frac{1}{3}x + 11$
$y = 3x - 9$

15. $y = -3$
$x = 6$

16. $y = 4x - 3$
$4.8x - 1.2y = 3.6$

17. $4x - 6y = 11$
$3x + 2y = 9$

18. $y = 3x - 2$
$3x + y = 2$

19. $5x + 9y = 14$
$y = -\frac{5}{9}x + \frac{14}{9}$

20. $y + 4x - 2 = 0$
$y + 4x + 1 = 0$

21. Are the graphs of $y = 3x - 2$ and $y = -3x + 2$ *parallel, coinciding, perpendicular,* or *none of these*? Explain.

*SHOW ALL WORK ON SEPARATE PAPER!

**Write the standard form of the equation of the line that is parallel to the graph of the given equation and passes through the point with the given coordinates.**

22. $y = 2x + 10$; $(0, -8)$

23. $4x - 9y = -23$; $(12, -15)$

24. $y = -9$; $(4, -11)$

**Write the standard form of the equation of the line that is perpendicular to the graph of the given equation and passes through the point with the given coordinates.**

25. $y = 5x + 12$; $(0, -3)$

26. $6x - y = 3$; $(7, -2)$

27. $x = 12$; $(6, -13)$

28. The equation of line $\ell$ is $5y - 4x = 10$. Write the standard form of the equation of the line that fits each description.
   a. parallel to $\ell$ and passes through the point at $(-15, 8)$
   b. perpendicular to $\ell$ and passes through the point at $(-15, 8)$

29. The equation of line $m$ is $8x - 14y + 3 = 0$.
   a. For what value of $k$ is the graph of $kx - 7y + 10 = 0$ parallel to line $m$?
   b. What is $k$ if the graphs of $m$ and $kx - 7y + 10 = 0$ are perpendicular?

**Applications and Problem Solving**

Real World Application

30. **Critical Thinking** Write equations of two lines that satisfy each description.
   a. perpendicular and one is vertical
   b. parallel and neither has a $y$-intercept

31. **Geometry** An altitude of a triangle is a segment that passes through one vertex and is perpendicular to the opposite side. Find the standard form of the equation of the line containing each altitude of $\triangle ABC$.