Name: _____ Class: _____

**Algebra Quarterly 1 Review Sheet 3**

Question 1

Solve for $x$. Explain what's different between (a) and (b) and why you get two different kinds of answers.

(a) $\frac{9}{4}x - 5 = 2(x - 5) + 0.25x$

(b) $\frac{9}{4}x - 5 = 2\left(x - \frac{5}{2}\right) + 0.25x$

Question 2

Ian is borrowing $1,000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

(a) Create an expression for the amount that Ian still owes his parents after $x$ months.

(b) Create an expression for the amount that Ken still owes his parents after $x$ months.

(c) Determine algebraically when the two boys will owe the same amount.

(d) Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

Question 3

| Year | 1980 | 1990 | 2000 | 2010 | 2020 |
|---|---|---|---|---|---|
| Population | 4.7 | 6.2 | 7.7 | 9.2 | 10.7 |

The table above shows the population of a certain mammal (in thousands) on a certain year.

(a) Create an equation "P = " that gives the population of the mammal (in thousands) in terms of $t$, where $t$ represents the number of decades after 1970.

(b) Explain why the table represents a linear function.

(c) Identify the y-intercept and explain what it represents in real-world terms.

(d) In what year will the population of the mammal exceed 20,000? Determine this algebraically.

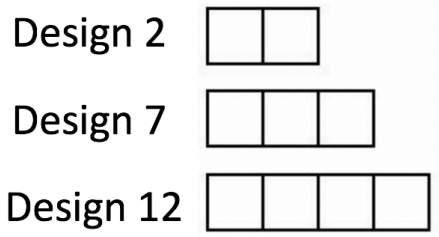
Question 4

Find which has the greatest **rate of change**. In addition, find which has the greatest **y-intercept**.

| | |
|---|---|
| A line that passes through the point (-3, -1) and has a y-intercept of 0. | <table><tr><th>x</th><th>y</th></tr><tr><td>0</td><td>5</td></tr><tr><td>1</td><td>5</td></tr><tr><td>2</td><td>5</td></tr><tr><td>3</td><td>5</td></tr></table><br>HINT: Hmm, this is weird. For the slope, think about how much you need to add to the y-values to get from one row to the next row… |
| $2y = \frac{1}{8}x - 10$ | $y = \frac{1}{8}(x - 1) + \frac{1}{8}$ |

Question 5

Find the number of blocks in the 107th design.




Question 6

Solve for $x$. Express your answer as a decimal.

$$\frac{7}{3}\left(x + \frac{9}{28}\right) = 20$$

Question 7

The cost, $c$, in dollars of running a particular factory that produces $w$ widgets can be modeled using the linear function:

$$c = 1.25(w - 2) + 2175$$

(a) Find the slope and explain what it means in the context of the problem.

(b) Find the y-intercept and explain what it means in the context of the problem.

Question 8

The ages of three brothers are consecutive even integers. Three times the age of the youngest brother exceeds the oldest brother's age by 48 years. What is the age of the youngest brother?