Study Guide Solutions

SCIENCE SCENE

A person's maximum heart rate depends on a person's age. The relationship can be written as $y = 220 - x$, where y represents the person's maximum heart rate and x represents the person's age.

1. Use the equation to determine your maximum heart rate.

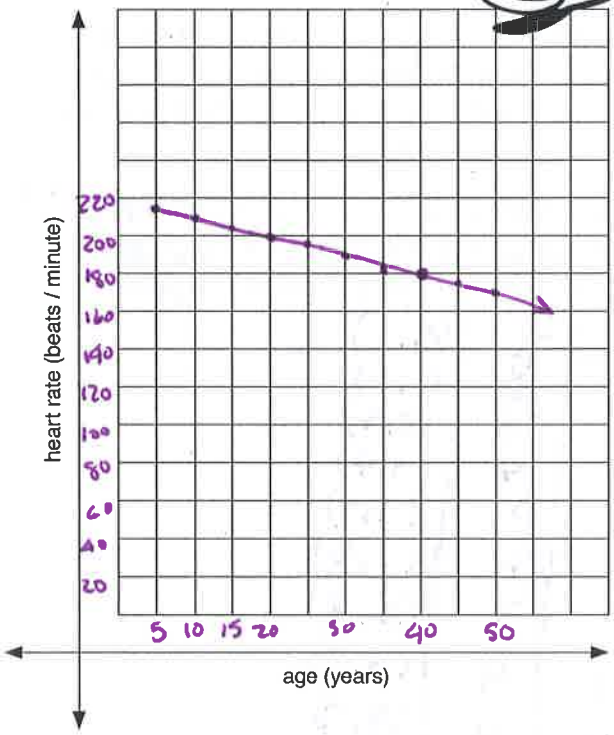
Answers Vary depending on your age

2. How will the maximum heart rate of an older person differ from that of a teenager? Explain and use examples.

An older persons maximum heart rate is less than a teenagers. For example a ~~grandmother~~ grandmother who is 80 yrs old has a max heartrate of 140 and a 15 year old has a maximum heartrate of 205

3. Complete the chart below. Then graph the (x, y) coordinates.

Person's Age (x)	220–x	y	(x, y)
5	~~5~~	215	(5,215)
10	220-10	210	(10,210)
15	220-15	205	(15,205)
20	220-20	200	(20,200)
25	220-25	195	(25,195)
30	220-30	190	(30,190)
35	220-35	185	(35,185)
40	220-40	180	(40,180)
45	220-45	175	(45,175)
50	220-50	170	(50,170)



4. Connect the points. Describe the relationship between age and maximum heart rate when exercising.

The relationship is linear and has a negative slope.

Albert graphed a linear equation to show how much weight he is losing during his spring training workout for football. In the equation, *y* equals the ounces he is losing and *x* is the hours he is spending exercising during the week.

The equation is y = 2(x) + 3.

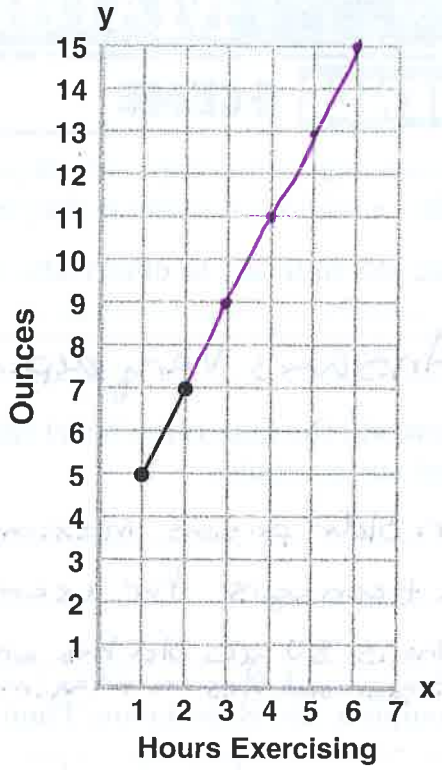
1. **Substitute the numbers 1, 2, 3, 4, 5, and 6 for x in the equation and graph the results. The first 2 are graphed for you.**

2. **Does the equation produce a straight line on the graph?**

Yes.

x	y
1	2(1)+3 = 5
2	2·2+3 = 7
3	2·3+3 = 9
4	2·4+3 = 11
5	2·5+3 = 13

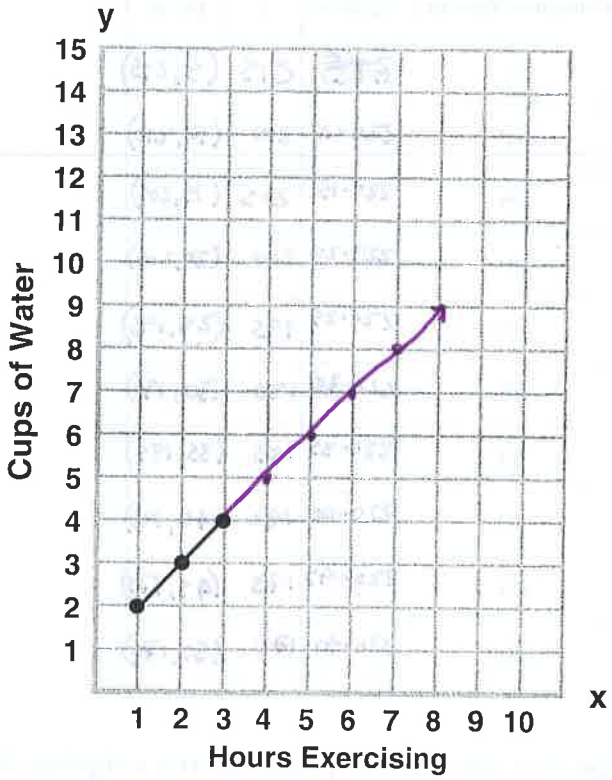
x	y
6	2·6+3 = 15



Albert produced the equation y = x + 1 for the graph to the right to show the number of cups of water he was drinking during and after exercise over the course of a week.

Substitute the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 for x in the equation and graph the results. The first 3 are graphed for you.

x	x+1	y	(x,y)
1	1+1	2	(1,2)
2	2+1	3	(2,3)
3	3+1	4	(3,4)
4	4+1	5	(4,5)
5	5+1	6	(5,6)
6	6+1	7	(6,7)
7	7+1	8	(7,8)
8	8+1	9	(8,9)



- **Which situation has a steeper slope?**
  The first one. Its slope is 2 while the slope of the second is 1.
- **What does that mean?**
  That means the slope of the first graph is greater than the slope of the second. 2 > 1

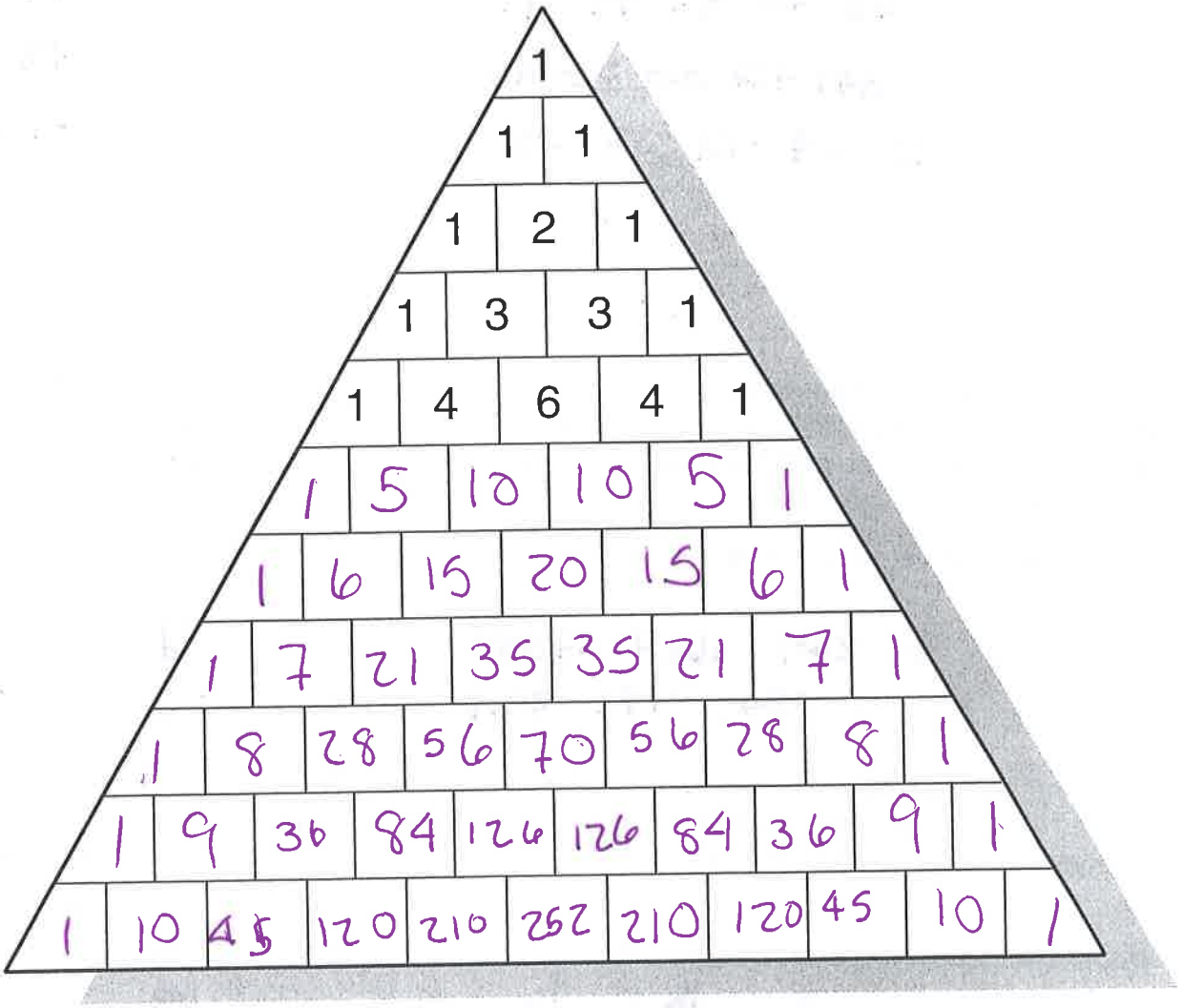
Name: _____ Date: _____

Continue the patterns

Level: 4 5 6 7 8

Pascal's Triangle

Directions: Follow the pattern to complete the next six rows in Pascal's* Triangle.



Describe at least one pattern you found in Pascal's Triangle.

The outside always has a 1

The 2nd box in from each side counts up by 1's

To get the next box find the sum of the two above it.

Every other row has 2 of the same number in the center.

* Blaise Pascal was a French scientist, philosopher, and mathematical prodigy. His contributions to mathematics include: the formulation of probability theory, the development of differential calculus, as well as Pascal's Law and Pascal's Triangle.

In the **arithmetic sequence** { 5, 11, 17, 23, 29, . . . } each number is obtained from the previous number by adding the same number, in this case 6, which is called the **common difference**.

Directions: Write the next five terms and the common difference for each of the following arithmetic sequences.

A. 3, 15, 27, 39, 51, 63, 75, 87, 99, 111 Common difference = 12

B. 37, 115, 193, 271, 349, 427, 505, 583, 661 Common difference = 78

C. 81, 64, 47, 30, 13, -4, -21, -38, -55 Common difference = -17

In a **geometric sequence**, each number is obtained by multiplying the previous number by a common ratio. Can you find the common multiplier in the following sequence? { 3, 15, 75, 375, . . . } Clearly, the next number in the sequence is 1875, since the common ratio is the number five.

Directions: Find the common ratio and the next three numbers for each geometric sequence below:

A. 1, 7, 49, 343, 2401, 16807, 117649 Common ratio = 7

B. 4, -12, 36, -108, 324, -972, 2916 Common ratio = -3

The second geometric sequence above is called an **alternating sequence** because it changes its sign, alternating between positive and negative, since the common multiplier is a negative number. The common ratio may also be a fraction with an absolute value less than one.

Directions: Repeat the exercise above for the following geometric sequences:

C. 243, 81, 27, 9, 3, 1, $\frac{1}{3}$ Common ratio = $\frac{1}{9}$

D. -32, 8, -2, $\frac{1}{2}$, $-\frac{1}{8}$, $\frac{1}{32}$, $-\frac{1}{128}$ Common ratio = $-\frac{1}{4}$

- Also know about growing tile patterns and how to determine if they show an arithmetic, geometric or neither sequence