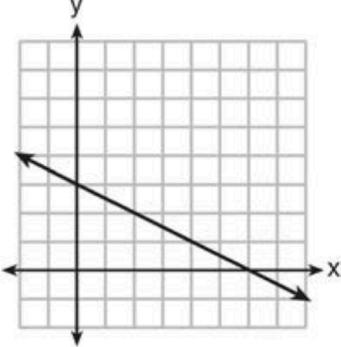


Name: _____

Class: _____

Algebra Quarterly 1 Review Sheet 2 Answer KeyQuestion 1Find which has the greatest **rate of change**. In addition, find which has the greatest **y-intercept**.

 <p>Rate of Change: $-\frac{1}{2}$</p> <p>Y-Intercept: 3</p>	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-8</td> <td>14</td> </tr> <tr> <td>-2</td> <td>11</td> </tr> <tr> <td>0</td> <td>10</td> </tr> <tr> <td>10</td> <td>5</td> </tr> </tbody> </table> <p>Rate of Change: $-\frac{1}{2}$</p> <p>Y-Intercept: 10</p>	x	y	-8	14	-2	11	0	10	10	5
x	y										
-8	14										
-2	11										
0	10										
10	5										
<p>A line that passes through the point (4, 6) and has a y-intercept of -3.</p> <p>Rate of Change: $\frac{9}{4}$</p> <p>Note: We can tell this by creating a table based on the fact that one point is (4, 6) and the other point is (0, -3), which we know from the y-intercept.</p> <p>Y-Intercept: -3</p>	$12x + 12y = 8$ <p>Simplify:</p> $12y = 8 - 12x$ $y = \frac{2}{3} - x$ <p>Rate of Change: -1</p> <p>Y-Intercept: $\frac{2}{3}$</p>										

So the lower-left box had the greatest rate of change. The upper-right box had the greatest y-intercept.

Question 2

Paul and Saul's ages are consecutive integers. Saul is younger than Paul. If the difference between five more than Saul's age and five less than Paul's age is equal to 9, create an equation that can be used to find Paul's age. Do not solve the equation.

Saul: x (because he's younger)**Paul:** x + 2

$$(x + 5) - (x + 1 - 5) = 9$$

Question 3

Solve for x :

$$\frac{1}{3}x + 18 = \frac{2}{3}(x - 6) - \frac{1}{3}x$$

Simplify the right hand side and solve:

$$\frac{1}{3}x + 18 = \frac{2}{3}x - 4 - \frac{1}{3}x$$

$$\frac{1}{3}x + 18 = \frac{1}{3}x - 4$$

$$18 = -4$$

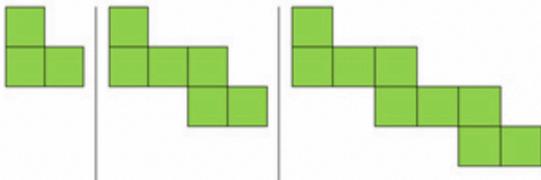
This is impossible, so there will never be a value for x that will make the equation true. So there is **NO SOLUTION**.

Question 4

Design 100

Design 102

Design 104



Find the number of blocks in Design 2. “Negatives blocks” are allowed.

First, find the rate of change. It is $\frac{3}{2}$ or 1.5 because the number of blocks increase by 3 as the term number increases by 2 and slope can be found by calculating $\frac{\text{change in } y}{\text{change in } x}$.

Using the 100th term, the expression is $3 + 1.5(x - 100)$.

Substitute 2 into the expression to get $3 + 1.5(2 - 100) = -144$ blocks.

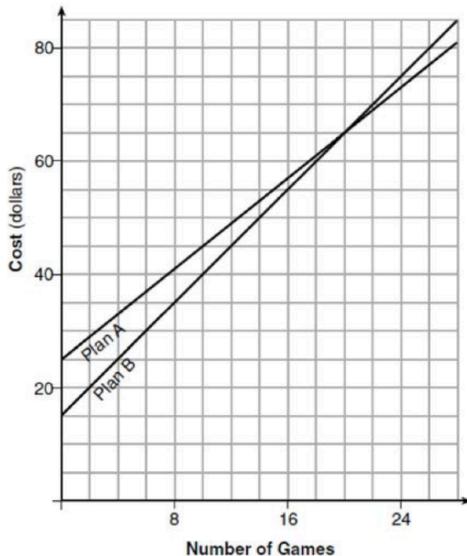
Question 5

Find the value of x that makes the following equation true. Express your answer as a decimal if necessary.

$$\begin{aligned} 4(x - 7) &= 0.3(x + 2) + 2.11 \\ 4x - 28 &= 0.3x + 0.6 + 2.11 \\ 3.7x &= 30.71 \\ x &= 8.3 \end{aligned}$$

Question 6

The graph below models the cost of renting video games with a membership in Plan A and Plan B.



(a) Create an *expression* for Plan A that gives the cost of renting x video games.

With all graphs, it's helpful to identify a couple of points that you know the graph passes through. Plan A passes through the points $(0, 25)$ and $(20, 65)$. So it has a slope of $\frac{65-25}{20-0} = 2$. We also know it has a y-intercept of 25.

Using the formula $y = mx + b$, we can create the expression $2x + 25$ for Plan A.

(b) Create an *expression* for Plan B that gives the cost of renting x video games.

Plan B passes through the points $(0, 15)$ and $(20, 65)$. So the y-value increases by 50 as the x-value increases by 20, so logically it has a slope of 50 divided by 20, which is 2.5. We also know it has a y-intercept of 15.

Using the formula $y = mx + b$, we can create the expression $2.5x + 15$ for Plan B.

(c) Show algebraically that Plan A and Plan B are equally worthwhile as long as you rent 20 video games.

Set the expressions equal to each other and solve:

$$\begin{aligned}2x + 25 &= 2.5x + 15 \\10 &= 0.5x \\20 &= x\end{aligned}$$

So they are equally worthwhile when $x = 20$, which is the same as renting 20 video games.

(d) Suppose Dylan has only \$50 to spend on video games. Show algebraically that he would get more video games using Plan B than Plan A.

For Plan A, set the expression equal to 50 and solve. We do this because the expression tells you the cost based on x video games. Notice, we do NOT substitute x for 50 because x represents the number of video games and does NOT represent money.

$$2x + 25 = 50$$

$$2x = 25$$

$$x = 12.5$$

→ This tells us that Dylan can buy at most 12 games using \$50 under Plan A.

For Plan B, set the expression equal to 50 and solve.

$$2.5x + 15 = 50$$

$$2.5x = 35$$

$$x = 14$$

→ This tells us that Dylan can buy 14 games using \$50 under Plan B. Thus, we have shown that Dylan can buy more video games with \$50 using Plan B than Plan A.

Question 7

The owner of a small computer repair business has one employee, who is paid an hourly rate of \$22. The owner estimates his weekly profit using the function $P = 8600 - 22(x - 3)$, where x represents the number of hours his employee works per week.

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

Simplify:

$$P = 8600 - 22x + 66$$

$$P = 8666 - 22x$$

-22 is the slope and it represents the hourly rate that the owner of the business pays his employee. In another sense, it represents how much *profit the owner loses each week* by keeping his employee around each hour.

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

8666 is the y-intercept and represents how much profit the owner would have if the employee did not work any hours that week.

Question 8

Consider the table below:

x	y
1	4
2	8
3	16

(a) Explain why the table does *not* represent a linear function. **The table is not a linear function because as x increases by 1, the y values do not increase by a constant amount. In other words, there is no constant rate of change.**

(b) Even though the table does not have a constant rate of change (slope), it is still possible to find the y-intercept. Find the y-intercept. HINT: Look for a pattern in the table. **The table doubles every time x increases by 1. Logically, it is halved every time x decreases by 1. So the y-intercept would be 2.**