

GRADE 9 ADV
EOT 1

MATH COVERAGE

Module 2,4,5 & 6

Name:

Class:

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Module 2: Equations in One Variable

M2L1: Writing and Interpreting Equations

**Remember
this**



Addition	Subtraction	Multiplication	Division	General Rules
Sum	Difference of	product	Quotient of	Equal sign = The same as Identical Equal to As much as
more	Less than	Times as many	Divided by	
In all	Left - deduct	Twice ($\times 2$)	Half ($\div 2$)	
Total - altogether	Fewer than	In each	Into equal groups	
plus	Minus – take away	Multiplied by	Shared	Squared (x^2) OR Second power (x^2)
increased by	decreased by	Double ($\times 2$)	per	Cube (x^3) OR Third power (x^3)
Added to	Subtracted from	Triple ($\times 3$)	Parts	The quantity ()

Translate the sentence into an equation or formula.



9. Twice a increased by the cube of a equals b.

10. Seven less than the sum of p and t is as much as 6.

11. The sum of x and its square is equal to y times z.

12. Four times the sum of f and g is identical to six times g.

13. The area A of a square is the length of a side squared.

14. The perimeter P of a triangle is equal to the sum of the lengths of sides a, b, and c.

Module 2: Equations in One Variable

L2-2: Solving One-Step Equations

**Remember
this**



What is the
inverse (opposite)
of each operation?



$$\begin{array}{r} 5 + x = 3 \\ -5 \quad -5 \\ \hline x = -2 \end{array}$$

Use properties of equality to solve each equation.



16. $-\frac{5}{7} = y - 2$

17. $v + 914 = -23$

18. $447 + x = -261$

19. $-\frac{1}{7}c = 21$

20. $-\frac{2}{3}v = -22$

21. $\frac{3}{5}q = -15$

Module 2: Equations in One Variable

L2-3: Solving Multi-Step Equations

Remember this



$$\frac{x}{4} - 3 = 2$$

$$+3 \quad +3$$

Undo addition & subtraction first. 

$$4 \cdot \frac{x}{4} = 5 \cdot 4$$

$$x = 20$$

Undo multiplication & division next. 



Use properties of equality to solve each equation.

1) $3t + 7 = -8$

2) $8 = 16 + 8n$

3.) $-34 = 6m - 4$

4) $9x + 27 = -72$

5) $\frac{y}{5} - 6 = 8$

6) $\frac{f}{-7} - 8 = 2$

7) $1 + \frac{r}{9} = 4$

8) $\frac{k}{3} + 4 = -16$

9) $\frac{n-2}{7} = 2$

10) $14 = \frac{6+z}{-2}$

11) $-11 = \frac{a-5}{6}$

12) $\frac{22-w}{3} = -7$

Module 2: Equations in One Variable



L2-4: Solving Equations with the Variable on Each Side

1) Use distributive property

$$5 - 2(3 - x) = 4x + 10$$

2) Rearrange the equation

$$5 - 6 + x = 4x + 10$$

$$5 - 6 - 10 = 4x - x$$

$$-11 = 3x$$

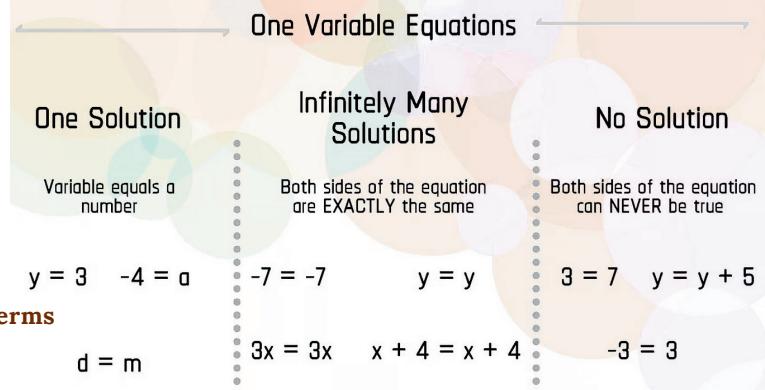
3) Collect like terms
4) then undo multiplication

$$-11/3 = x$$

Remember this



Determining the Number of Solutions



Solve each equation and state whether the equation has one solution, no solution, or is an identity.

25) $-6y - 3 = 3 - 6y$

26) $\frac{1}{2}(x + 6) = \frac{1}{2}x - 9$

27) $8q + 12 = 4(3 + 2q)$

28) $21(x + 1) - 6x = 15x + 21$

29) $12y + 48 - 4y = 8(y - 6)$

30) $8(z + 6) = 4(2z + 12)$

31) $2a + 2 = 3(a + 2)$

32) $\frac{1}{4}x + 5 = \frac{1}{4}x$

33) $7(c + 9) = 7c + 63$

34) $4k + 3 = \frac{1}{4}(8k + 16)$

35) $3b - 13 + 4b = 7b + 1$

36) $\frac{1}{2}(\frac{1}{2}m - 8) = \frac{1}{4}(m - 16)$



Module 2: Equations in One Variable

L2-5: Solving Equations Involving Absolute Value

**Remember
this**



$$|x - 5| = 2$$

Case 1: $x - 5 = 2$

Case 2: $x - 5 = -2$

Then solve each case

IMPORTANT

$$|x| = -3$$

NO SOLUTION
An absolute value
can never equal a
negative number



Solve each equation.

11. $|7 - 2q| = 3$

12. $|4x - 2| = 26$

13. $|w + 1| = 5$

14. $|n + 2| = -1$

15. $|m - 2| = 2$

16. $|5c - 3| = 1$

17. $|2t + 6| = 4$

18. $|8k - 5| = -4$

Module 2: Equations in One Variable

L2-5: Solving Equations Involving Absolute Value

**Remember
this**



$$|x - 5| = 2$$

Case 1: $x - 5 = 2$

Case 2: $x - 5 = -2$

Then solve each case

IMPORTANT

$$|x| = -3$$

NO SOLUTION
An absolute value
can never equal a
negative number



19. **ENGINEERING** *Tolerance* is an allowance made for imperfections in a manufactured object. The manufacturer of an oven specifies a temperature tolerance of $\pm 15^\circ\text{F}$. This means that the temperature inside the oven will be within 15°F of the temperature that it is set. Write and solve an absolute value equation to find the maximum and minimum temperatures inside the oven when the thermostat is set to 400°F .

20. **POLLS** Candidate A and Candidate B are running for mayor. A poll was taken to determine which candidate would likely win the election. The poll is accurate within $\pm 5\%$. Write and solve an absolute value equation to find the maximum and minimum percent of voters who will vote for Candidate A if 38% of the voters in the poll voted for Candidate A.

21. **STATISTICS** The most familiar statistical measure is the arithmetic mean, or average. A second important statistical measure is the standard deviation, which is a measure of how far the data are from the mean. For example, the mean score on the Wechsler IQ test is 100 and the standard deviation is 15. This means that people within one standard deviation of the mean have IQ scores that are 15 points higher or lower than the mean.
- One year, the mean mathematics score on the ACT test was 20.9 with a standard deviation of 5.3. Write an absolute value equation to find the maximum and minimum scores within one standard deviation of the mean.
 - What is the range of ACT mathematics scores within one standard deviation of the mean? within two standard deviations of the mean?

Module 2: Equations in One Variable

L2-6: Solving Proportions

**Remember
this**

Use **cross multiplication**,
then solve the equation



$$\frac{(x+1)}{2} = \frac{x+2}{3}$$
$$3(x+1) = 2(x+2)$$



Solve each equation.

61. $\frac{m-2}{4} = \frac{5}{20}$

62. $\frac{9}{5} = \frac{3}{x+7}$

63. $\frac{5}{b} = \frac{3}{b-6}$

64. $\frac{2p+3}{3} = \frac{4p-7}{2}$

65. $\frac{3y+4}{5} = \frac{y-1}{4}$

66. $\frac{2}{w} = \frac{7}{w+5}$

Module 2: Equations in One Variable

L2-7: Using Formulas



19. **RECTANGLES** The formula $P = 2\ell + 2w$ represents the perimeter of a rectangle. In this formula, ℓ is the length of the rectangle and w is the width.

- Solve the formula for ℓ .
- Find the length when the width is 4 meters and the perimeter is 36 meters.

-
20. **BASEBALL** The formula $a = \frac{h}{b}$ can be used to find the batting average a of a batter who has h hits in b times at bat.
- Solve the formula for b .

- If a batter has a batting average of 0.325 and has 39 hits, how many times has the player been at bat?

-
21. **SHOPPING** Thomas went to the store to buy videogames for \$13.50 each and controllers. The total amount Thomas spent can be represented by $c = 13.50g + p$, where c is the total cost, g is the number of games he bought, and p is the cost of the controllers. The controllers cost \$55 and Thomas spent \$136 total.
- Solve the equation for g .

- Find how many games Thomas bought.

-
22. **GEOMETRY** The volume of a box V is given by the formula $V = \ell wh$, where ℓ is the length, w is the width, and h is the height.
- Solve the formula for h .

- What is the height of a box with a volume of 50 cubic meters, length of 10 meters, and width of 2 meters?

Module 4: Linear and Nonlinear Functions

L4-1: Graphing Linear Functions

Remember this



$$2x + 4y = 8$$

To find the **x-intercept**, let $y=0$, then solve the equation for x .
The first point is **(x-value, 0)**

$$2x + 4(0) = 8$$

$$x = 4$$

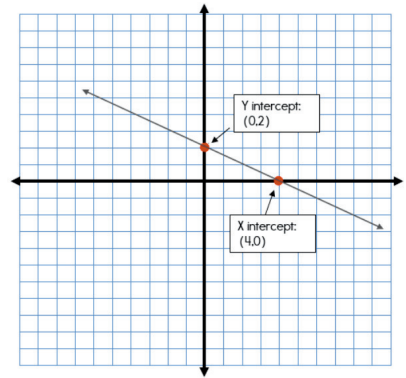
The x intercept is:
(4, 0)

To find the **y-intercept**, let $x=0$, then solve the equation for y .
The second point is **(0, y-value)**

$$2(0) + 4y = 8$$

$$y = 2$$

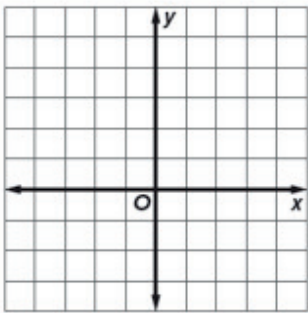
The y intercept is:
(0, 2)



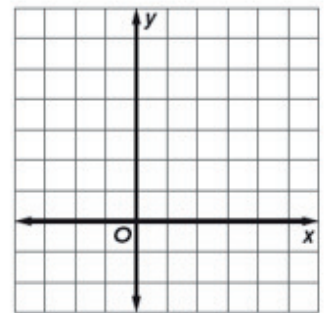
Graph each equation by using the x-and y-intercepts.



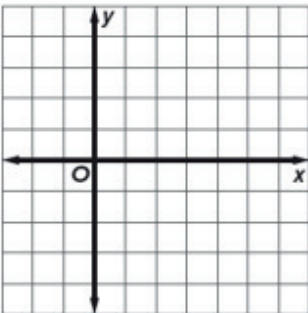
9. $y = 4 + 2x$



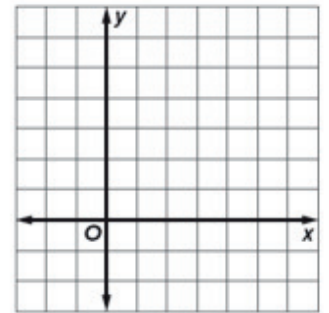
10. $5 - y = -3x$



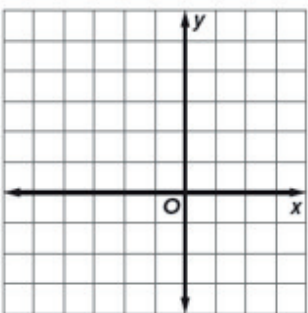
11. $x = 5y + 5$



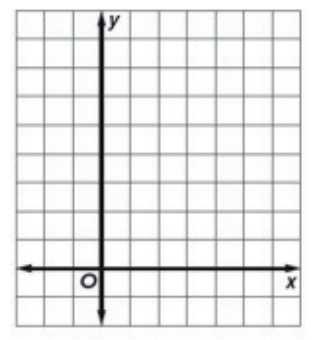
12. $x + y = 4$



13. $x - y = -3$



14. $y = 8 - 6x$



Module 4: Linear and Nonlinear Functions

L4-2: Rate of Change and Slope

Remember this



1) Substitute the known values into the **formula**.

Points $\rightarrow (8, 15)$ and $(-2, r)$
Slope $\rightarrow m = -3$

$$-3 = \frac{r - 15}{-2 - 8}$$



Rate of change (Slope)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

2) Simplify
the
numerator
OR the
denominator

$$\frac{-3}{1} = \frac{r - 15}{-10}$$

3) Then use **cross multiplication** to solve the equation

$$(-3)(-10) = r - 15$$

$$30 = r - 15$$

$$r = 45$$

Find the value of r so that the line passes through each pair of points has the given slope.



38. $(12, 10), (-2, r), m = -4$

39. $(r, -5), (3, 13), m = 8$

40. $(3, 5), (-3, r), m = \frac{3}{4}$

41. $(-2, 8), (r, 4), m = -\frac{1}{2}$

42. $(r, 3), (5, 9), m = 2$

43. $(5, 9), (r, -3), m = -4$

44. $(r, 2), (6, 3), m = \frac{1}{2}$

45. $(r, 4), (7, 1), m = \frac{3}{4}$



Module 4: Linear and Nonlinear Functions

L4-3: Slope-Intercept Form

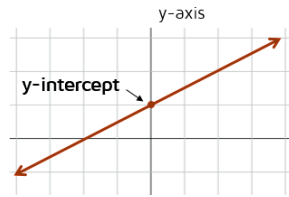
Remember this



Step 1: Use the **slope** formula to find the slope.

Step 2: Determine the **y-intercept**, which is the y-value where the graph crosses the y-axis.

Step 3: Write the **equation** of the line



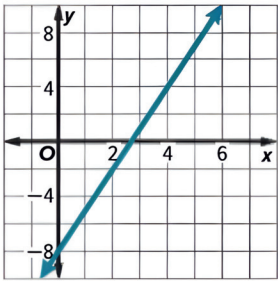
Slope Intercept Form

$$y = mx + b$$

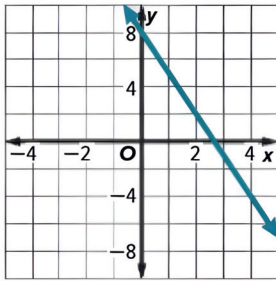
$$y = (\text{slope})x + \text{y-intercept}$$

Match each graph with its equation:

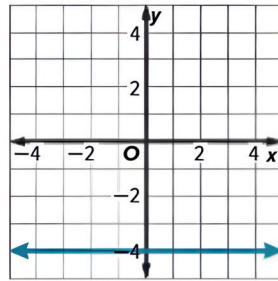
A.



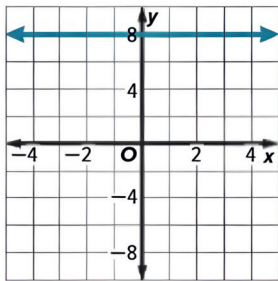
B.



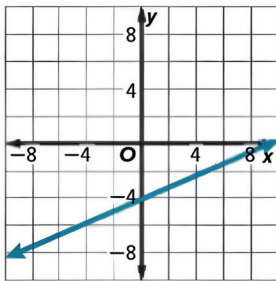
C.



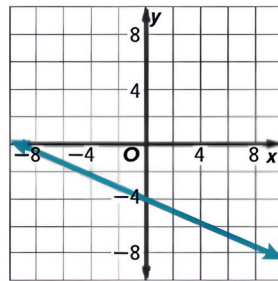
D.



E.



F.



? $y = 8$

? $y = -4$

? $3x + 7y = -28$

? $y = -3x + 8$

? $y = \frac{3}{7}x - 4$

? $3x - y = 8$



Hint:

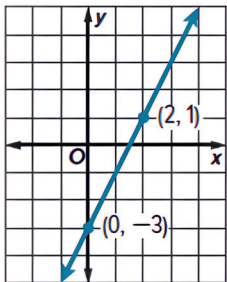
The equation $y = a$ represents a **horizontal line** at $y = a$, and its slope is zero

MCQ

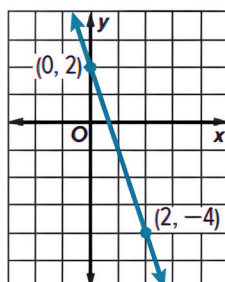
- ? ☐ A.
- ? ☐ B.
- ? ☐ C.
- ? ☐ D.

Write an equation in slope-intercept form for each graph shown.

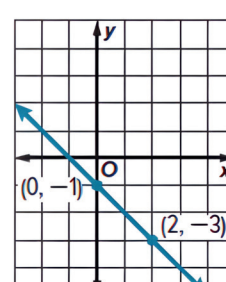
37.



38.



39.



Module 4: Linear and Nonlinear Functions

L4-3: Slope-Intercept Form

Remember this



Slope Intercept Form

$$y = mx + b$$

$$y = (\text{slope})x + \text{y-intercept}$$



15. **SAVINGS** Wade's grandmother gave him \$100 for his birthday. Wade wants to save his money to buy a new portable game console. Each month, he adds \$25 to his savings. **Write an equation in slope-intercept form** to represent Wade's saving y after x months.

Equation:

16. **FITNESS CLASSES** Toshelle wants to take strength training classes at the community center. She has to pay a one-time enrollment fee of \$25 to join the community center, and then \$45 for each class she wants to take. **Write an equation in slope-intercept form** for the cost of taking x classes.

Equation:

17. **EARNINGS** Macario works part time at a clothing store in the mall. He is paid \$9 per hour plus 12% commission on the items he sells in the store. **Write an equation in slope-intercept form** to represent Macario's hourly wage y .

Equation:

18. **ENERGY** From 2002 to 2005, U.S. consumption of renewable energy increased an average of 0.17 quadrillion BTUs per year. About 6.07 quadrillion BTUs of renewable power were produced in the year 2002. **Write an equation in slope-intercept form** to find the amount of renewable power P in quadrillion BTUs produced in year y between 2002 and 2005.

Equation:

29. **STREAMING** An online company charges \$13 per month for the basic plan. They offer premium channels for an additional \$8 per month.

a. Write an equation in slope-intercept form for the total cost c of the basic plan with p premium channels in one month.

Equation:

b. Graph the function.

c. What would the monthly cost be for a basic plan plus 3 premium channels?

30. **CAR CARE** Suppose regular gasoline costs \$2.76 per gallon. You can purchase a car wash at the gas station for \$3.

a. Write an equation in slope-intercept form for the total cost y of purchasing a car wash and x gallons of gasoline.

Equation:

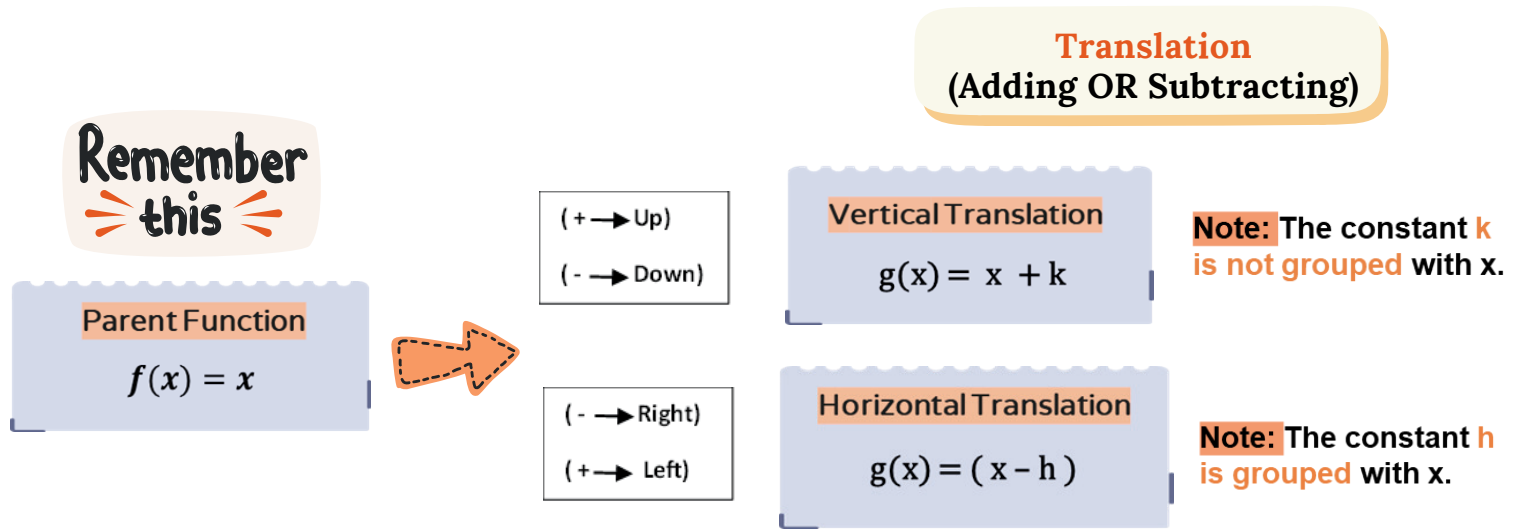
b. Graph the function.

c. Find the cost of purchasing a car wash and 8 gallons of gasoline.



Module 4: Linear and Nonlinear Functions

L4-4: Transformations of Linear Functions



Describe the translation in each function as it relates to the graph of the parent function.



1. $g(x) = x + 11$

2. $g(x) = x - 8$

3. $g(x) = (x - 7)$

4. $g(x) = (x + 12)$

5. $g(x) = (x + 10) - 1$

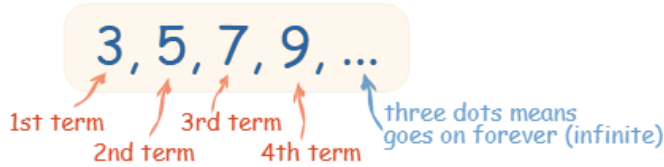
6. $g(x) = (x - 9) + 5$

Module 4: Linear and Nonlinear Functions

L4-5: Arithmetic Sequences

**Remember
this**

Arithmetic Sequences



Arithmetic Sequences Formula

$$a_n = a_1 + d(n-1)$$

The 1st term points to a_1 . The common difference points to d . The n^{th} term points to a_n . The term number points to $(n-1)$.



To calculate the **common difference**, subtract each term by the previous term

$$d = 5 - 3 = 2 \quad \text{OR} \quad d = 7 - 5 = 2 \quad \text{OR} \quad d = 9 - 7 = 2$$

Use the given arithmetic sequence to write an equation and then find the **7th** term of the sequence.



19. $-3, -8, -13, -18, \dots$

20. $-2, 3, 8, 13, \dots$

21. $-11, -15, -19, -23, \dots$

22. $-0.75, -0.5, -0.25, 0, \dots$

Module 4: Linear and Nonlinear Functions



L4-6: Piecewise and Step Functions

Remember this

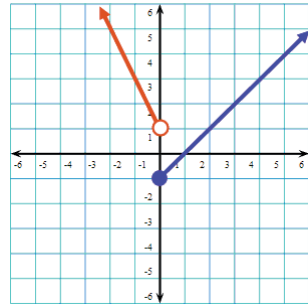


Piecewise Functions

a function whose graph is composed of several connected straight-line segments

Example:

$$g(x) = \begin{cases} -2x + 1 & x < 0 \\ x - 1 & x \geq 0 \end{cases}$$



Example 1 Graph a Piecewise-Defined Function

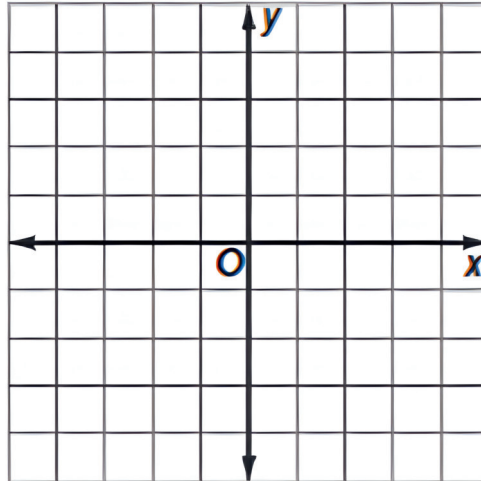
To graph a piecewise-defined function, graph each "piece" separately.

Graph $f(x) = \begin{cases} 2x + 4 & \text{if } x \leq 1 \\ -x + 3 & \text{if } x > 1 \end{cases}$. State the domain and range.

- Create a table for $f(x) = 2x + 4$ using values of $x \leq 1$.
- Create a table for $f(x) = -x + 3$ using values of $x > 1$.

$x \leq 1$	x	y
	1	

$x > 1$	x	y
	1	



IMPORTANT

Inequality Symbol	Closed Or Opened Circle
$>$	Opened
$<$	Opened
$\geq$	Closed
$\leq$	Closed

Remember this



In the **greatest integer function** $[]$, the value is rounded down to the nearest integer that is less than or equal to the given number.

Examples: $[5.3] = 5$; $[-5.3] = -6$

$$f(x) = 2[x - 1]$$

First, perform the calculation inside the function $(x - 1)$, and **then** find the value of the function $[]$.

18. Suppose $f(x) = 2[x - 1]$.

a. Find $f(1.5)$.

b. Find $f(2.2)$.

c. Find $f(9.7)$.

d. Find $f(-1.25)$.



Module 4: Linear and Nonlinear Functions

L4-7: Absolute Value Function

Remember this



(+ → Up)
(- → Down)

Vertical Translation

$$g(x) = |x| + k$$

Note: The constant **k** is not inside the absolute value sign.

Parent Function

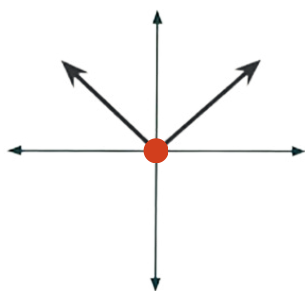
$$f(x) = |x|$$

(- → Right)
(+ → Left)

Horizontal Translation

$$g(x) = |x - h|$$

Note: The constant **h** is inside the absolute value sign.



The vertex of the parent graph is located at the origin (0, 0).

How to find the Equation of an Absolute Value Function from a Graph?

$$f(x) = a|x - h| + k$$

Dilation (Slope)

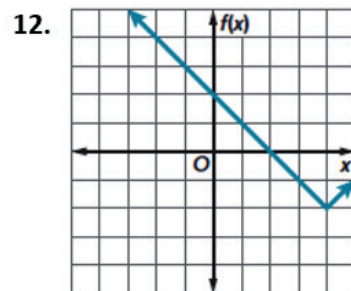
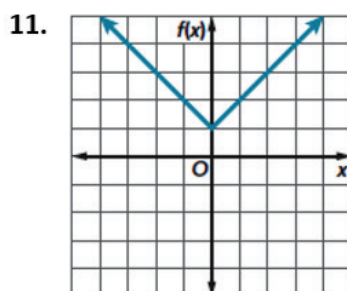
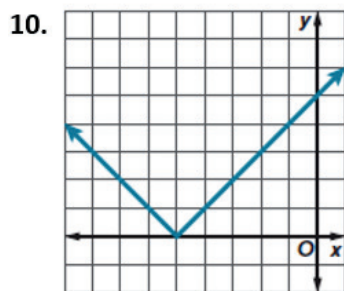
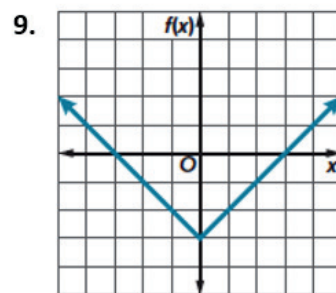
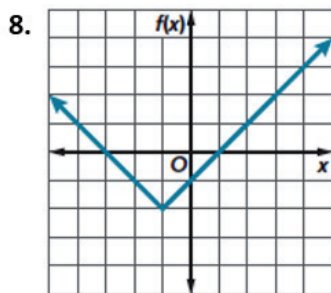
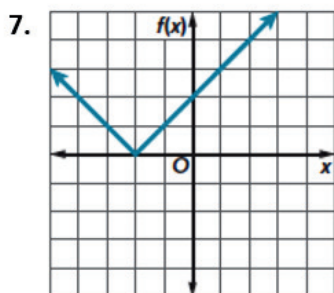
Horizontal Translation (Right or Left)

Vertical Translation (UP or DOWN)

To find the translation (vertical or horizontal), **trace the vertex from the origin.**



Use the graph of the function to write its equation.



Module 5: Creating Linear Equations

L5-1: Writing Equations in Slope-Intercept Form

**Remember
this**



Slope Intercept Form

$$y = mx + b$$

$$y = (\text{slope})x + \text{y-intercept}$$

Write an Equation Given two points

Step 1: Use the given 2 points to **find the slope**.

Step 2: **Substitute** one of the given points into the equation of slope intercept form to **find the y-intercept**.

Step 3: **Write the equation** in slope-intercept form.

Write an equation of the line that passes through each pair of points.



11. $(0, -4), (5, -4)$

12. $(-4, -2), (4, 0)$

13. $(-2, -3), (4, 5)$

14. $(0, 1), (5, 3)$

15. $(-3, 0), (1, -6)$

16. $(1, 0), (5, -1)$

Module 5: Creating Linear Equations

L5-2: Writing Equations in Standard and Point-Slope Forms

Remember this



Slope Intercept Form

$$y = mx + b$$

$$y = (\text{slope})x + \text{y-intercept}$$

Write an Equation Given two points

Step 1: Use the given 2 points to **find the slope**.

Step 2: **Substitute** one of the given points into the equation of slope intercept form to **find the y-intercept**.

Step 3: Write the equation in slope-intercept form.

Parallel and Perpendicular Line

Parallel lines: Two lines are parallel if they have the **same slope**.

$$\text{slope 1} = \text{slope 2}$$

Perpendicular lines: Two lines are perpendicular if the **product of their slopes is -1**.

$$\text{Slope 1} \times \text{slope 2} = -1$$

If slope 1 is m , then slope 2 is $-\frac{1}{m}$

Write an equation in slope-intercept form for the line that passes through the given point and is parallel to the graph of each equation. Then write an equation for the line that passes through the given point and is perpendicular to the graph.

25. $(3, -2); y = x + 4$

Parallel

Perpendicular

27. $(0, 2); y = -5x + 8$

Parallel

Perpendicular

29. $(-2, 3); y = -\frac{3}{4}x + 4$

Parallel

Perpendicular

26. $(4, -3); y = 3x - 5$

Parallel

Perpendicular

28. $(-4, 2); y = -\frac{1}{2}x + 6$

Parallel

Perpendicular

30. $(9, 12); y = 13x - 4$

Parallel

Perpendicular



Module 5: Creating Linear Equations

L5-2: Writing Equations in Standard and Point-Slope Forms

**Remember
this**



Slope Intercept Form

$$y = mx + b$$

$$y = (\text{slope})x + \text{y-intercept}$$

Write an Equation Given two points

Step 1: Use the given 2 points to **find the slope**.

Step 2: **Substitute** one of the given points into the equation of slope intercept form to **find the y-intercept**.

Step 3: Write the equation in slope-intercept form.

Parallel and Perpendicular Line

Parallel lines: Two lines are parallel if they have the **same slope**.

$$\text{slope 1} = \text{slope 2}$$

Perpendicular lines: Two lines are perpendicular if the **product of their slopes is -1**.

$$\text{Slope 1} \times \text{slope 2} = -1$$

If slope 1 is m , then slope 2 is $-\frac{1}{m}$

Determine whether the graphs of each pair of equations are parallel, perpendicular, or neither.

31. $y = 4x + 3$
 $4x + y = 3$

32. $y = -2x$
 $2x + y = 3$



33. $3x + 5y = 10$
 $5x - 3y = -6$

34. $-3x + 4y = 8$
 $-4x + 3y = -6$

35. $2x + 5y = 15$
 $3x + 5y = 15$

36. $2x + 7y = -35$
 $4x + 14y = -42$

Module 5: Creating Linear Equations

L5-6: Inverses of Linear Functions

**Remember
this**



Finding Inverse of Functions Steps:

Step 1: Replace $f(x)$ with y in the equation.

Step 2: Interchange y and x in the equation.

Step 3: Solve the equation for y .

Step 4: Replace y with $f^{-1}(x)$ in the new equation.

Example:

Find the inverse function of $f(x) = 5x - 2$

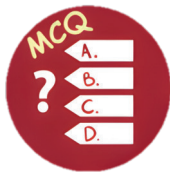
$$y = 5x - 2$$

$$x = 5y - 2$$

$$x + 2 = 5y \quad \rightsquigarrow \quad \frac{x + 2}{5} = y$$

$$f^{-1}(x) = \frac{x + 2}{5}$$

Find the inverse of each function.



16. $f(x) = 8x - 5$

17. $f(x) = 6(x + 7)$

18. $f(x) = \frac{3}{4}x + 9$

19. $f(x) = -16 + \frac{2}{5}x$

20. $f(x) = \frac{3x + 5}{4}$

21. $f(x) = \frac{-4x + 1}{5}$

Module 6: Linear Inequalities

L6-1: Solving One-Step Inequalities

Remember this



What is the inverse (opposite) of each operation?

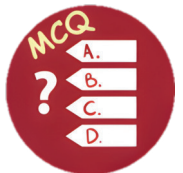
$$\begin{array}{r} x - 5 \leq 3 \\ +5 \quad +5 \\ \hline x \leq 8 \end{array}$$

How to graph Inequalities?

Inequality Symbol	Closed Or Opened Circle	Arrow	Graph
$>$	Opened	Right	
$<$	Opened	Left	
$\geq$	Closed	Right	
$\leq$	Closed	Left	

Example 1 Graph Inequalities

Graph the solution set of $y \leq 4$.



Example 4 Solve Inequalities by Subtracting

Solve $x + 24 \geq 61$.

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

13. $m - 4 < 3$

14. $p - 6 \geq 3$



15. $r - 8 \leq 7$

16. $t - 3 > -8$



17. $b + 2 \geq 4$

18. $13 > 18 + r$



19. $5 + c \leq 1$

20. $-23 \geq q - 30$



Module 6: Linear Inequalities

L6-2: Solving Multi-Step Inequalities

**Remember
this**



$$\begin{aligned} -3(x - 12) &\geq 39 \\ -3x + 36 &\geq 39 \\ -3x &\geq 3 \\ x &\leq -1 \end{aligned}$$

Note: When you **multiply or divide** each side of an inequality by the same **negative number**, you **must reverse the direction** of the **inequality symbol**.

Example 2 Write and Solve a Multi-Step Inequality

Consider the inequality *The opposite of a number divided by two minus seventeen is less than seven.*

Translate the sentence into an inequality.

Solve the inequality.



Example 3 Solve an Inequality with the Distributive Property

Solve the inequality $4(2x - 11) \leq -12 + 2(x - 4)$. Then graph the solution on a number line.



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

16. $-3(7n + 3) < 6n$

17. $21 \geq 3(a - 7) + 9$



18. $2y + 4 > 2(3 + y)$



19. $3(2 - b) < 10 - 3(b - 6)$



Module 6: Linear Inequalities



L6-2: Solving Multi-Step Inequalities

20. $7 + t \leq 2(t + 3) + 2$

21. $8a + 2(1 - 5a) \leq 20$

22. $2(x - 4) \leq 2 + 3(x - 6)$

23. $\frac{2x - 4}{6} \geq -5x + 2$

24. $5.6z + 1.5 < 2.5z - 4.7$

25. $0.7(2m - 5) \geq 21.7$

26. $2(-3m - 5) \geq -28$

27. $-6(w + 1) < 2(w + 5)$

28. $3x + 7 > 4x + 9$

29. $13x - 11 \leq 7x + 37$

30. $2(x - 3) < 3(2x + 2)$

31. $\frac{1}{2}x - 9 < 2x$

32. $2x - \frac{2}{3} \geq x - 22$

33. $\frac{1}{2}(4x + 3) \geq \frac{2}{3}x + 2$



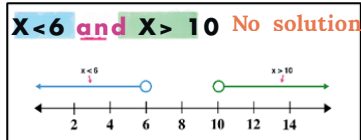
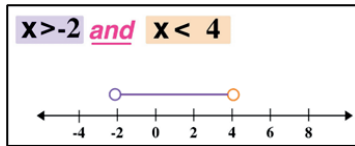
Module 6: Linear Inequalities

L6-3: Solving Compound Inequalities

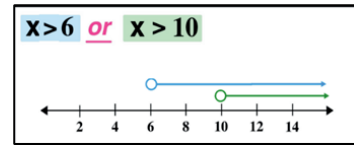
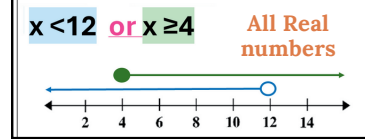
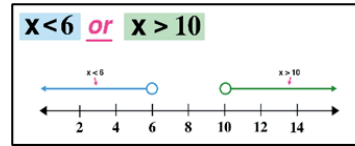
Remember this

In an "and" compound inequality, the solution is where the two individual solution sets intersect or overlap. If there's no intersection or overlap, then there's no solution.

"and"
(Intersection)



"or"
(Union)



If the union "or" of overlapping intervals covers the entire number line, the solution is the set of all real numbers, denoted by the symbol $\mathbb{R}$.



Solve each compound inequality. Then graph the solution set.

1. $f - 6 < 5$ and $f - 4 \geq 2$



2. $n + 2 \leq -5$ and $n + 6 \geq -6$



3. $y - 1 \geq 7$ or $y + 3 < -1$



4. $t + 14 \geq 15$ or $t - 9 < -10$



5. $-5 < 3p + 7 \leq 22$



6. $-3 \leq 7c + 4 < 18$



7. $5h - 4 \geq 6$ and $7h + 11 < 32$



8. $22 \geq 4m - 2$ or $5 - 3m \leq -13$



9. $-y + 5 \geq 9$ or $3y + 4 < -5$



10. $-4a + 13 \geq 29$ and $10 < 6a - 14$



Module 6: Linear Inequalities

L6-4: Solving Absolute Value Inequalities

Remember this



$$\begin{array}{ccc} & |x+2| \leq 4 & \\ \text{Case 1:} & \swarrow & \searrow \text{Case 2:} \\ x+2 \leq 4 & & -(x+2) \leq 4 \end{array}$$

Solution: $x \leq 2$ or $x \geq -6$, then graph it

The **solution** set of an absolute value inequality **represents** a **union** ("or") when the inequality uses a "greater than" ($>$) or "greater than or equal to" ($\geq$) symbol.



Solve each inequality. Then graph the solution set.

7. $|r+2| > 6$



8. $|k-4| > 3$



9. $|2h-3| \geq 9$



10. $|4p+2| \geq 10$



11. $|5v+3| > -9$



12. $|-2c-3| > -4$

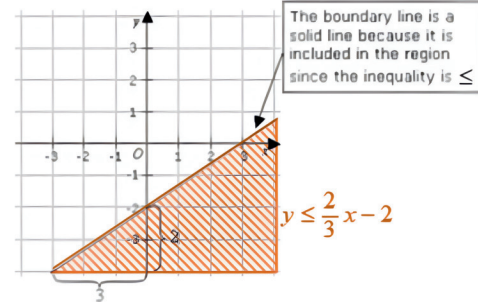


Module 6: Linear Inequalities

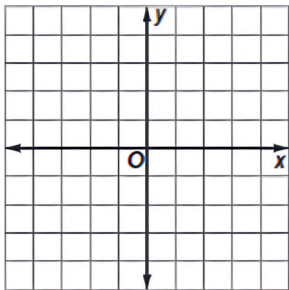
L6-5: Graphing Inequalities in Two Variables

Step 1 (Preparing the system)	1) Isolate y in each inequality (if necessary): Example: $2x + y < 4$ change it to $y < -2x + 4$ 2) Replace the inequality symbols with equal signs: Example: $y < -2x + 4$ change it to $y = -2x + 4$
Step 2 (Graphing)	1) Graph each equation on the coordinate plane (First, plot the y-intercept, then use the slope to find the second point). 2) Connect the points with a dashed line (- - -) if the inequality does not include an equal sign ($<$ or $>$). Connect them with a solid line (_____) if the inequality includes an equal sign ($\leq$ or $\geq$). 3) Determine which side of each line will be shaded (do test point $(0,0)$).

Graph $y \leq \frac{2}{3}x - 2$

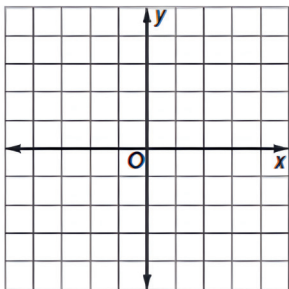
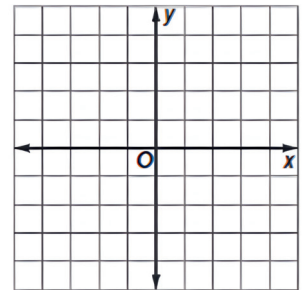


Graph each inequality.



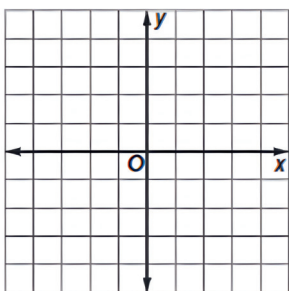
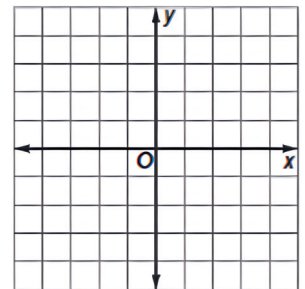
1. $y < x - 3$

2. $y > x + 12$



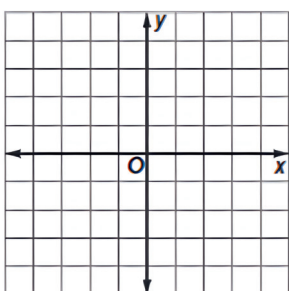
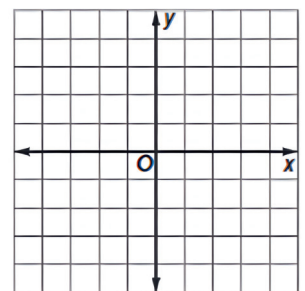
3. $y \geq 3x - 1$

4. $y \leq -4x + 12$



5. $6x + 3y > 12$

6. $2x + 2y < 18$



7. $7.5x + y > 10$

8. $2x + y < -3$

