Part I. Answer 10 questions in this part. Each correct answer will receive 1 credit. No partial credit will be allowed. For each question, any work should be shown to the right side of the problem, when possible. *All questions marked W require appropriate work to be shown or no credit will be given - even if a correct answer is provided.*   [10]

1.	2.	3.	4.	5.
6.	7.	8.	9.	10.

1. When $2\sqrt{48}$ is written in simplest radical form, the result is $8\sqrt{k}$. What is the value of k?

   (1) 2   (2) 3   (3) 4   (4) 9

W 2. Which ordered pair is part of the solution set to the following system of inequalities?

$$2y \geq 5x - 8$$
$$x - 3y > 6$$

   (1)   (5,1)   (2) (1,7)   (3) (-4,3)   (4) (-2,-3)

W 3. The table below shows the cost of mailing a postcard in different years. During which time interval did the cost increase at the lowest average rate?

Year	1898	1971	1985	2006	2012
Cost (¢)	1	6	14	24	35

   (1)   1971 - 1985   (3) 1971 - 2012

   (2)   1971 - 2006   (4) 1985 - 2012

4. Which recursively defined function represents the sequence 3, 7, 15, 31, ...?

(1) $f(1) = 3,\ f(n+1) = 2^{f(n)} + 3$ (3) $f(1) = 3,\ f(n+1) = 2f(n) + 1$

(2) $f(1) = 3,\ f(n+1) = 2^{f(n)} - 1$ (4) $f(1) = 3,\ f(n+1) = 3f(n) - 2$

5. Which table represents the recursive formula: $a_n = a_{n-1} + 6$

(1)

n	a_n
1	1
2	-5
3	1
4	-5
5	1

(3)

n	a_n
1	2
2	8
3	14
4	20
5	26

(2)

n	a_n
1	2
2	-2
3	-10
4	-26
5	-58

(4)

n	a_n
1	5
2	-1
3	-7
4	-13
5	-19

W 6. Subtract $6x^2$ from $(3x - 2)^2$ and the result is

(1) $3x^2 - 12x + 4$ (3) $3x^2 + 4$

(2) $-3x^2 + 12x - 4$ (4) $-3x^2 - 4$

7. A certain type of hat costs \$4.50 each to manufacture. Which inequality represents the number of dollars, d, the manufacturer must charge for each hat in order to make a profit of at least \$1700 when q hats are sold?

(1) $(q - 4.5)d \geq 1700$ (3) $dq - 4.50q \geq 1700$

(2) $(q - 4.50)d \leq 1700$ (4) $(d - 4.50)q \leq 1700$

8. If $Ax + y = H$, then x is equal to

(1) $\dfrac{H}{A} - y$ (2) $\dfrac{H}{A} + y$ (3) $\dfrac{H - y}{A}$ (4) $\dfrac{H + y}{A}$

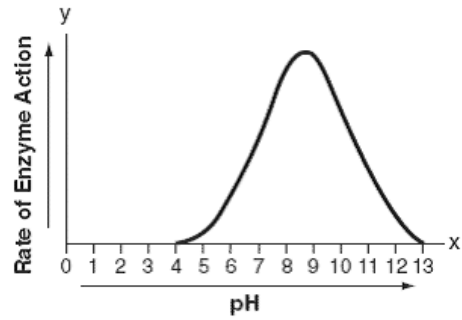**W** 9. How old is James if his age 8 years from now will be triple his age four years ago?

(1) 6   (2) 10   (3) 13   (4) 18

10. The effect of pH on the action of a certain enzyme is shown on the accompanying graph.

What is the domain of the function?

(1) $4 \leq y \leq 13$ (3) $y \geq 0$

(2) $4 \leq x \leq 13$ (4) $x \geq 0$

Part II. Answer both questions in this part. Each correct answer will receive the credits shown. Clearly indicate all necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [5]

11. Two siblings Justin and Lea are both going skiing but choose different payment plans. Justin's plan charges $45 for rentals and $5.25 per lift up the mountain. Lea's plan was a bundle where her entire day cost $108. **[2]**

Write an inequality that models the number of trips, n, up the mountain for which Justin will pay more than Lea.

What is the greatest amount of trips that Justin can take up the mountain and still pay less than Lea?

12. The accompanying table represents the number of hours a student babysat and the amount of money earned during that time. **[3]**

# of hours (h)	money earned (m)
2	22.25
3	30.50
6	55.25

Write an equation that represents the amount of money earned (m) in a certain number of hours (h) worked.

Using this equation, determine the amount of money that would be earned for babysitting 7 hours.

Part III. Answer both questions in this part. Each correct answer will receive 5 credits. Clearly indicate all necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [10]

13. (a) Given a sequence defined by the explicit formula $a(n) = 15n + 35$, create a table of values and graph the sequence on the interval $1 \leq n \leq 6$.
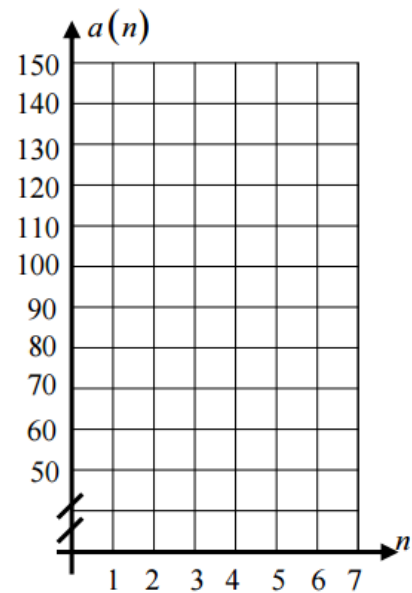
(b) Write a recursive definition for this sequence.

14. Jacob wants to buy hockey equipment that costs a total of $470, including tax. He already has saved $94 towards the purchase price. At the end of each week, he is paid $80 for working on a website and will save four-fifths of that money for the equipment.

Write an inequality that can be used to determine the minimum number of weeks Jacob needs to work on the website to have enough money to purchase his hockey equipment.

Determine and state the minimum number of full weeks that Jacob needs to work on the website in order to have enough money for the equipment. [Only an algebraic solution can receive full credit.]