

Algebra CC
Assignment #24
Modeling with Inequalities
*** Optional**

- *1. Translate each of the following phrases into an inequality, and then find the solution set by solving the inequality.
- (a) When 4 times a number n is decreased by 3 it's at most 21.
 - (b) When 6 less than 3 times a number is increased by 2, it's at least 5 times the same number decreased by 8.
 - (c) Find all numbers such that a third of a number increased by half that number is at least 3 less than that same number.
 - (d) The sum of 2 consecutive integers is at most the difference between nine times the smaller and 5 times the larger.
2. A 2.2 GB game is being downloaded onto your laptop. When you have downloaded half a gigabyte, you notice that your computer has been downloading at a rate of .01GB/min.
- (a) Write an inequality that represents at least how many minutes m it will take to download the whole game.
 - (b) At this point you also realize your computer only has 2 hours of battery life left and you've forgotten your charger. Will there be enough time to download the entire game? Don't forget you've already downloaded some of it.
 - (c) If, after turning off a few applications, the download speed increases to .015GB/min will you be able to download the entire game now?
3. At an amusement park there's only enough room for 4500 people to be in it at any time. The manager has also worked out that there needs to be 2800 people in the park to make a profit after all the overhead costs and employee pay. If people are entering the park at a rate of 12 people a minute and there are 850 people in the park currently *between* how many minutes should the door stay open to let guests in?
- (a) Translate the scenario above into a compound inequality involving the number of minutes, m , that the door has been open. Take into account both the fact that there must be a minimum of 2800 people and a maximum of 4500 people.
 - (b) Rewrite the inequality you found in part (a) using the AND connector and then solve the compound inequality.
 - (c) Write the solution set as a single statement using interval notation.
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R1. Solve for x : $2x + 8y = 4z$

***R2.** What is the sum of $-3x^2 - 7x + 9$ and $-5x^2 + 6x - 4$?

R3. Simplify the following: $-2x^2y + 3x$ when $x = -1$ and $y = 5$

***R4.** If the sum of 5 and number is multiplied by two, the result is 20. What is the number?

***R5.** Is the following equation a true statement? $\frac{1}{2}(-8) + 2 = 10 + (-12)$

R6. The side length of a square is represented as $2x$. The perimeter of the square is equal to 40. What is the measurement of one side length of the square?



$2x$

1. (a) $4n - 3 \leq 21$
 $n \leq 6$

R1. $x = 2z - 4y$

(b) $(3x - 6) + 2 \geq 5x - 8$
 $x \leq 2$

R2. $-8x^2 - x + 5$

(c) $\frac{1}{3}x + \frac{1}{2}x \geq x - 3$
 $x \leq 18$

R3. -13

(d) $x + (x + 1) \leq 9x - 5(x + 1)$
 $x \geq 3$

R4. 5

R5. yes

R6. 10

2. (a) $.01m \geq 2.2$

(b) no, it will take 170 minutes

(c) Yes, it will take about $113.\bar{3}$

3. (a) $2800 \leq 12m + 850 \leq 4500$

(b) $2800 \leq 12m + 850$ and $12m + 850 \leq 4500$

$m \geq 162.5$ $m \leq 304.2$

(c) $[162.5, 304.2]$