

Part I

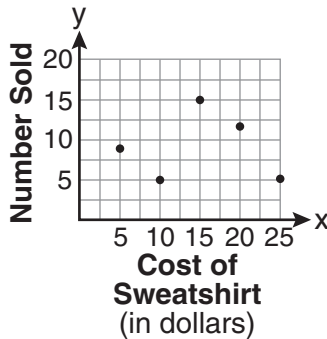
Answer all 30 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [60]

**Use this space for
computations.**

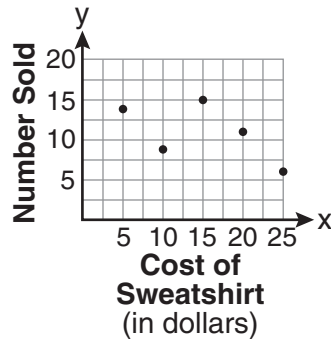
- 1 The school store did a study comparing the cost of a sweatshirt with the number of sweatshirts sold. The price was changed several times and the numbers of sweatshirts sold were recorded. The data are shown in the table below.

Cost of Sweatshirt	\$10	\$25	\$15	\$20	\$5
Number Sold	9	6	15	11	14

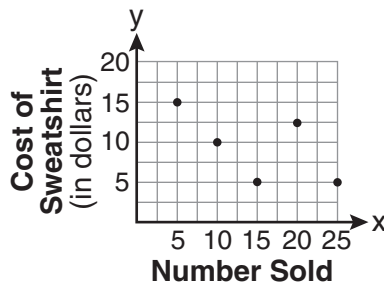
Which scatter plot represents the data?



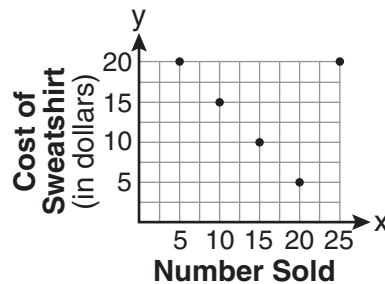
(1)



(3)



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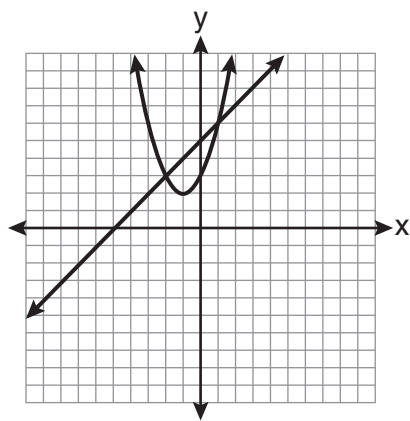
(4)

Use this space for
computations.

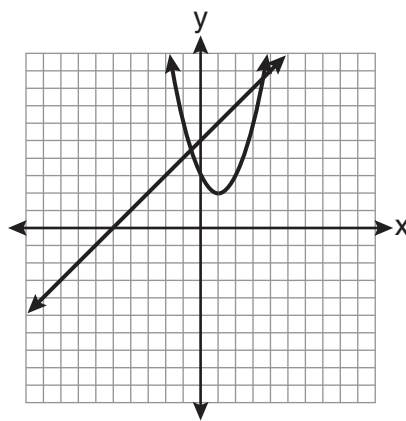
10 Which graph can be used to find the solution of the following system of equations?

$$y = x^2 + 2x + 3$$

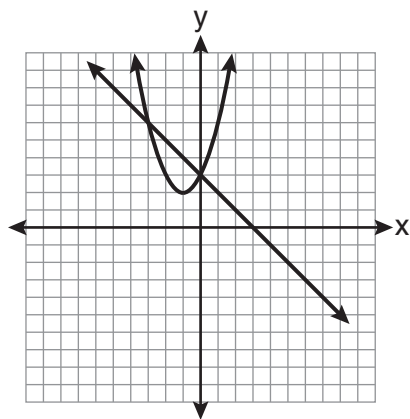
$$2y - 2x = 10$$



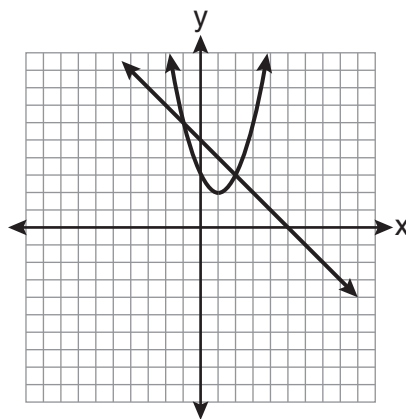
(1)



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**Use this space for
computations.**

11 The width of a rectangle is 3 less than twice the length, x . If the area of the rectangle is 43 square feet, which equation can be used to find the length, in feet?

(1) $2x(x - 3) = 43$

(3) $2x + 2(2x - 3) = 43$

(2) $x(3 - 2x) = 43$

(4) $x(2x - 3) = 43$

12 Which value of x is the solution of $\frac{2x - 3}{x - 4} = \frac{2}{3}$?

(1) $-\frac{1}{4}$

(3) -4

(2) $\frac{1}{4}$

(4) 4

13 What is the perimeter of a regular pentagon with a side whose length is $x + 4$?

(1) $x^2 + 16$

(3) $5x + 4$

(2) $4x + 16$

(4) $5x + 20$

14 Which equation represents a line parallel to the y -axis?

(1) $x = y$

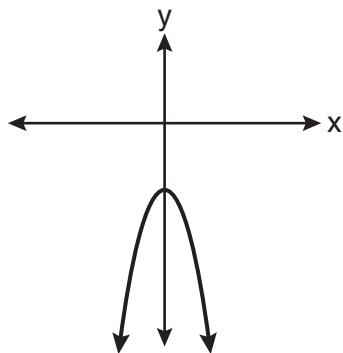
(3) $y = 4$

(2) $x = 4$

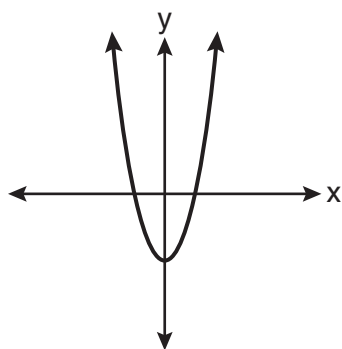
(4) $y = x + 4$

Use this space for
computations.

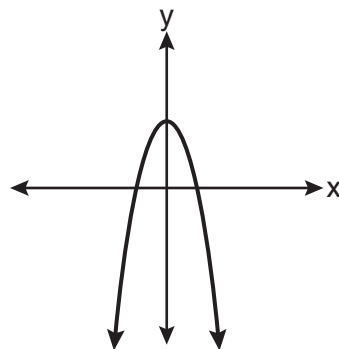
15 The diagram below shows the graph of $y = -x^2 - c$.



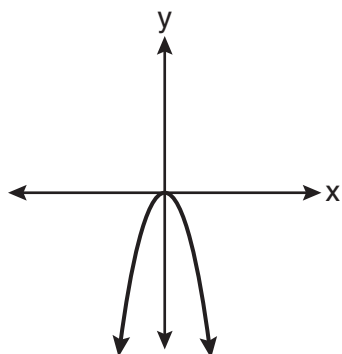
Which diagram shows the graph of $y = x^2 - c$?



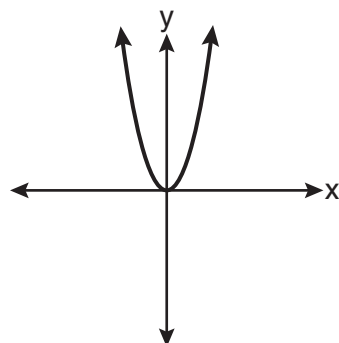
(1)



(3)



(2)



(4)

**Use this space for
computations.**

20 This year, John played in 10 baseball games. In these games he had hit the ball 2, 3, 0, 1, 3, 2, 4, 0, 2, and 3 times. In the first 10 games he plays next year, John wants to increase his average (mean) hits per game by 0.5. What is the total number of hits John needs over the first 10 games next year to achieve his goal?

- (1) 5
- (2) 2
- (3) 20
- (4) 25

21 What is the value of the y -coordinate of the solution to the system of equations $2x + y = 8$ and $x - 3y = -3$?

- (1) -2
- (2) 2
- (3) 3
- (4) -3

22 Which set-builder notation describes $\{-3, -2, -1, 0, 1, 2\}$?

- (1) $\{x \mid -3 \leq x < 2, \text{ where } x \text{ is an integer}\}$
- (2) $\{x \mid -3 < x \leq 2, \text{ where } x \text{ is an integer}\}$
- (3) $\{x \mid -3 < x < 2, \text{ where } x \text{ is an integer}\}$
- (4) $\{x \mid -3 \leq x \leq 2, \text{ where } x \text{ is an integer}\}$

**Use this space for
computations.**

23 Corinne calculated the area of a paper plate to be 50.27 square inches. If the actual area of the plate is 55.42 square inches, what is the relative error in calculating the area, to the *nearest thousandth*?

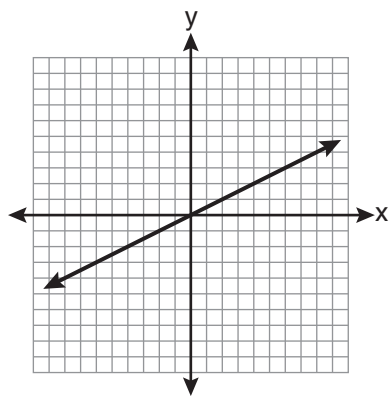
- (1) 0.092 (3) 0.102
(2) 0.093 (4) 0.103

24 The probability that it will snow on Sunday is $\frac{3}{5}$. The probability that it will snow on both Sunday and Monday is $\frac{3}{10}$. What is the probability that it will snow on Monday, if it snowed on Sunday?

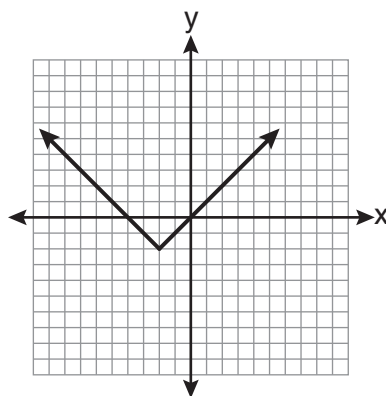
- (1) $\frac{9}{50}$ (3) $\frac{1}{2}$
(2) 2 (4) $\frac{9}{10}$

Use this space for
computations.

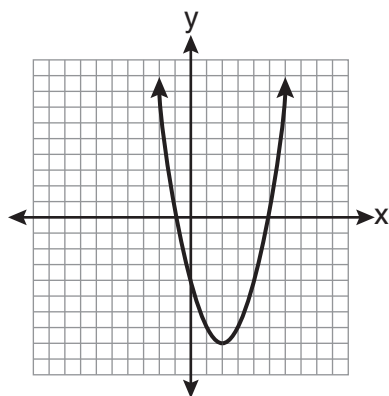
25 Which graph represents an exponential equation?



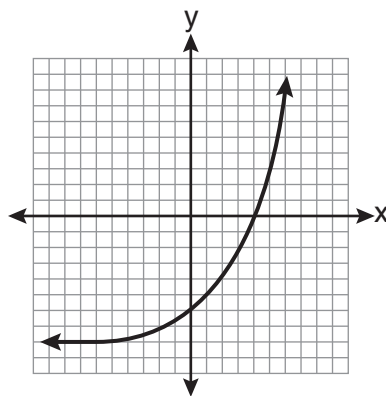
(1)



(3)



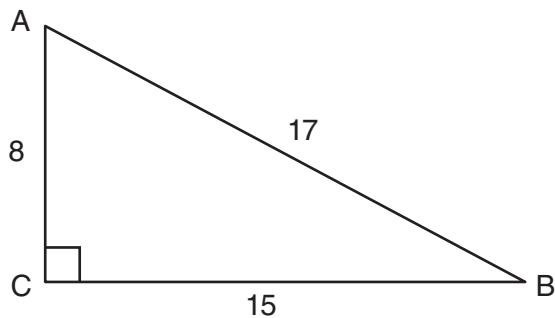
(2)



(4)

Use this space for computations.

- 26** Right triangle ABC has legs of 8 and 15 and a hypotenuse of 17, as shown in the diagram below.



The value of the tangent of $\angle B$ is

- (1) 0.4706 (3) 0.8824
(2) 0.5333 (4) 1.8750
- 27** What is $\frac{2+x}{5x} - \frac{x-2}{5x}$ expressed in simplest form?

- (1) 0 (3) $\frac{4}{5x}$
(2) $\frac{2}{5}$ (4) $\frac{2x+4}{5x}$

**Use this space for
computations.**

28 How many different four-letter arrangements are possible with the letters G, A, R, D, E, N if each letter may be used only once?

(1) 15

(3) 360

(2) 24

(4) 720

29 What is an equation of the line that passes through the points $(1,3)$ and $(8,5)$?

(1) $y + 1 = \frac{2}{7}(x + 3)$

(3) $y - 1 = \frac{2}{7}(x + 3)$

(2) $y - 5 = \frac{2}{7}(x - 8)$

(4) $y + 5 = \frac{2}{7}(x - 8)$

30 An example of an algebraic expression is

(1) $x + 2$

(3) $y < x + 2$

(2) $y = x + 2$

(4) $y = x^2 + 2x$

Part II

Answer all 3 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the 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. [6]

31 Express in simplest form: $\frac{45a^4b^3 - 90a^3b}{15a^2b}$

32 Joseph typed a 1,200-word essay in 25 minutes. At this rate, determine how many words he can type in 45 minutes.

33 Express $-3\sqrt{48}$ in simplest radical form.

Part III

Answer all 3 questions in this part. Each correct answer will receive 3 credits. Clearly indicate the 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. [9]

34 The number of songs fifteen students have on their MP3 players is:

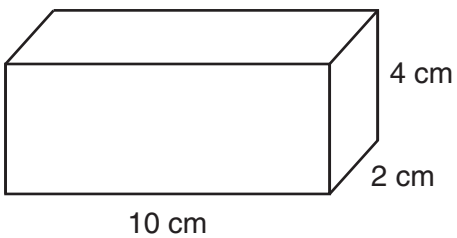
120, 124, 132, 145, 200, 255, 260, 292, 308, 314, 342, 407, 421, 435, 452

State the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

Using these values, construct a box-and-whisker plot using an appropriate scale on the line below.



35 Find the volume, in cubic centimeters, *and* the surface area, in square centimeters, of the rectangular prism shown below.



36 Find the roots of the equation $x^2 = 30 - 13x$ algebraically.

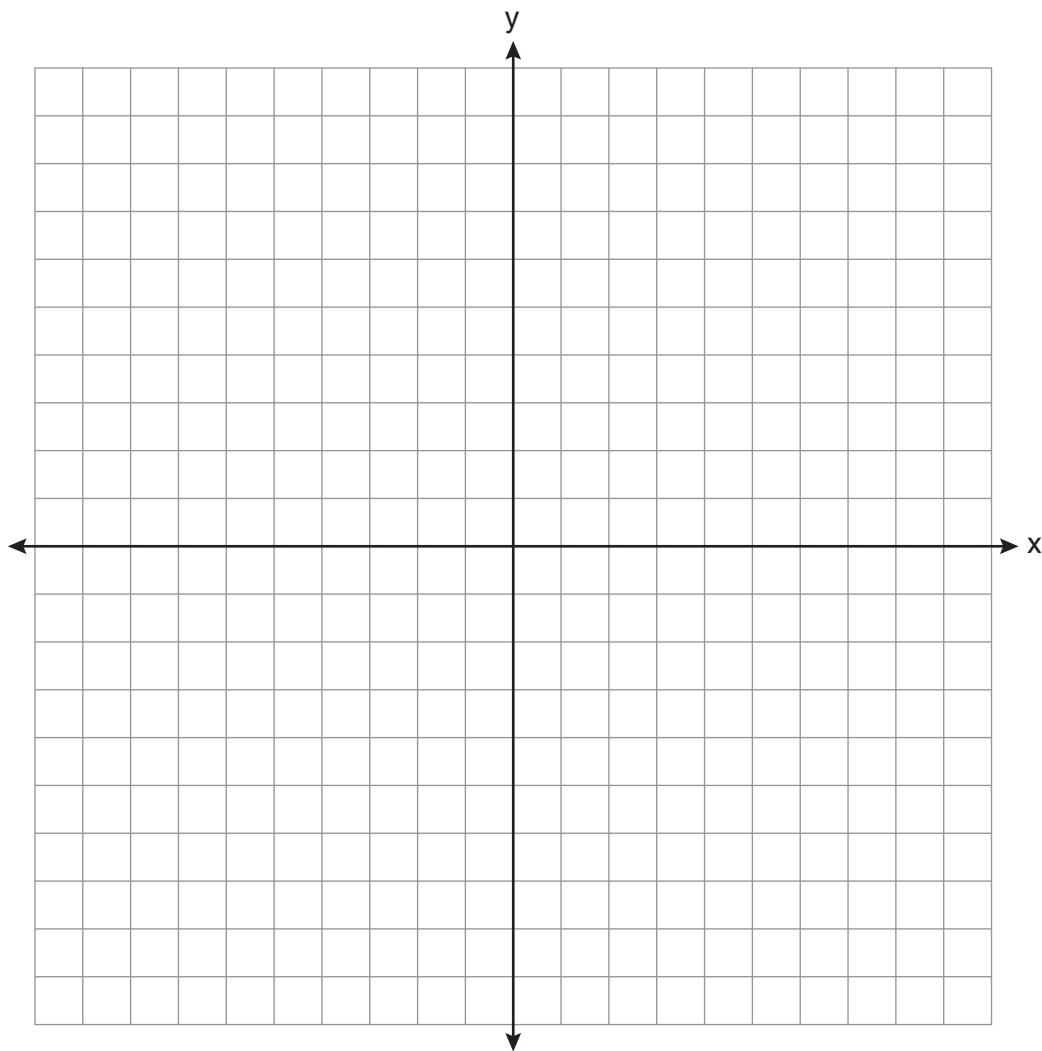
Part IV

Answer all 3 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the 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. [12]

37 On the set of axes below, solve the following system of inequalities graphically.

$$y < 2x + 1$$
$$y \geq -\frac{1}{3}x + 4$$

State the coordinates of a point in the solution set.



- 38** Each of the hats shown below has colored marbles placed inside. Hat A contains five green marbles and four red marbles. Hat B contains six blue marbles and five red marbles. Hat C contains five green marbles and five blue marbles.



Hat A



Hat B

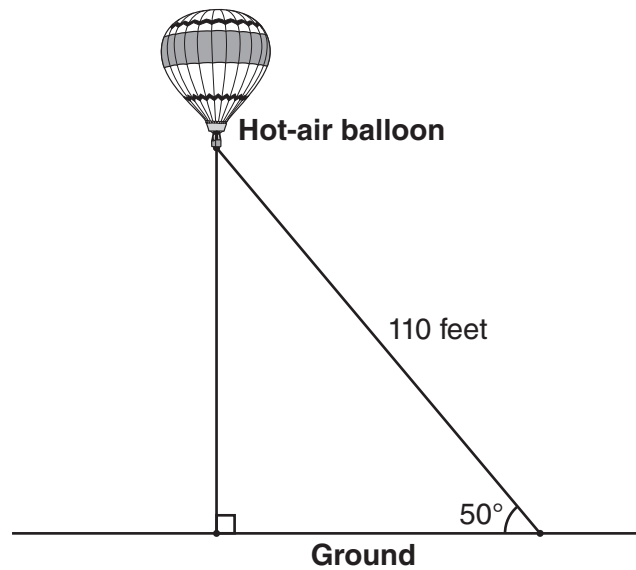


Hat C

If a student were to randomly pick one marble from each of these three hats, determine from which hat the student would most likely pick a green marble. Justify your answer.

Determine the fewest number of marbles, if any, and the color of these marbles that could be added to *each* hat so that the probability of picking a green marble will be one-half in each of the three hats.

- 39 A hot-air balloon is tied to the ground with two taut (straight) ropes, as shown in the diagram below. One rope is directly under the balloon and makes a right angle with the ground. The other rope forms an angle of 50° with the ground.



Determine the height, to the *nearest foot*, of the balloon directly above the ground.

Determine the distance, to the *nearest foot*, on the ground between the two ropes.

Part I

Allow a total of 60 credits, 2 credits for each of the following. Allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 3	(9) 3	(17) 3	(25) 4
(2) 1	(10) 1	(18) 3	(26) 2
(3) 2	(11) 4	(19) 2	(27) 3
(4) 2	(12) 2	(20) 4	(28) 3
(5) 2	(13) 4	(21) 2	(29) 2
(6) 4	(14) 2	(22) 4	(30) 1
(7) 2	(15) 1	(23) 2	
(8) 3	(16) 4	(24) 3	