

Name: _____

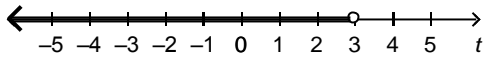
Date: _____

Review for Grade 9 Math Exam - Unit 6 - Linear Equations and Inequalities**Multiple Choice***Identify the choice that best completes the statement or answers the question.*

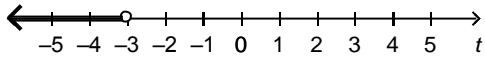
- _____ 1. Solve: $9x - 15 = 3$
a. $\frac{46}{3}$ b. 9 c. -2 d. 2
- _____ 2. Solve: $5 = -3x + 14$
a. $\frac{19}{-3}$ b. 3 c. -3 d. $\frac{19}{3}$
- _____ 3. Solve: $4x + 2.8 = 6.4$
a. -1.2 b. -0.4 c. 5.7 d. 0.9
- _____ 4. Solve: $\frac{x}{7} - 4 = 5$
a. 39 b. 2 c. 63 d. 33
- _____ 5. Write an equation for this statement: A number divided by 2, plus 5, is 8.
a. $\frac{x+5}{2} = 8$ b. $\frac{x}{2} = 5 + 8$ c. $\frac{2}{x} + 5 = 8$ d. $\frac{x}{2} + 5 = 8$
- _____ 6. Solve: $3(x + 5) = 12$
a. $\frac{7}{3}$ b. -6 c. -1 d. 4
- _____ 7. A number times 5, minus 6, is 8. Write an equation to determine the number.
a. $6 - 5x = 8$ b. $5x - 6 = 8$ c. $5 - 6x = 8$ d. $6x - 5 = 8$
- _____ 8. Solve: $13 - 4x = 3x - 8$
a. $x = -3$ b. $x = \frac{1}{3}$ c. $x = -\frac{1}{3}$ d. $x = 3$
- _____ 9. Solve: $3(5q - 4) = 2(4q + 6)$
a. $q = -3\frac{3}{7}$ b. $q = \frac{7}{24}$ c. $q = -\frac{7}{24}$ d. $q = 3\frac{3}{7}$

10. Which of these graphs is a solution of $t \leq 3$?

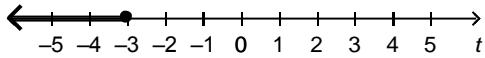
i) .



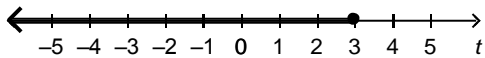
ii) .



iii) .



iv) .



a. Graph ii

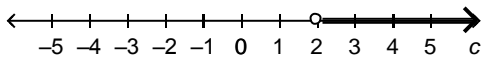
b. Graph iii

c. Graph iv

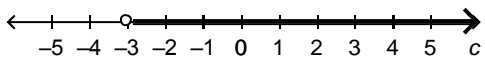
d. Graph i

11. Which of these graphs is a solution of $c > -3$?

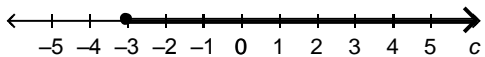
i) .



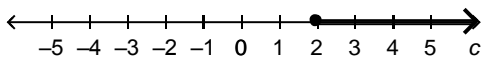
ii) .



iii) .



iv) .



a. Graph i

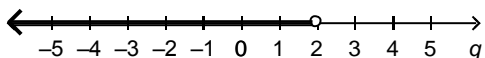
b. Graph ii

c. Graph iv

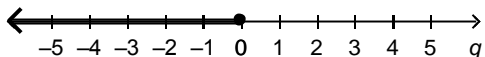
d. Graph iii

12. Which of these graphs represent the solution of the inequality $q - 2 \leq 0$?

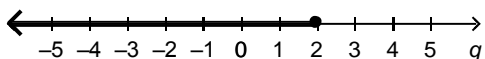
i) .



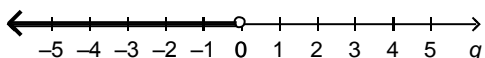
ii) .



iii) .



iv) .



a. Graph ii

b. Graph iv

c. Graph iii

d. Graph i

- _____ 13. Solve: $12t - 8 < 16 + 13t$
 a. $t > -24$ b. $t < -3$ c. $t < -24$ d. $t > 8$
- _____ 14. Solve: $20 - 3t > 5$
 a. $t < -5$ b. $t > -5$ c. $t < 5$ d. $t > 5$
- _____ 15. An equipment rental company charges a flat rate of \$25, plus \$13 per day for insurance. Kyle has \$121. Write an inequality to represent the number of days, d , for which he can rent equipment.
 a. $25 + 13d > 121$ c. $25 + 13d \leq 121$
 b. $25 + 13d \geq 121$ d. $25 + 13d < 121$

Short Answer

16. Here is a student's solution for this question:
 Solve: $3x + 5 = 18$

$$\begin{aligned}
 3x + 5 &= 18 \\
 \frac{3x}{3} + 5 &= \frac{18}{3} \\
 x + 5 &= 6 \\
 x + 5 - 5 &= 6 - 5 \\
 x &= 1
 \end{aligned}$$

Identify any errors in the solution.

17. A student solved this equation: $4(3w - 6) = 3 - 6w$

$$\begin{aligned}
 12w - 6 &= -3w \\
 12w - 6 + 6 &= -3w + 6 \\
 12w &= -3w + 6 \\
 12w - (-3w) &= -3w + 6 - (-3w) \\
 15w &= 6 \\
 w &= \frac{6}{15}
 \end{aligned}$$

Identify any errors the student made, and then solve the original equation above.

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

19. Car Rental Company A charges \$29 a week, plus \$13 per kilometre driven.
Car Rental Company B charges \$85 a week, plus \$6 per kilometre driven.

Determine the distance you must drive for the two rental costs to be the same.
Model the problem with an equation.

20. Solve: $8w - 4 \geq 7w - 2$

21. Solve and graph: $10.8 - 1.8b > 14.04$



22. A games room charges a \$13 entrance fee, plus \$2.35 per hour of play time. Anne-Marie has \$29.45. For how long can she play in the games room?
- Choose a variable and write an inequality for this problem.
 - Solve the inequality.
23. The cost to rent a banquet hall is \$500, plus \$35 per person. A company's social committee has \$4700 to put towards renting a banquet hall. How many people could attend the function if they rented the banquet hall?
- Choose a variable and write an inequality to solve the problem.
 - Solve the inequality.

Problem

24. Solve: $4(6x - 7) - (3x - 5) = 40$
Show your work.
25. Solve: $3(p + 5) + 4(p - 2) = 4(p + 6)$
Show your work.

26. A cell phone company offers two different plans.
Plan A: Monthly fee of \$28, plus \$0.38 per minute
Plan B: Monthly fee of \$22, plus \$0.46 per minute
- Write an equation to determine the time in minutes that results in the same monthly cost for both plans.
 - Solve the equation.
 - Verify the solution.

27. Solve: $\frac{2}{3}(x+2) - \frac{1}{2}(x-4) > \frac{1}{4}(x+5)$
Show your work.

28. Company A charges \$17, plus \$11 per day to rent a piece of equipment.
Company B charges \$33, plus \$9 per day to rent the same piece of equipment.
- How many days must the piece of equipment be rented for the cost to be the same at both companies?
 - How many days must the piece of equipment be rented for Company B to be less expensive?

Review for Grade 9 Math Exam - Unit 6 - Linear Equations and Inequalities Answer Section

MULTIPLE CHOICE

- 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
- ANS: B 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
- 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
- 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
- ANS: D PTS: 1 DIF: Moderate
REF: 6.1 Solving Equations by Using Inverse Operations LOC: 9.PR3
TOP: Patterns and Relations (Variables and Equations) KEY: Conceptual Understanding
- ANS: C 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
- ANS: B PTS: 1 DIF: Easy
REF: 6.2 Solving Equations by Using Balance Strategies LOC: 9.PR3
TOP: Patterns and Relations (Variables and Equations)
KEY: Conceptual Understanding | Procedural Knowledge
- ANS: D 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
- 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
- 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
- ANS: B PTS: 1 DIF: Easy
REF: 6.3 Introduction to Linear Inequalities LOC: 9.PR4
TOP: Patterns and Relations (Variables and Equations) KEY: Procedural Knowledge
- ANS: C PTS: 1 DIF: Easy
REF: 6.4 Solving Linear Inequalities by Using Addition and Subtraction
LOC: 9.PR4 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge
- ANS: A PTS: 1 DIF: Moderate
REF: 6.4 Solving Linear Inequalities by Using Addition and Subtraction
LOC: 9.PR4 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge

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

SHORT ANSWER

16. ANS:
 Error: If the student is going to divide by 3 first, each term must be divided by 3. Alternatively, the student could subtract 5 from each side first, then divide each side by 3.

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 | Communication

17. ANS:
 Errors:
 The student forgot to multiply 4 by 6 when using the distributive property.
 3 - 6w is not equal to -3w.

Correct solution:

$$\begin{aligned}
 4(3w - 6) &= 3 - 6w \\
 12w - 24 &= 3 - 6w \\
 12w - 24 + 24 &= 3 - 6w + 24 \\
 12w &= -6w + 27 \\
 12w - (-6w) &= -6w + 27 - (-6w) \\
 18w &= 27 \\
 w &= \frac{27}{18} \text{ or } 1\frac{9}{18} \text{ or } 1\frac{1}{2} \text{ or } 1.5
 \end{aligned}$$

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 | Communication

18. ANS:

$$x = 2\frac{4}{7}$$

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

19. ANS:

Let d represent the distance driven.

$$29 + 13d = 85 + 6d$$

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

20. ANS:

$$w \geq 2$$

PTS: 1 DIF: Moderate
REF: 6.4 Solving Linear Inequalities by Using Addition and Subtraction
LOC: 9.PR4 TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge

21. ANS:

$$b < -1.8$$

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

22. ANS:

a) Let h represent the number of hours of play time.

$$13 + 2.35h \leq 29.45$$

b) $h \leq 7$

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

23. ANS:

a) Let p represent the number of people.

$$500 + 35p \leq 4700$$

b) $p \leq 120$

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

24. ANS:

$$4(6x - 7) - (3x - 5) = 40$$

$$24x - 28 - 3x + 5 = 40$$

$$24x - 3x - 28 + 5 = 40$$

$$21x - 23 = 40$$

$$21x - 23 + 23 = 40 + 23$$

$$21x = 63$$

$$\frac{21x}{21} = \frac{63}{21}$$

$$x = 3$$

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

25. ANS:

$$3(p + 5) + 4(p - 2) = 4(p + 6)$$

$$3(p) + 3(5) + 4(p) + 4(-2) = 4(p) + 4(6)$$

$$3p + 15 + 4p - 8 = 4p + 24$$

$$3p + 4p + 15 - 8 = 4p + 24$$

$$7p + 7 = 4p + 24$$

$$7p + 7 - 4p = 4p + 24 - 4p$$

$$3p + 7 = 24$$

$$3p + 7 - 7 = 24 - 7$$

$$3p = 17$$

$$\frac{3p}{3} = \frac{17}{3}$$

$$p = \frac{17}{3}$$

So, $p = \frac{17}{3}$, or $5\frac{2}{3}$.

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

26. ANS:

a) Let t represent the number of minutes.

$$28 + 0.38t = 22 + 0.46t$$

b) $28 + 0.38t = 22 + 0.46t$

$$28 + 0.38t - 0.38t = 22 + 0.46t - 0.38t$$

$$28 = 22 + 0.08t$$

$$28 - 22 = 22 + 0.08t - 22$$

$$6 = 0.08t$$

$$\frac{6}{0.08} = \frac{0.08t}{0.08}$$

$$t = 75$$

The monthly costs for both plans are the same at 75 min.

c) Verify: Substitute $t = 75$ into the original equation.

$$\text{Left side} = 28 + 0.38t$$

$$\text{Right side} = 22 + 0.46t$$

$$= 28 + 0.38(75)$$

$$= 22 + 0.46(75)$$

$$= 28 + 28.5$$

$$= 22 + 34.5$$

$$= 56.5$$

$$= 56.5$$

Since the left side equals the right side, $t = 75$ 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

27. ANS:

Multiply each side of the inequality by 12.

$$12 \times \left(\frac{2}{3}(x+2) - \frac{1}{2}(x-4) \right) > 12 \times \frac{1}{4}(x+5)$$

$$8(x+2) - 6(x-4) > 3(x+5)$$

$$8x + 16 - 6x + 24 > 3x + 15$$

$$2x + 40 > 3x + 15$$

$$2x + 40 - 2x > 3x + 15 - 2x$$

$$40 > x + 15$$

$$40 - 15 > x + 15 - 15$$

$$25 > x$$

$$x < 25$$

PTS: 1

DIF: Difficult

REF: 6.4 Solving Linear Inequalities by Using Addition and Subtraction

LOC: 9.PR4

TOP: Patterns and Relations (Variables and Equations)

KEY: Procedural Knowledge

28. ANS:

a) Let d represent the number of days to rent the piece of equipment.

$$\begin{aligned}17 + 11d &= 33 + 9d \\17 + 11d - 9d &= 33 + 9d - 9d \\17 + 2d &= 33 \\17 + 2d - 17 &= 33 - 17 \\2d &= 16 \\\frac{2d}{2} &= \frac{16}{2} \\d &= 8\end{aligned}$$

The piece of equipment must be rented for 8 days for the cost to be the same at both companies.

b) Let d represent the number of days to rent the piece of equipment.

$$\begin{aligned}17 + 11d &> 33 + 9d \\17 + 11d - 9d &> 33 + 9d - 9d \\17 + 2d &> 33 \\17 + 2d - 17 &> 33 - 17 \\2d &> 16 \\\frac{2d}{2} &> \frac{16}{2} \\d &> 8\end{aligned}$$

The piece of equipment must be rented for 9 or more days for Company B to be less expensive.

PTS: 1

DIF: Difficult

REF: 6.5 Solving Linear Inequalities by Using Multiplication and Division

LOC: 9.PR4

TOP: Patterns and Relations (Variables and Equations)

KEY: Problem-Solving Skills | Communication