Grade 9 Ch. 6 Test Review Equations & Inequalities   Name:_____

**Multiple Choice:** *Identify the choice that best completes the statement or answers the question.*

____ 1. Solve: $5 = -2x + 11$

   a. 8   b. –8   c. 3   d. –3

____ 2. Solve: $4x + 2.8 = 7.2$

   a. 0.4   b. –1   c. 6.5   d. 1.1

____ 3. Solve: $\dfrac{x}{8} - 2 = 3$

   a. 40   b. –3   c. 19   d. 26

____ 4. Solve: $5 = \dfrac{35}{w}, w \neq 0$

   a. $w = 7$ b. $w = -30$ c. $w = 175$ d. $w = \dfrac{1}{7}$

____ 5. Solve: $8y = 4y - 12$

   a. $y = -3$ b. $y = 3$ c. $y = -16$ d. $y = \dfrac{-8}{8}$

____ 6. Solve: $4v - 6 = -14$

   a. $v = -\dfrac{1}{2}$ b. $v = 2$ c. $v = -2$ d. $v = -2$

____ 7. Solve: $1.2b + 2.6 = 10.1 - 1.3b$

   a. $b = 0.3$ b. $b = 3$ c. $b = -3$ d. $b = -0.3$

____ 8. Solve: $3(5q - 2) = 2(4q + 5)$

   a. $q = \dfrac{7}{16}$ b. $q = -2\dfrac{2}{7}$ c. $q = -\dfrac{7}{16}$ d. $q = 2\dfrac{2}{7}$

____ 9. Solve: $\dfrac{x}{4} + \dfrac{11}{2} = \dfrac{7}{4}$

   a. $x = -4$ b. $x = -60$ c. $x = -8$ d. $x = -15$

____ 10. Use a symbol to write an inequality that corresponds to this statement: w is greater than -6

   a. $w \geq 6$ b. $w > 6$ c. $w > -6$ d. $w \geq -6$

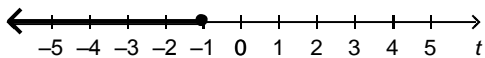____ 11. Which of these graphs is a solution of $t \leq 1$?
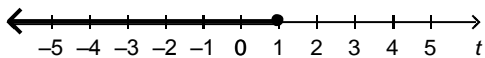
   i)
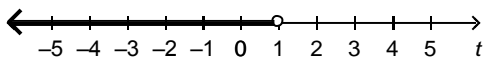
   ii)
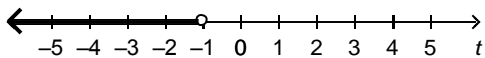
                         a. Graph i   b. Graph iv   c. Graph ii   d. Graph iii

   iii)

   iv)

Short Answer

12. Solve: $\dfrac{6x}{4} = -12$

13. Solve: $\dfrac{4x}{5} = 4.4$

14. Solve: $20 = \dfrac{-3x}{4} + 5$

15. Solve: $-5(x - 31) = 11.5$

16. Solve: $\dfrac{3}{4}(3x - 5) = \dfrac{1}{2}(2x + 4)$

17. A games room charges a $12 entrance fee, plus $2.55 per hour of play time. Anne-Marie has $32.40. For how long can she play in the games room?

   a) Choose a variable and write an inequality for this problem.   b) Solve the inequality.

18. Solve: $5x + 22 = 18$
    Verify the solution

19. The trapezoid below has side lengths 2.5 cm and 4.3 cm, and perimeter 13.6 cm.
    a) Write an equation that can be used to determine the lengths of the remaining sides.
   b) Solve the equation.

2.5 cm

x x

4.3 cm
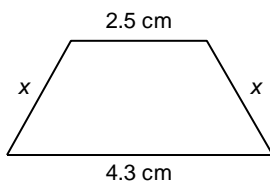
20. Solve: $\dfrac{2}{x} + \dfrac{3}{x} = \dfrac{4}{5}, x \neq 0$

Show your work.

21. To raise money for charity, a group of students decide to sell designer T-shirts.
    The cost to rent the machine that prints the T-shirts is $172.
    The cost to buy and print a design on each T-shirt is $13.
    The students plan to sell the T-shirts for $17 each.
    Let x represent the number of T-shirts.

    How many T-shirts must be sold before the students start making a profit?
    a) Model this problem with an equation.
    b) Solve the problem.
    c) Verify the solution.

22. a) Graph the solutions to these two inequalities on the same number line.
       $x < -1$ and $x \geq 7$

    ←——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——→
      −10 −9 −8 −7 −6 −5 −4 −3 −2 −1 0 1 2 3 4 5 6 7 8 9 10 x
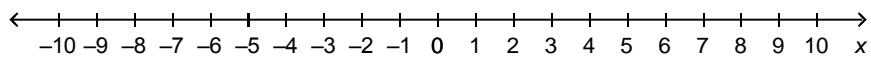
    b) i) Write 3 points that are less than −1.
       ii) Write 3 points that are greater than or equal to 7.

Grade 9 ch. 6 Test Review Equations & Inequalities
Answer Section

MULTIPLE CHOICE

1. ANS: C PTS: 1 DIF: Easy
   REF: 6.1 Solving Equations by Using Inverse Operations LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
2. ANS: D PTS: 1 DIF: Easy
   REF: 6.1 Solving Equations by Using Inverse Operations LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
3. ANS: A PTS: 1 DIF: Easy
   REF: 6.1 Solving Equations by Using Inverse Operations LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
4. ANS: A PTS: 1 DIF: Easy
   REF: 6.2 Solving Equations by Using Balance Strategies LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
5. ANS: A PTS: 1 DIF: Easy
   REF: 6.2 Solving Equations by Using Balance Strategies LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
6. ANS: C PTS: 1 DIF: Easy
   REF: 6.2 Solving Equations by Using Balance Strategies LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
7. ANS: B PTS: 1 DIF: Moderate
   REF: 6.2 Solving Equations by Using Balance Strategies LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
8. ANS: D PTS: 1 DIF: Difficult
   REF: 6.2 Solving Equations by Using Balance Strategies LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
9. ANS: D PTS: 1 DIF: Difficult
   REF: 6.2 Solving Equations by Using Balance Strategies LOC: 9.PR3
   TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
10. ANS: C PTS: 1 DIF: Easy
    REF: 6.3 Introduction to Linear Inequalities LOC: 9.PR4
    TOP: Patterns and Relations (Variables and Equations) KEY: Conceptual Understanding
11. ANS: B PTS: 1 DIF: Easy
    REF: 6.3 Introduction to Linear Inequalities LOC: 9.PR4
    TOP: Patterns and Relations (Variables and Equations) KEY: Conceptual Understanding

SHORT ANSWER

12. ANS:
    −8

    PTS: 1 DIF: Easy REF: 6.1 Solving Equations by Using Inverse Operations
    LOC: 9.PR3 TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge

13. ANS:
    5.5

    PTS: 1   DIF: Easy   REF: 6.1 Solving Equations by Using Inverse Operations
    LOC: 9.PR3   TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge
14. ANS:
    −20

    PTS: 1   DIF: Easy   REF: 6.1 Solving Equations by Using Inverse Operations
    LOC: 9.PR3   TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge
15. ANS:
    28.7

    PTS: 1   DIF: Moderate   REF: 6.1 Solving Equations by Using Inverse Operations
    LOC: 9.PR3   TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge
16. ANS:
    $$x = 4\frac{3}{5}$$

    PTS: 1   DIF: Difficult   REF: 6.2 Solving Equations by Using Balance Strategies
    LOC: 9.PR3   TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge
17. ANS:
    a) Let h represent the number of hours of play time.
       $$12 + 2.55h \le 32.4$$
    b) $h \le 8$

    PTS: 1   DIF: Moderate
    REF: 6.5 Solving Linear Inequalities by Using Multiplication and Division
    LOC: 9.PR4   TOP: Patterns and Relations (Variables and Equations)
    KEY: Procedural Knowledge

PROBLEM

18. ANS:
    $$5x + 22 = 18$$
    $$5x + 22 - 22 = 18 - 22$$
    $$5x = -4$$
    $$\frac{5x}{5} = \frac{-4}{5}$$
    $$x = -0.8$$

    To verify the solution, substitute $x = -0.8$ into $5x + 22 = 18$.

Left side $= 5x + 22$ Right side $= 18$

$$= (5)(-0.8) + 22$$
$$= -4 + 22$$
$$= 18$$

Since the left side matches the right side, $x = -0.8$ is correct.

PTS: 1   DIF: Difficult   REF: 6.1 Solving Equations by Using Inverse Operations
LOC: 9.PR3   TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge | Communication

19. ANS:
a) Equation to determine the lengths of the remaining sides:

$$x + 2.5 + x + 4.3 = 13.6$$
$$x + x + 2.5 + 4.3 = 13.6$$
$$2x + 6.8 = 13.6$$
$$2x + 6.8 - 6.8 = 13.6 - 6.8$$
$$2x = 6.8$$

b) $2x = 6.8$

$$\frac{2x}{2} = \frac{6.8}{2}$$
$$x = 3.4$$

The length of each remaining side is 3.4 cm.

PTS: 1   DIF: Difficult   REF: 6.1 Solving Equations by Using Inverse Operations
LOC: 9.PR3   TOP: Patterns and Relations (Variables and Equations)
KEY: Problem-Solving Skills

20. ANS:

$$\frac{2}{x} + \frac{3}{x} = \frac{4}{5}$$
$$\left(\frac{2}{x} + \frac{3}{x}\right) \times 5x = \frac{4}{5} \times 5x$$
$$10 + 15 = 4x$$
$$4x = 25$$
$$\frac{4x}{4} = \frac{25}{4}$$

So, $x = \frac{25}{4}$, or $6\frac{1}{4}$.

PTS: 1   DIF: Difficult   REF: 6.2 Solving Equations by Using Balance Strategies
LOC: 9.PR3   TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge

21. ANS:
a) $17x = 172 + 13x$

b) $17x = 172 + 13x$

$17x - 13x = 172 + 13x - 13x$

$4x = 172$

$\dfrac{4x}{4} = \dfrac{172}{4}$

$x = 43$

The students must sell 43 T-shirts before they start making a profit.

c) Verify: Substitute $x = 43$ into the original equation.

Left side $= 17x$ Right side $= 172 + 13x$

$= 17(43)$ $= 172 + 13(43)$

$= 731$ $= 172 + 559$

                              $= 731$

Since the left side equals the right side, $x = 43$ is the correct solution.

PTS: 1   DIF: Difficult   REF: 6.2 Solving Equations by Using Balance Strategies
LOC: 9.PR3   TOP: Patterns and Relations (Variables and Equations)
KEY: Problem-Solving Skills | Communication

22. ANS:

a)
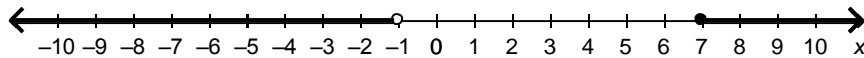
b) i) Answers will vary.
       Any 3 points to the left of −1 on the number line, excluding −1.
       For example: –3, –7, –10
   ii) Answers will vary.
       Any 3 points that are greater than or equal to 7. For example: 12, 15, 24

PTS: 1   DIF: Difficult   REF: 6.3 Introduction to Linear Inequalities
LOC: 9.PR4   TOP: Patterns and Relations (Variables and Equations)
KEY: Problem-Solving Skills | Communication