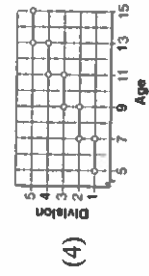
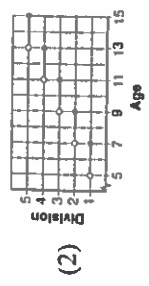
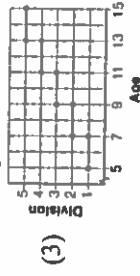
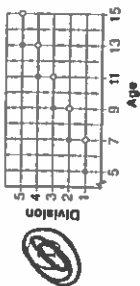


$-1.15(u + p) = 165$
 $2 \cdot 1.75a + 2.50p = 337.50$
 $-1.75a - 1.75p = -288.75$
 $1.75a + 2.50p = 337.50$
 $.75p = 48.75$
 $p = 65$

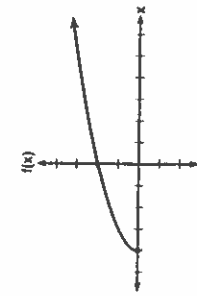
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6. Mo's farm stand sold a total of 165 pounds of apples and peaches. She sold apples for \$1.75 per pound and peaches for \$2.50 per pound. If she made \$337.50, how many pounds of peaches did she sell?
 (1) 11 (2) 18 (3) 65 (4) 100

7. Morgan can start wrestling at age 5 in Division 1. He remains in that division until his next odd birthday when he is required to move up to the next division level. Which graph correctly represents this information?



8. Which statement is *not* always true?
 (1) The sum of two rational numbers is rational.
 (2) The product of two irrational numbers is rational.
 (3) The sum of a rational number and an irrational number is irrational.
 (4) The product of a nonzero rational number and an irrational number is irrational.



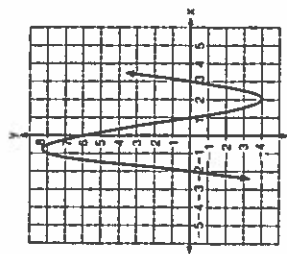
9. The graph of the function $f(x) = \sqrt{x+4}$ is shown. The domain of the function is
 (1) $\{x \mid x > 0\}$ (2) $\{x \mid x \geq -4\}$
 (3) $\{x \mid x > -4\}$ (4) $\{x \mid x \geq -4\}$

10. What are the zeros of the function $f(x) = x^2 - 13x - 30$?
 (1) -10 and 3 (2) 10 and -3 (3) -15 and 2 (4) 15 and -2
11. Joey enlarged a 3-inch by 5-inch photograph on a copy machine. He enlarged it four times. The table below shows the area of the photograph after each enlargement.

Enlargement	0	1	2	3	4
Area (square inches)	15	18.8	23.4	29.3	36.6

- What is the average rate of change of the area from the original photograph to the fourth enlargement, to the nearest tenth?
 (1) 4.3 (2) 4.5 (3) 5.4 (4) 6.0

12. Which equation(s) represent the accompanying graph?



- I. $y = (x+2)(x^2 - 4x - 12)$
 II. $y = (x-3)(x^2 + x - 2)$
 III. $y = (x-1)(x^2 - 5x - 6)$
 (1) I, only
 (2) II, only
 (3) I and II
 (4) II and III

13. A laboratory technician studied the population growth of a colony of bacteria. He recorded the number of bacteria every other day, as shown in the partial table below.

t (time, in days)	0	2	4
f(t) (bacteria)	25	15,625	9,765,625

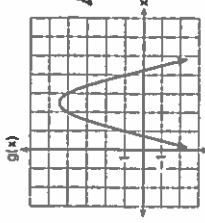
- Which function would accurately model the technician's data?

- (1) $f(t) = 25^t$ (2) $f(t) = 25t$ (3) $f(t) = 25(t+1)$ (4) $f(t) = 25(t+1)$

14. Which quadratic function has the largest maximum?

- (1) $h(x) = (3-x)(2+x)$ (2) $h(x) = -5x^2 - 12x + 4$ (3) $h(x) = -5x^2 - 12x + 4$ (4) $h(x) = -5x^2 - 12x + 4$

x	f(x)
-1	-3
0	5
1	9
2	9
3	5
4	-3

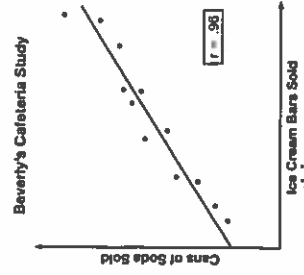


9.5

$m \approx 4.25$

15. If $f(x) = 3^x$ and $g(x) = 2x + 5$, at which value of x is $f(x) < g(x)$?
 (1) -1 (2) 2 (3) -3 (4) 4

16. Beverly did a study this past spring using data she collected from a cafeteria. She recorded data weekly for ice cream sales and soda sales. Beverly found the line of best fit and the correlation coefficient, as shown in the diagram.



- Given this information, which statement(s) can correctly be concluded?

- I. Eating more ice cream causes a person to become thirsty.
 II. Drinking more soda causes a person to become hungry.
 III. There is a strong correlation between ice cream sales and soda sales.
 (1) I, only (2) III, only (3) I and III (4) II and III

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17. The function $V(t) = 1350(1.017)^t$ represents the value $V(t)$, in dollars, of a comic book t years after its purchase. The yearly rate of appreciation of the comic book is

- (1) 17% (2) 1.7% (3) 1.017% (4) 0.017% 17 2

18. When directed to solve a quadratic equation by completing the square, Sam arrived at the equation $\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$. Which equation could have been the original equation given to Sam?

- (1) $x^2 + 5x + 7 = 0$ (2) $x^2 + 5x + 3 = 0$ (3) $x^2 - 5x + 7 = 0$ (4) $x^2 - 5x + 3 = 0$ 18 4

19. The distance a free falling object has traveled can be modeled by the equation $d = \frac{1}{2}at^2$, where a is acceleration due to gravity and t is the amount of time the object has fallen. What is t in terms of a and d ?

- (1) $t = \sqrt{\frac{2d}{a}}$ (2) $t = \sqrt{\frac{2d}{a}}$ (3) $t = \left(\frac{da}{d}\right)^2$ (4) $t = \left(\frac{2d}{a}\right)^2$ 19 2

20. The accompanying table shows the annual salaries for the 24 members of a professional sports team in terms of millions of dollars.

0.5	0.5	0.6	0.7	0.75	0.8
1.0	1.0	1.1	1.25	1.3	1.4
1.4	1.8	2.5	3.7	3.8	4
4.2	4.6	5.1	6	6.3	7.2

The team signs an additional player to a contract worth 10 million dollars per year. Which statement about the median and mean is true? $med = 1.4$
 (1) Both will increase. (2) Only the median will increase. (3) Only the mean will increase. (4) Neither will change. 20 3

21. A student is asked to solve the equation $4(3x - 1)^2 - 17 = 83$. The student's solution to the problem starts as

$$4(3x - 1)^2 = 100$$

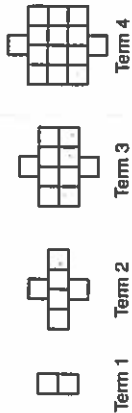
$$\sqrt{(3x - 1)^2} = \sqrt{25}$$

$$3x - 1 = \pm 5$$

A correct next step in the solution of the problem is

- (1) $3x - 1 = \pm 5$ (2) $3x - 1 = \pm 25$ (3) $9x^2 - 1 = 25$ (4) $9x^2 - 6x + 1 = 5$ 21 1

22. A pattern of blocks is shown to the right.



If the pattern of blocks continues, which formula(s) could be used to determine the number of blocks in the n th term?

	Term 1	Term 2	Term 3	Term 4
I	$a_n = n + 4$			
II		$a_1 = 2$		
III		$a_n = a_{n-1} + 4$		$a_n = 4n - 2$

- (1) I and II (2) I and III (3) II and III (4) III, only 22 3

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23. What are the solutions to the equation $x^2 - 8x = 24$?

$x^2 - 8x + 16 = 24 + 16$
 $(x - 4)^2 = 40$
 $x - 4 = \pm 2\sqrt{10}$
 $x = 4 \pm 2\sqrt{10}$

- (1) $x = 4 \pm 2\sqrt{10}$ (2) $x = -4 \pm 2\sqrt{10}$ (3) $x = 4 \pm 2\sqrt{2}$ (4) $x = -4 \pm 2\sqrt{2}$ 23 1

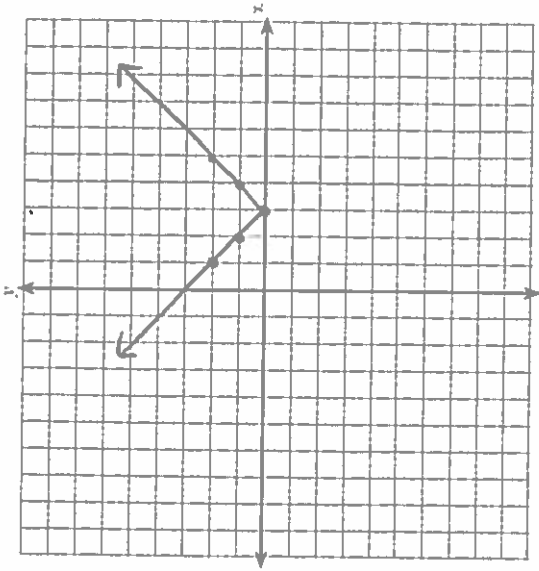
24. Natasha is planning a school celebration and wants to have live music and food for everyone who attends. She has found a band that will charge her \$750 and a caterer who will provide snacks and drinks for \$2.25 per person. If her goal is to keep the average cost per person between \$2.75 and \$3.25, how many people, p , must attend?

- (1) $225 < p < 325$ (2) $325 < p < 750$ (3) $500 < p < 1000$ (4) $750 < p < 1500$ 24 4

Part II

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

25. Graph the function $y = |x - 3|$ on the set of axes below.



Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.
 shifted right 3 units

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Part III

Answer all 4 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

33. Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

$-1.5 [8x + 9y = 48] \checkmark$
 $12x + 5y = 21$
 $-12x - 13.5y = -72$
 $12x + 5y = 21$
 $-8.5y = -51 \checkmark$
 $x = -0.75, y = +6$
 Show Albert's math! $12x + 5y = 21$ correct $\$510$

34. The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \leq x \leq 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, in dollars, for an employee who works 52 hours versus one who works 38 hours.

$52 \text{ hours} \rightarrow 15(52 - 40) + 400 = 10(38)$
 $f(5) = 580$
 $f(38) = 380$

$580 - 380 = 200$

Determine the number of hours an employee must work in order to earn \$445. Explain how you arrived at this answer.

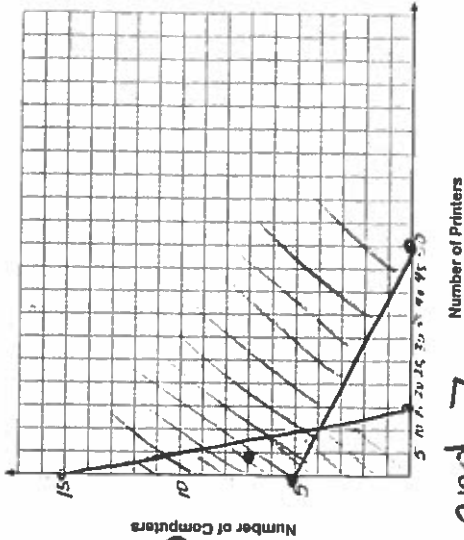
43 hours...
 sub. diff. values for x until
 I got \$445.

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35. An on-line electronics store must sell at least \$2500 worth of printers and computers per day. Each printer costs \$50 and each computer costs \$500. The store can ship a maximum of 15 items per day.

On the set of axes, graph a system of inequalities that models these constraints.

$x + y \leq 15$
 $50x + 500y \geq 2500$



Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

5 printers and 7 computers

36. An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$y = 80(1.5)^x$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the nearest download.

$y = 80(1.5)^{26}$

$y = 3030140$ downloads

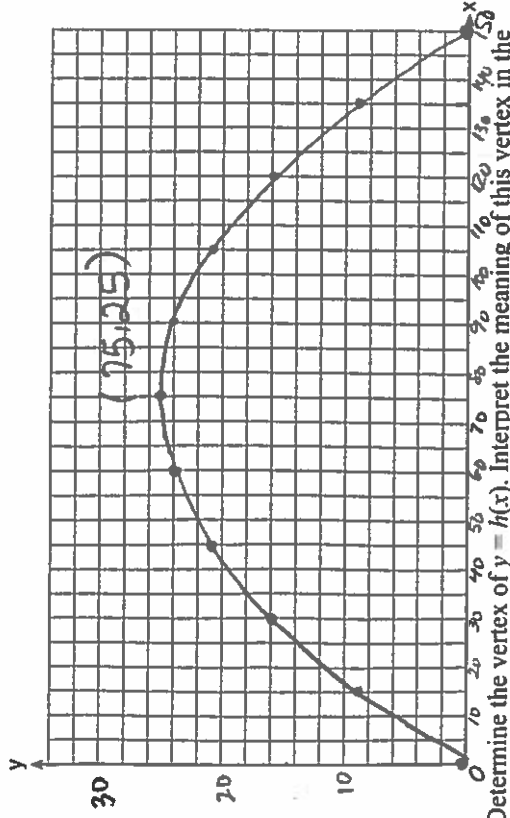
Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

No b/c the app won't be as popular and have as many downloads.

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. A correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be written in pencil. [6]

37. A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \leq x \leq 150$.



Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

(75, 25) At 75 feet the ball is 25 ft in the air.

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

45 yds = 135 ft.

At 135 ft. the ball is only 7 ft. in the air which is too low. to make it over the 10 ft. high goal post.

0 0
 59
 0 16
 1521
 0 24
 25
 0 24
 521
 0 16
 59
 10

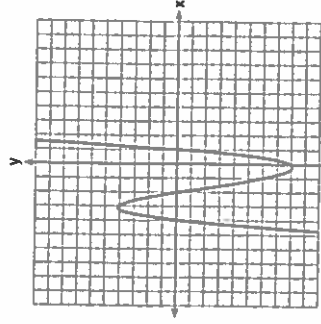
Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers in the space provided. [48]

- Given the graph of the line represented by the equation $f(x) = -2x + b$, if b is increased by 4 units, the graph of the new line would be shifted 4 units
 (1) right (2) up (3) left (4) down 1 _____
- Rowan has \$50 in a savings jar and is putting in \$5 every week. Jonah has \$10 in his own jar and is putting in \$15 every week. Each of them plots his progress on a graph with time on the horizontal axis and amount in the jar on the vertical axis. Which statement about their graphs is true?
 (1) Rowan's graph has a steeper slope than Jonah's.
 (2) Rowan's graph always lies above Jonah's.
 (3) Jonah's graph has a steeper slope than Rowan's.
 (4) Jonah's graph always lies above Rowan's. 2 _____

3. To watch a varsity basketball game, spectators must buy a ticket at the door. The cost of an adult ticket is \$3.00 and the cost of a student ticket is \$1.50. If the number of adult tickets sold is represented by a and student tickets sold by s , which expression represents the amount of money collected at the door from the ticket sales?
 (1) $4.50as$ (2) $4.50(a + s)$ (3) $(3.00a)(1.50s)$ (4) $3.00a + 1.50s$ 3 _____

4. The graph of $f(x)$ is shown. Which function could represent the graph of $f(x)$?

- $f(x) = (x + 2)(x^2 + 3x - 4)$
- $f(x) = (x - 2)(x^2 + 3x - 4)$
- $f(x) = (x + 2)(x^2 + 3x + 4)$
- $f(x) = (x - 2)(x^2 + 3x + 4)$



5. The cost of a pack of chewing gum in a vending machine is \$0.75. The cost of a bottle of juice in the same machine is \$1.25. Julia has \$22.00 to spend on chewing gum and bottles of juice for her team and she must buy seven packs of chewing gum. If b represents the number of bottles of juice, which inequality represents the maximum number of bottles she can buy?

- $0.75b + 1.25(7) \geq 22$
- $0.75b + 1.25(7) \leq 22$
- $0.75(7) + 1.25b \geq 22$
- $0.75(7) + 1.25b \leq 22$