Unit 2 Comprehensive Review - Answer Key

Directions: No calculators are allowed. Show all work. Reduce all fractions. Box or circle all answers.

A. Distributive Property, Combining Like Terms

Problems 1-6: Simplify each expression.

1. $8x-3x+7=5x+7$
2. $4a+5b-7a+2b=-3a+7b$
3. $3(2x-5)+4x=10x-15$
4. $-2(y+6)+7y=5y-12$
5. $4(3m-2)-2(m+5)=10m-18$
6. $-3(2p-5)+4(p+1)=-2p+19$
7. Decide whether $4(x+3)+2x$ and $6x+12$ are equivalent. If they are not, give one value of x that shows they are different. Equivalent.
8. Create an expression that uses distribution and simplifies to $9x-4$. Sample: $5(x-2)+4x+6$

B. Solving Linear Equations, Solving Linear Inequalities

Problems 9-14: Solve each equation. State no solution or infinitely many solutions when appropriate.

9. $3x+5=26; x=7$
10. $4(a-3)=20; a=8$
11. $5m-7=2m+11; m=6$
12. $3(2y+1)-4y=15; y=6$
13. $4n-9=4n-9; \textit{infinitely many solutions}$
14. $6p+5=6p-8; \textit{no solution}$

Problems 15-19: Solve each inequality.

15. $2x-5\le 13; x\le 9$
16. $-3a+4>16; a\leftarrow 4$
17. $5m-2\le 3m+10; m\le 6$
18. $-2(r-4)\ge 12; r\le -2$
19. $4p+1>2p-9; p>-5$

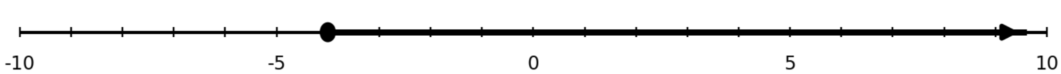
Problems 20-24: Solve each compound inequality.

20. $-5<2x+1\le 9; -3<x\le 4$
21. $-12\le 3a<6; -4\le a<2$
22. $1<4m-3\le 13; 1<m\le 4$
23. $-8\le -2y+4<10; -3<y\le 6$
24. $7>1-3n\ge -8; -2<n\le 3$
25. a. Create an equation with variables on both sides whose solution is $x=3$. Sample: $5x+2=2x+11$
b. Create an inequality that requires reversing the inequality symbol and has solution $x<4$. Sample: $-2x>-8$

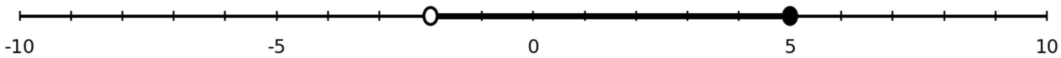
C. Graphing inequalities on a number line, Interval Notation

Problems 26-27: The inequality is already solved. Graph it on the number line and write it in interval notation.

26. $x\ge -4$ Interval notation: ¿

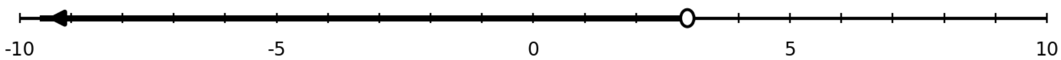


27. $-2<x\leq 5$ Interval notation: $(-2,5$¿

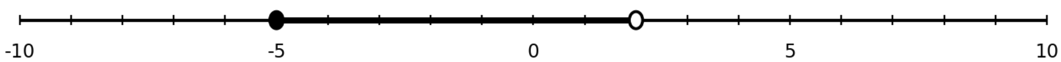


Problems 28-29: Interval notation is given. Write the solution in inequality form and graph it on the number line.

28. $(-\infty,3)$ Inequality: $x<3$

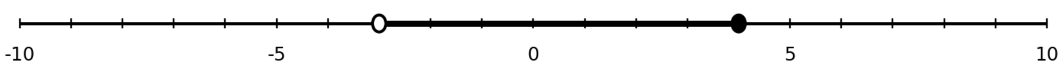


29. ¿ Inequality: $-5\leq x<2$



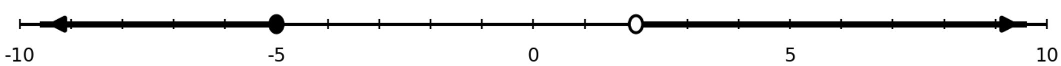
30. For each number-line graph, write the solution in inequality form and interval notation.

a.



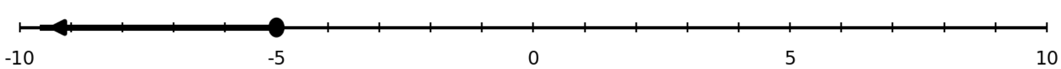
Inequality: $-3<x\leq 4$ Interval notation: $(-3,4$¿

b.

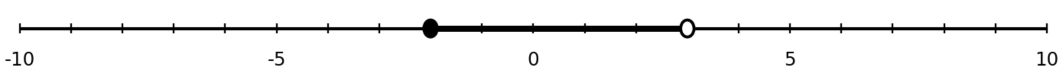


Inequality: $x\leq -5\vee x>2$ Interval notation: $(-\infty,-5$¿ $\cup\ (2,\infty)$

31. Solve $-2x+4\geq 14$. $x\leq -5;(-\infty,-5$¿

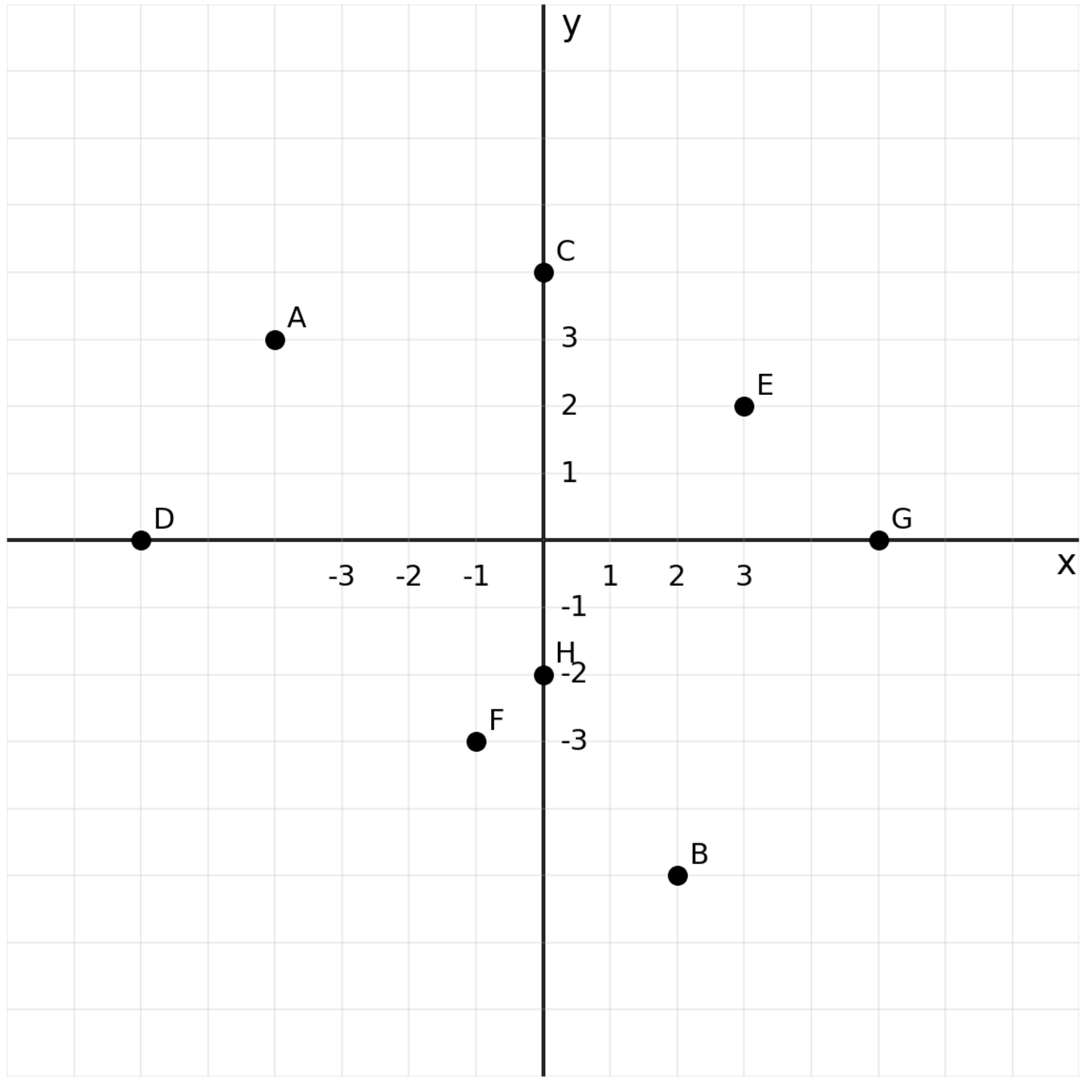


32. Create a bounded solution set that contains 0 but does not contain 4. Sample: $-2\leq x<3;$¿



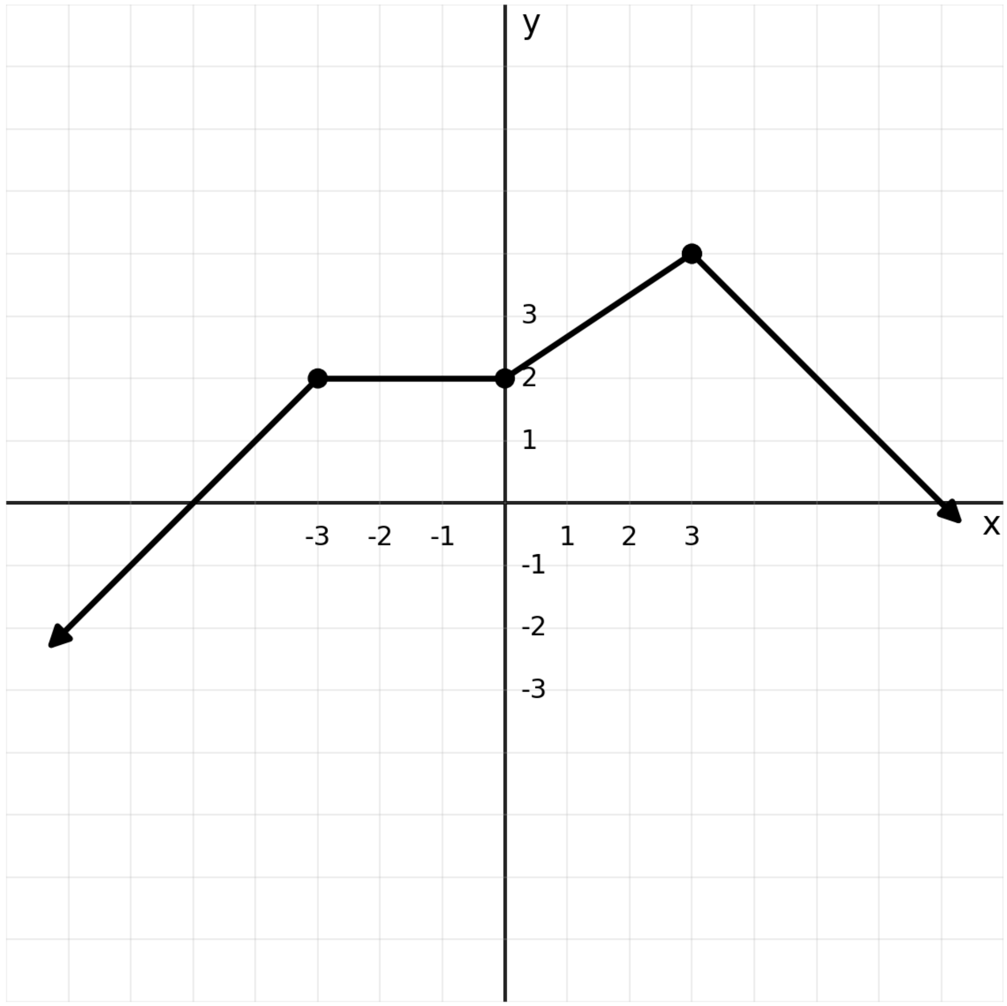
D. Basics of Coordinate System, Nine Key Features of a Function

33. Plot and label each point on the same coordinate plane: $A(-4,3)$, $B(2,-5)$, $C(0,4)$, $D(-6,0)$, $E(3,2)$, $F(-1,-3)$, $G(5,0)$, and $H(0,-2)$.



34. For each graph in parts a-b, state all nine key features: domain, range, increasing intervals, decreasing intervals, constant intervals, x-intercepts, y-intercept, absolute maximum value and where it occurs, and absolute minimum value and where it occurs. If a feature does not exist, write none.

a.



Domain: all real numbers

Range: $y \leq 4$

Increasing: $(-\infty,-3)$ and $(0,3)$

Decreasing: $(3,\infty)$

Constant: $[-3,0]$

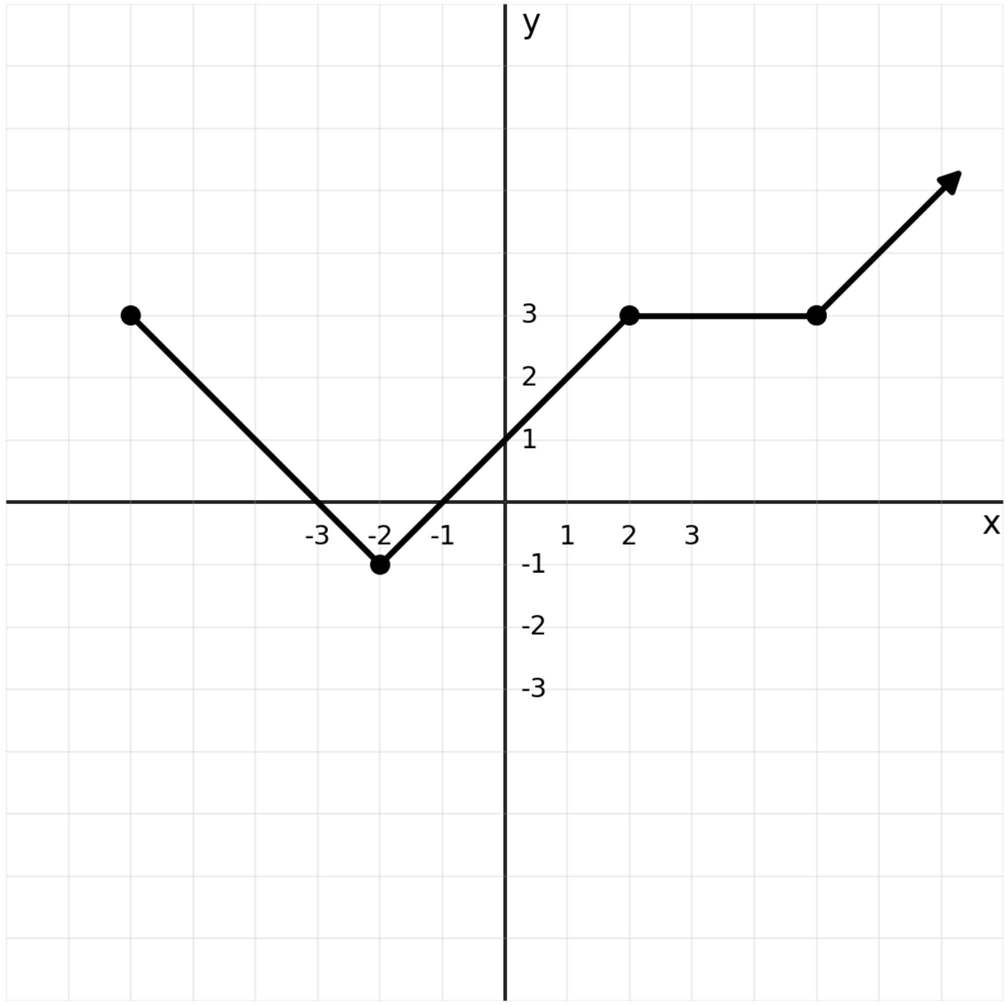
x-intercepts: $(-5,0)$ and $(7,0)$

y-intercept: $(0,2)$

Absolute maximum value: 4 at $x=3$

Absolute minimum value: none

b.



Domain: x≥-6

Range: y≥-1

Increasing: (-2,2) and (5,∞)

Decreasing: (-6,-2)

Constant: [2,5]

x-intercepts: (-3,0) and (-1,0)

y-intercept: (0,1)

Absolute maximum value: none

Absolute minimum value: -1 at x=-2

35. Create one function that satisfies all of the constraints below. More than one answer may be possible.
Domain: ¿
Range: $(-\infty,4$¿
Increasing: $[-5,-2]$
Decreasing: ¿
Constant: $[-2,1]$
x-intercepts: two
y-intercept: one
Absolute maximum: 4
Absolute minimum: none
Sample answer: