3.1 Linear Equations

Equations
Symbolic Solutions
Numerical and Graphical Solutions
Identities and Contradictions
Intercepts of a Line

Key Terms

Use the vocabulary terms listed below to complete the statements in exercises 1-11.

solve	contradiction	conditional equation
identity	solution set	Addition Property of Equality
$ax+by=c$	equivalent	Multiplication Property of Equality
$ax+b=0$	equation	

1. A linear equation in one variable is an equation that can be written in the form _____, where a and b are constants with $a \neq 0$.

2. To _____ an equation means to find all values for a variable that make the equation a true statement.

3. The set of all solutions to an equation is called the _____.

4. Two equations are _____ if they have the same solution set.

5. The fact that if $x-2=5$ then $x-2+2=5+2$ is an example of the _____.

6. The _____ states that if a, b, and c are real numbers with $c \neq 0$, then $a=b$ is equivalent to $ac=bc$.

7. A(n) _____ is a statement that two expressions are equal.

8. A(n) _____ is an equation that is always true.

9. A(n) _____ is an equation that is always false.

10. A(n) _____ is an equation that is true for some, but not all, values of the variable(s).

11. The standard form for the equation of a line is _____, where a, b, and c are constants with a and b not both 0.

Symbolic Solutions

Exercises 1-16: Solve the equation.

1. $x+5=4$ **1.** _____

2. $y-3=8$ **2.** _____

3. $2-x=-8$ **3.** _____

4. $\frac{1}{2}-x=\frac{3}{4}$ **4.** _____

5. $2x-1=7$ **5.** _____

6. $3x-7=8$ **6.** _____

7. $5-2=\frac{1}{2}x-3$ **7.** _____

8. $1-\frac{1}{2}x=1$ **8.** _____

9. $2(x-3)+7=4x$ **9.** _____

10. $9-(t+1)=4+2(t+3)$ **10.** _____

11. $1-3(x-1)=2(x-8)$ **11.** _____

12. $2+3(x-2)=3-(x-1)$ **12.** _____

13. $\frac{1}{2}(2a-6)=\frac{1}{3}(a-1)+2$ **13.** _____

14. $\frac{2}{3}(t-1)-\frac{1}{4}(t+1)=-3$ **14.** _____

15. $0.75(z-1)+2=0.25(z+3)$ **15.** _____

16. $0.3(x+2)-3=0.4x+7$ **16.** _____

Numerical and Graphical Solutions

Exercises 17-20: Complete the table. Then use the table to solve the equation.

17. $-2x-3=-5$ **17.** _____

x	-2	-1	0	1	2
$-2x-3$	1				

18. $6-4x=-2$ **18.** _____

x	0	1	2	3	4
$6-4x$	6				-10

19. $8x+7=2x-5$ **19.** _____

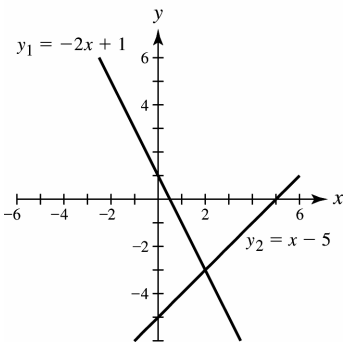
x	-2	-1	0	1	2
$8x+7$			7		23
$2x-5$			-5	-3	

20. $2(x-1)=-3(1-x)$ **20.** _____

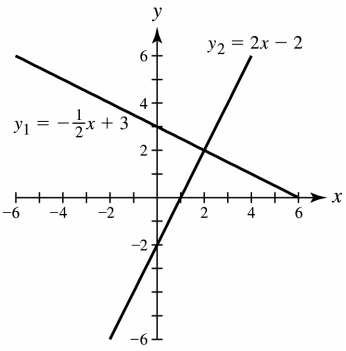
x	-2	-1	0	1	2
$2(x-1)$	-6		-2		
$-3(1-x)$	-9				

Exercises 21-22: A linear equation is solved graphically by letting y_1 equal the left side of the equation and y_2 equal the right side of the equation. Find the solution.

21. **21.** _____



22. **22.** _____



Identities and Contradictions

Exercises 23-26: Determine whether each equation is an identity, contradiction, or conditional equation.

23. $x-3=x+4$ **23.** _____

24. $2x-3=4(2x-3)$ **24.** _____

25. $-2x=x-3x$ **25.** _____

26. $7x-(x+3)=\frac{1}{2}(12x-4)-1$ **26.** _____

Intercepts of a Line

Exercises 27-30: For each equation,* (a) *find the x- and y-intercepts and* (b) *solve the equation for y to obtain the slope-intercept form.

27. $2x-3y=-6$

27. (a)_____

_____

(b)_____

28. $x-y=-4$

28. (a)_____

_____

(b)_____

29. $\frac{3}{4}x-y=3$

29. (a)_____

_____

(b)_____

30. $x-\frac{2}{3}y=-6$

30. (a)_____

_____

(b)_____