Daily Math
Week 18 (2013-2014)

Mon. December 16, 2013
Tues. December 17, 2013
Wed. December 18, 2013
Thurs. December 19, 2013
Fri. December 20, 2013

Monday, December 16, 2013 1st

Find the rate of change (slope) in the following situation: "A swimming pool holds 1000 gallons of water and is being drained for the winter. The water drains at a rate of 20 gallons per minute."

Monday, December 16, 2013 1^{st}

Find the rate of change (slope) in the following situation: "A swimming pool holds 1000 gallons of water and is being drained for the winter. The water drains at a rate of 20 gallons per minute."

Answer: The *rate of change*—the number associated with the variable in the situation—is in units of gallons per minute. The total amount of water is decreasing, so,

Slope = -20 gallons/minute

Monday, December 16, 2013 2nd

Find the rate of change (slope) in the following situation: "Tyler collects sports cards. Right now, he has 42 cards, and collects 5 each week."

Monday, December 16, 2013 2nd

Find the rate of change (slope) in the following situation: "Tyler collects sports cards. Right now, he has 42 cards, and collects 5 each week."

Answer: The *rate of change*—the number associated with the variable in the situation—is in units of cards per week. The total amount of cards is increasing, so,

Slope = 5 cards/week

Monday, December 16, 2013 3rd

Find the rate of change (slope) in the following situation: "Kenia is building her portfolio with drawings. Currently, she has 12 drawings, but plans to add 5 drawings each week."

Monday, December 16, 2013 3rd

Find the rate of change (slope) in the following situation: "Kenia is building her portfolio with drawings. Currently, she has 12 drawings, but plans to add 5 drawings each week."

Answer: The *rate of change*—the number associated with the variable in the situation—is in units of drawings per week. The total number of drawings is increasing, so,

Slope = 5 drawing/week

Monday, December 16, 2013 4^{th}

Find the rate of change (slope) in the following situation: "Suppose that the average salary for a particular career begins at $30, 000 for someone with no experience and increases by $2500 per year of experience."

Monday, December 16, 2013 4^{th}

Find the rate of change (slope) in the following situation: "Suppose that the average salary for a particular career begins at \$30, 000 for someone with no experience and increases by \$2500 per year of experience."

Answer: The *rate of change*—the number associated with the variable in the situation—is in units of dollars per year. The total salary is increasing, so,

Slope = \$2500 /year

Monday, December 16, 2013 5th

Find the rate of change (slope) in the following situation: "There are 80 pennies in a jar. Each day 5 pennies are removed from the jar."

Monday, December 16, 2013 5th

Find the rate of change (slope) in the following situation: "There are 80 pennies in a jar. Each day 5 pennies are removed from the jar."

Answer: The *rate of change*—the number associated with the variable in the situation—is in units of pennies per day. The total number of pennies is decreasing, so,

Slope = -5 pennies/day

Monday, December 16, 2013 6^{th}

Find the rate of change (slope) in the following situation: "A bowling alley charges $3 for shoe rental and $2 per game."

Monday, December 16, 2013 6^{th}

Find the rate of change (slope) in the following situation: "A bowling alley charges $3 for shoe rental and $2 per game."

Answer: The *rate of change*—the number associated with the variable in the situation—is in dollars per game. The total cost of bowling is increasing, so,

Slope = $2/game

Monday, December 16, 2013 7th

Find the rate of change (slope) in the following situation: "You deposit $50 into your lunch account. Each day you buy a lunch that costs $1.50."

Monday, December 16, 2013 7th

Find the rate of change (slope) in the following situation: "You deposit \$50 into your lunch account. Each day you buy a lunch that costs \$1.50."

Answer: The *rate of change*—the number associated with the variable in the situation—is in dollars per day. The total value of your lunch account is decreasing, so,

Slope = -\$1.50/day

Tuesday, December 17, 2013 1^{st}

Find the rate of change (slope) represented in this table:

x	3	5	10	13	17
y	8	12	22	28	36

Tuesday, December 17, 2013 1^{st}

Find the rate of change (slope) represented in this table:

x	3	5	10	13	17
y	8	12	22	28	36

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{12-8}{5-3} = \frac{4}{2} = \mathbf{2}$$

Tuesday, December 17, 2013 2^{nd}

Find the rate of change (slope) represented in this table:

x	y
0	50
4	44
12	32
16	26
22	17

Tuesday, December 17, 2013 2^{nd}

Find the rate of change (slope) represented in this table:

x	y
0	50
4	44
12	32
16	26
22	17

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2-y_1}{x_2-x_1} = \frac{44-50}{4-0} = \frac{-6}{4} = \mathbf{-1.5 \; or \; -\frac{3}{2}}$$

Tuesday, December 17, 2013 **3rd**

Find the rate of change (slope) represented in this table:

x	y
1	100
-2	94
-7	84
-10	78
-12	74

Tuesday, December 17, 2013 3^{rd}

Find the rate of change (slope) represented in this table:

x	y
1	100
-2	94
-7	84
-10	78
-12	74

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{94 - 100}{(-2) - 1} = \frac{-6}{-3} = \mathbf{2}$$

Tuesday, December 17, 2013 4th

Find the rate of change (slope) represented in this table:

x	2	6	12	20	24
y	-4	-10	-19	-31	-37

Tuesday, December 17, 2013 4^{th}

Find the rate of change (slope) represented in this table:

x	2	6	12	20	24
y	-4	-10	-19	-31	-37

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{(-10) - (-4)}{6 - 2} = \frac{-6}{4} = \boldsymbol{-\frac{3}{2} \; or \; -1.5}$$

Tuesday, December 17, 2013 5th

Find the rate of change (slope) represented in this table:

x	-3	1	6	8	11
y	-10	-2	8	12	18

Tuesday, December 17, 2013 5th

Find the rate of change (slope) represented in this table:

x	-3	1	6	8	11
y	-10	-2	8	12	18

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{(-2) - (-10)}{1 - (-3)} = \frac{8}{4} = \mathbf{2}$$

Tuesday, December 17, 2013 **6th**

Find the rate of change (slope) represented in this table:

x	-8	0	12	20	32
y	-4	-2	1	3	6

Tuesday, December 17, 2013 6th

Find the rate of change (slope) represented in this table:

x	-8	0	12	20	32
y	-4	-2	1	3	6

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{(-2)-(-4)}{0-(-8)} = \frac{2}{8} = \mathbf{\frac{1}{4}}$$

Tuesday, December 17, 2013 7^{th}

Find the rate of change (slope) represented in this table:

x	y
-6	9
0	5
9	-1
12	-3
27	-13

Tuesday, December 17, 2013 7^{th}

Find the rate of change (slope) represented in this table:

x	y
-6	9
0	5
9	-1
12	-3
27	-13

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{5-9}{0-(-6)} = \frac{-4}{6} = -\frac{2}{3}$$

Wednesday, December 18, 2013 **1st**

Find the slope:

x	1	2	3
y	3	5	7

Wednesday, December 18, 2013 1^{st}

Find the slope:

x	1	2	3
y	3	5	7

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{5-3}{2-1} = \frac{2}{1} = \mathbf{2}$$

Wednesday, December 18, 2013 **2nd**

Find the slope: $y = 4x + 6$

Wednesday, December 18, 2013 **2nd**

Find the slope: $y = 4x + 6$

Answer: When the equation is in *slope-intercept* form ($y = mx + b$), then the coefficient of x (i.e. m) is the slope.

So, for this equation, **slope = 4**

Wednesday, December 18, 2013 **3rd**

Find the slope between these two points: (4,3) and (7,4)

Wednesday, December 18, 2013 **3rd**

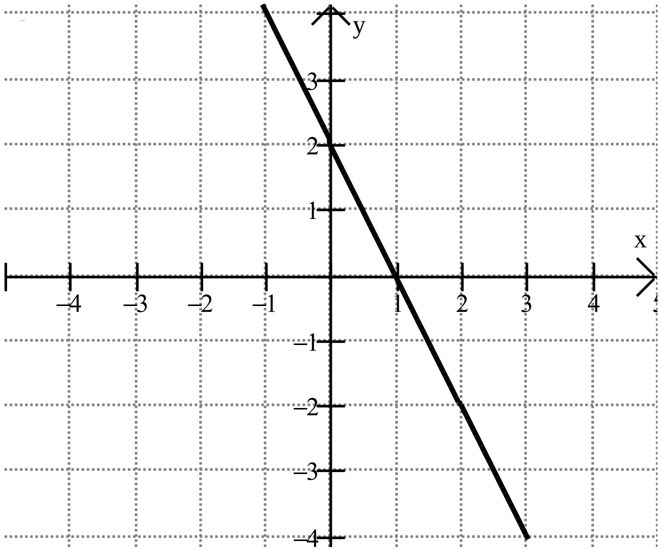
Find the slope between these two points: (4,3) and (7,4)

Answer: $slope = \frac{y_2 - y_1}{x_2 - x_1}$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{4-3}{7-4} = \mathbf{\frac{1}{3}}$$

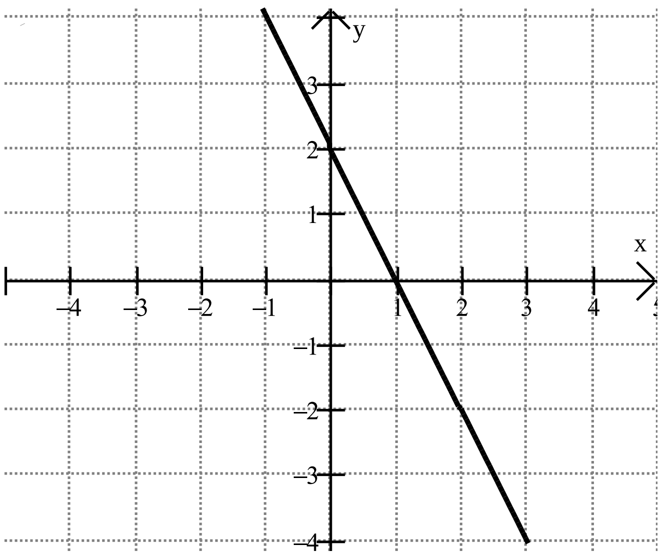
Wednesday, December 18, 2013 **4th**

Find the slope:



Wednesday, December 18, 2013 **4th**

Find the slope:



Answer:

$$Slope = \frac{rise}{run}$$

Moving left to right, $\frac{rise}{run} = \frac{-2}{1} = \mathbf{-2}$

Wednesday, December 18, 2013 **5th**

Find the slope of the line describing the total cost of a pizza in the following scenario: *"It cost $6 for a pizza plus $1 for each topping."*

Wednesday, December 18, 2013 **5^{th}**

Find the slope of the line describing the total cost of a pizza in the following scenario: *"It cost $6 for a pizza plus $1 for each topping."*

Answer: The *rate of change*—the number associated with the variable in the situation—is in dollars per topping. The total cost of your pizza is decreasing with each topping, so,

Slope = $1/topping

Wednesday, December 18, 2013 **6th**

Find the slope:

x	10	12	14
y	8	5	2

Wednesday, December 18, 2013 6th

Find the slope:

x	10	12	14
y	8	5	2

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{5-8}{12-10} = \frac{-3}{2} = -\frac{3}{2}$$

Wednesday, December 18, 2013 7^{th}

Find the slope: $y = -3x - 5$

Wednesday, December 18, 2013 7th

Find the slope: $y = -3x - 5$

Answer: When the equation is in *slope-intercept* form ($y = mx + b$), then the coefficient of x (i.e. m) is the slope.

So, for this equation, **slope = -3**

Thursday, December 19, 2013 **1st**

Find the slope between these points:

(0, 3) and (-2, 5)

Thursday, December 19, 2013 **1st**

Find the slope between these points:

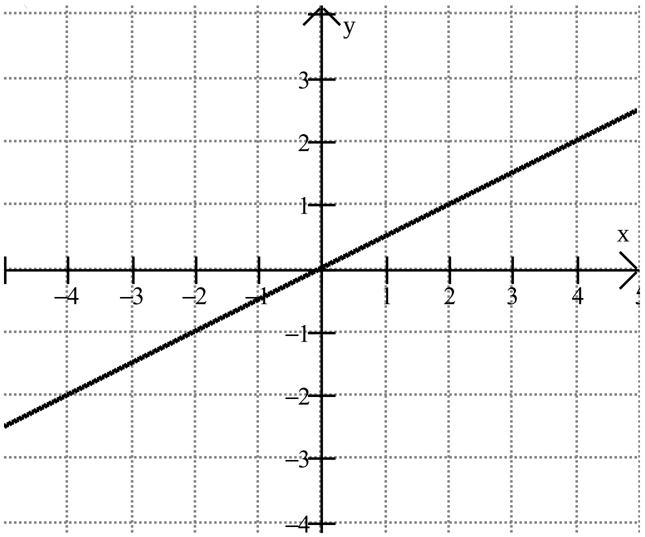
(0, 3) and (-2, 5)

Answer: $slope = \frac{y_2 - y_1}{x_2 - x_1}$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 3}{(-2) - 0} = \frac{2}{-2} = \mathbf{-1}$$

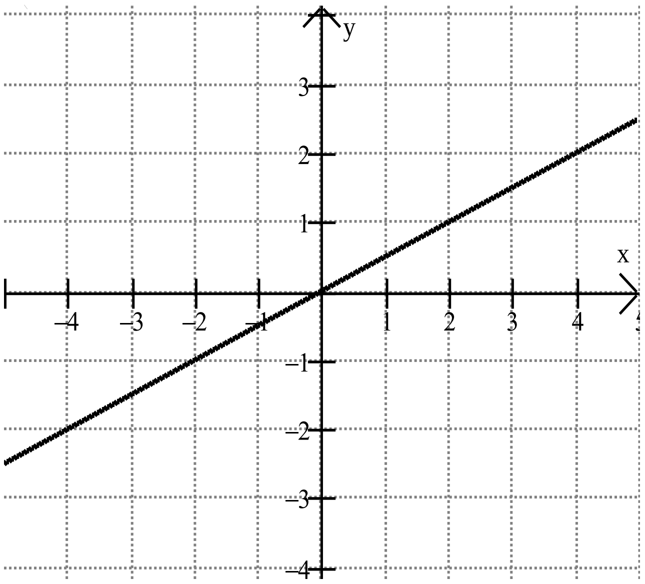
Thursday, December 19, 2013 **2nd**

Find the slope:



Thursday, December 19, 2013 **2nd**

Find the slope:



Answer:

$$Slope = \frac{rise}{run}$$

Moving left to right, $\frac{rise}{run} = \frac{+1}{2} = \mathbf{\frac{1}{2}}$

Thursday, December 19, 2013 **3rd**

Find the slope of the line describing the total cost of attending the school fair in the following scenario: *"There is a \$5 entrance fee into the school fair. Each game costs an additional \$2."*

Thursday, December 19, 2013 **3rd**

Find the slope of the line describing the total cost of attending the school fair in the following scenario: *“There is a $5 entrance fee into the school fair. Each game costs an additional $2.”*

Answer: The *rate of change*—the number associated with the variable in the situation—is in dollars per additional game. The total cost goes up with each additional game, so,

Slope = $2/game

Thursday, December 19, 2013 **4th**

Find the slope:

x	y
-4	2
-1	2
2	2

Thursday, December 19, 2013 **4th**

Find the slope:

x	y
-4	2
-1	2
2	2

Answer: If the slope is constant (in linear relationships), then any two points can be used to find the slope:

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{2-2}{(-1)-(-4)} = \frac{0}{3} =$$

0 (a horizontal line)

Thursday, December 19, 2013 **5th**

Find the slope: $y = \frac{1}{2}x + 7$

Thursday, December 19, 2013 **5th**

Find the slope: $y = \frac{1}{2}x + 7$

Answer: When the equation is in *slope-intercept* form ($y = mx + b$), then the coefficient of x (i.e. m) is the slope.

So, for this equation, **slope =** $\mathbf{\frac{1}{2}}$

Thursday, December 19, 2013 **6th**

Find the slope between these points:

(-1, -5) and (2, 1)

Thursday, December 19, 2013 **6th**

Find the slope between these points:

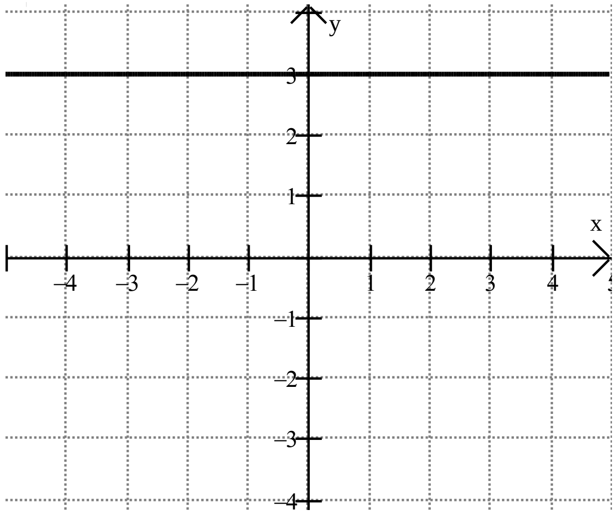
(-1, -5) and (2, 1)

Answer: $slope = \frac{y_2 - y_1}{x_2 - x_1}$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{1-(-5)}{2-(-1)} = \frac{6}{3} = \mathbf{2}$$

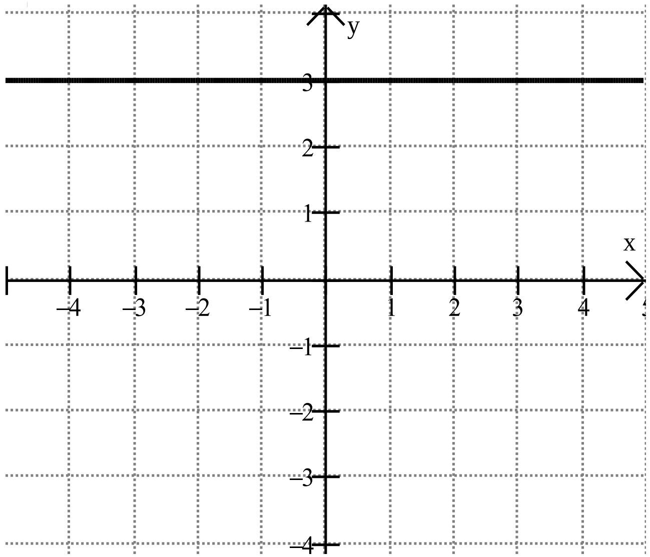
Thursday, December 19, 2013 **7th**

Find the slope:



Thursday, December 19, 2013 **7th**

Find the slope:



Answer:

$$Slope = \frac{rise}{run}$$

Moving left to right, $\frac{rise}{run} = \frac{0}{1} = \mathbf{0}$

Friday, December 20, 2013 **1st**

Solve the inequality:

$$5n < 75$$

Friday, December 20, 2013 **1st**

Solve the inequality:

$$5n < 75$$

Answer:

$$5n < 75$$

$$5n \div 5 < 75 \div 5$$

$$\boldsymbol{n < 15}$$

Friday, December 20, 2013 **2nd**

Solve the inequality:

$$\frac{x}{6} \leq -12$$

Friday, December 20, 2013 **2nd**

Solve the inequality:

$$\frac{x}{6} \leq -12$$

Answer:

$$\frac{x}{6} \leq -12$$

$$6\left(\frac{x}{6}\right) \leq 6(-12)$$

$$\boldsymbol{x \leq -72}$$

Friday, December 20, 2013 **3rd**

Solve the inequality:

$$-15t > -60$$

Friday, December 20, 2013 3rd

Solve the inequality:

$$-15t > -60$$

Answer: $$-15t > -60$$

$$-15t \div (-15) < -60 \div (-15)$$

(note that the sign is reversed whenever you multiply or divide by a negative number)

$$\boldsymbol{t < 4}$$

Friday, December 20, 2013 **4th**

Solve the inequality:

$$-4q \geq 122$$

Friday, December 20, 2013 **4th**

Solve the inequality:

$$-4q \geq 122$$

Answer: $-4q \geq 122$

$$(-4q) \div (-4) \leq (122) \div (-4)$$

(note that the sign is reversed whenever you multiply or divide by a negative number)

$$\boldsymbol{q \leq -30.5}$$

Friday, December 20, 2013 **5th**

Solve the inequality:

$$-8p < \frac{4}{5}$$

Friday, December 20, 2013 5th

Solve the inequality:

$$-8p < \frac{4}{5}$$

Answer:

$$-8p < \frac{4}{5}$$

$$-8p \div (-8) > \frac{4}{5} \div (-8)$$

(note that the sign is reversed whenever you multiply or divide by a negative number)

$$p > \frac{4}{5} \cdot \frac{-1}{8}$$

$$p > \frac{-4}{40}$$

$$\boldsymbol{p > -\frac{1}{10}}$$

Friday, December 20, 2013 **6th**

Solve the inequality:

$$-9 \geq 2.4m$$

Friday, December 20, 2013 **6th**

Solve the inequality:

$$-9 \geq 2.4m$$

Answer: $-9 \geq 2.4m$

$$-9 \div 2.4 \geq 2.4m \div 2.4$$

Note that the sign does NOT change because you are dividing by a positive number.

$$\mathbf{-3.75 \geq m}$$

Friday, December 20, 2013 **7th**

Solve the inequality:

$$-\frac{r}{2} \leq -11$$

Friday, December 20, 2013 **7th**

Solve the inequality:

$$-\frac{r}{2} \leq -11$$

Answer:

$$-\frac{r}{2} \leq -11$$

$$\left(-\frac{1}{2}\right) r \leq -11$$

$$(-2) \cdot \left(-\frac{1}{2}\right) r \geq (-2) \cdot (-11\ )$$

(note that the sign is reversed whenever you multiply or divide by a negative number)

$$\boldsymbol{r \geq 22}$$