

1. A water tank is being filled by pumps at a constant rate. The volume of water in the tank V , in gallons, is given by the equation:

$$V(t) = 65t + 280, \text{ where } t \text{ is the time, in minutes, the pump has been on}$$

- (a) At what rate, in gallons per minute, is the water being pumped into the tank?
 - (b) How many gallons of water were in the tank when the pumps were turned on?
 - (c) What is the volume in the tank after two hours of the pumps running?
 - (d) The pumps will turn off when the volume in the tank hits 10,000 gallons. To the nearest minute, after how long does this happen?
2. A solar lease customer built up an excess of 6,500 kilowatt hours (kwh) during the summer using his solar panels. When he turned his electric heat on, the excess began to be used up at a rate of 50 kilowatt hours per day.
- (a) If E represents the excess left and d represents the number of days since the heat has been turned on, write an equation for E in terms of d .
 - (b) How much of the excess will be left after one month (use a month length of 30 days)?
 - (c) If the heat will need to be turned on for 5 months, will the excess be enough to last through this time period? Justify your answer.

3. The population of Champaign, Illinois is given for three years in the table:

Year	Population
1970	163,488
1980	168,392
2012	203,276

- (a) Using 1970 as $t = 0$, create a linear model from the first two data points in this table to predict the population, p , as a function of the number of years since 1970, t .
- (b) If this model is used to predict the population of Champaign in the year 2012, will the model overestimate or underestimate the actual population? Explain.

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- R1. Consider the compound inequality given by:

$$-2 \leq \frac{1}{2}x + 2 \text{ and } \frac{1}{2}x + 2 < 3$$

Solve this compound inequality and graph the solution on a number line. Write the solution set as a single algebraic statement.

- R2. If the functions $f(x) = 2x - 3$ and $g(x) = \frac{3}{2}x + 1$ then which of the following is a true statement?

Hint: Use your calculator's Table App.

- (1) $f(0) > g(0)$
- (2) $f(2) = g(2)$
- (3) $f(8) = g(8)$
- (4) $g(4) < f(4)$

- R3. Factor: $12m - 16y$

- R4. If $x + 3$ is an odd integer, represent the next consecutive odd integer in terms of x .
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1. (a) 65 gallons per minute

(b) 280 gallons

(c) 8080 gallons

(d) 150 minutes

2. (a) $E=6500-50d$

(b) 5000 kilowatts

(c) No. 7500 kilowatts will be needed for 5 months and the customer only has 6500 kilowatts.

3. (a) $p = 490.4t + 163,488$

(b) Using the model the populations should be about 184,085 but the actual population is 203,276.

R1.



$$-8 \leq x < 2$$

R2. (3)

R3. $4(3m - 4y)$

R4. $x + 5$