Study Guide and Review - Chapter 1

State whether each sentence is true or false. If false, replace the underlined term to make a true sentence.

1. The absolute value of a number is always negative.

ANSWER:
false; nonnegative

2. $\sqrt{12}$ belongs to the set of rational numbers.

ANSWER:
false; irrational

3. An equation is a statement that two expressions have the same value.

ANSWER:
true

4. A solution of an equation is a value that makes the equation false.

ANSWER:
false; true

5. The empty set contains no elements.

ANSWER:
true

6. A mathematical sentence containing one or more variables is called an open sentence.

ANSWER:
true

7. The graph of a compound inequality containing *and* is the union of the solution sets of the two inequalities.

ANSWER:
false; or

8. Variables are used to represent unknown quantities.

ANSWER:
true

9. The set of rational numbers includes terminating and repeating decimals.

ANSWER:
true

10. Expressions that contain at least one variable are called algebraic expressions.

ANSWER:
true

Evaluate each expression.

11. $[28-(16+3)] \div 3$

ANSWER:
3

12. $\frac{2}{3}\left(3^3+12\right)$

ANSWER:
26

13. $\frac{15(9-7)}{3}$

ANSWER:
10

Evaluate each expression if $w=0.2, x=10, y=\frac{1}{2}$, **and** $z=-4$

14. $4w-8y$

ANSWER:
–3.2

15. z^2+xy

ANSWER:
21

16. $\frac{5w-xy}{z}$

ANSWER:
1

17. **GEOMETRY** The formula for the volume of a cylinder is $V=\pi r^2 h$, where V is volume, r is radius, and h is the height. What is the volume of a cylinder that is 6 inches high and has a radius of 3 inches?

ANSWER:
$\approx 169.65\ in^3$

Name the sets of numbers to which each value belongs.

18. $1.\overline{3}$

ANSWER:
Q, R

19. $\sqrt{4}$

ANSWER:
N, W, Z, Q, R

20. $-\frac{3}{4}$

ANSWER:
Q, R

Simplify each expression.

21. $4x - 3y + 7x + 5y$

ANSWER:
$11x + 2y$

22. $2(a + 3) - 4a + 8b$

ANSWER:
$-2a + 8b + 6$

23. $4(2m + 5n) - 3(m - 7n)$

ANSWER:
$5m + 41n$

24. **MONEY** At Fun City Amusement Park, hot dogs sell for $3.50 and sodas sell for $2.50. Dion bought 3 hot dogs and 3 sodas during one day at the park.
a. Illustrate the Distributive Property by writing two expressions to represent the cost of the hot dogs and the sodas.
b. Use the Distributive Property to find how much money Dion spent on food and drinks.

ANSWER:
a. 3(3.50 + 2.50) or 3(3.50) + 3(2.50)
b.$18

Solve each equation. Check your solution.

25. $8 + 5r = -27$

ANSWER:
-7

26. $4w + 10 = 6w - 13$

ANSWER:
$\frac{23}{2}$

27. $\frac{x}{6} + \frac{x}{3} = \frac{3}{4}$

ANSWER:
$\frac{3}{2}$

28. $6b - 5 = 3(b + 2)$

ANSWER:
$\frac{11}{3}$

29. **MONEY** It cost Lori $14 to go to the movies. She bought popcorn for $3.50 and a soda for $2.50. How much was her ticket?

ANSWER:
$8

Solve each equation or formula for the specified variable.

30. $2k - 3m = 16$ for k

ANSWER:
$k = \frac{16 + 3m}{2}$

31. $\frac{r + 5}{mn} = p$ for m

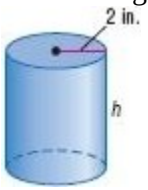
ANSWER:
$m = \frac{r + 5}{pn}$

32. $A = \frac{1}{2}h(a+b)$ for h

ANSWER:

$h = \frac{2A}{a+b}$

33. **GEOMETRY** Yu-Jun wants to fill the water container at the right. He knows that the radius is 2 inches and the volume is 100.48 cubic inches. What is the height of the water bottle? Use the formula for the volume of a cylinder, $V = \pi r^2 h$, to find the height of the bottle.



ANSWER:

about 8 in.

Solve each equation. Check your solution.

34. $|r+5| = 12$

ANSWER:

{–17, 7}

35. $4|a-6| = 16$

ANSWER:

{2, 10}

36. $|3x+7| = -15$

ANSWER:

$\varnothing$

37. $|b+5| = 2b-9$

ANSWER:

$\{14\}$

38. **MEASUREMENT** Marcos is cutting ribbons for a craft project. Each ribbon needs to be $\frac{3}{4}$ yard long. If each piece is always within plus or minus $\frac{1}{16}$ yard, how long are the shortest and longest pieces of ribbon?

ANSWER:

$\frac{11}{16}$ yd; $\frac{13}{16}$ yd

Solve each inequality. Then graph the solution set on a number line.

39. $-4a \le 24$

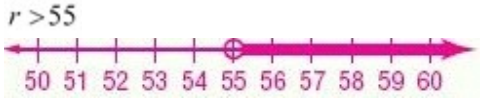
ANSWER:

$a \ge -6$

40. $\frac{r}{5} - 8 > 3$

ANSWER:

$r > 55$



41. $4 - 7x \ge 2(x+3)$

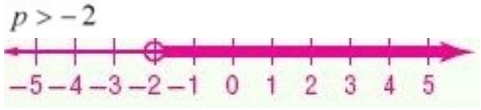
ANSWER:

$x \le -\frac{2}{9}$

42. $-p - 13 < 3(5+4p) - 2$

ANSWER:

$p > -2$



43. **MONEY** Ms. Hawkins is taking her science class on a field trip to a museum. She has $572 to spend on the trip. There are 52 students that will go to the museum. The museum charges $5 per student, and Ms. Hawkins gets in for free. If the students will have slices of pizza for lunch that cost $2 each, how many slices can each student have?

ANSWER:

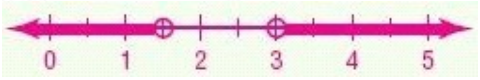
3 or fewer slices each

Solve each inequality. Graph the solution set on a number line.

44. $2m + 4 < 7$ or $3m + 5 > 14$

ANSWER:

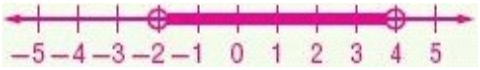
$\left\{m \middle| m < \frac{3}{2} \text{ or } m > 3\right\}$



45. $-5 < 4x + 3 < 19$

ANSWER:

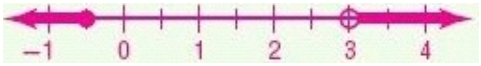
$\{x \mid -2 < x < 4\}$



46. $6y - 1 > 17$ or $8y - 6 \le -10$

ANSWER:

$\{y \mid y \le -\frac{1}{2} \text{ or } y > 3\}$



47. $-2 \le 5(m - 3) < 9$

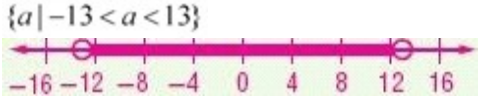
ANSWER:

$\left\{m \middle| \frac{13}{5} \le m < \frac{24}{5}\right\}$

48. $|a| + 2 < 15$

ANSWER:

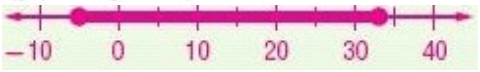
$\{a \mid -13 < a < 13\}$



49. $|p - 14| \le 19$

ANSWER:

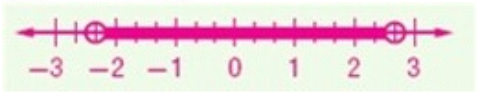
$\{p \mid -5 \le p \le 33\}$



50. $|6k - 1| < 15$

ANSWER:

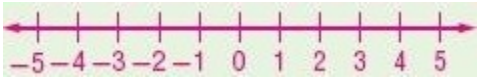
$\left\{k \middle| -\frac{7}{3} < k < \frac{8}{3}\right\}$



51. $|2r + 7| < -1$

ANSWER:

$\varnothing$



52. $\frac{1}{3}|8q + 5| \ge 7$

ANSWER:

$\left\{q \middle| q \le -\frac{13}{4} \text{ or } q \ge 2\right\}$

53. **MONEY** Cara is making a beaded necklace for a gift. She wants to spend between $20 and $30 on the necklace. The bead store charges $2.50 for large beads and $1.25 for small beads. If she buys 3 large beads, how many small beads can she buy to stay within her budget? Write and solve a compound inequality to describe the range of possible beads.

ANSWER:

$20 \le 2.50(3) + 1.25b \le 30;\ 10 \le b \le 18$