

# University of the State of New York.

71ST PRELIMINARY EXAMINATION.

## ARITHMETIC.

TUESDAY, Jan. 21, 1890—Time, 9:30 A. M. to 12:30 P. M., only.

100 credits, necessary to pass, 75.

1. Explain the difference between the simple value of a figure and its local value..... 4
2. How may the correctness of multiplication be proved and why is this a proof?..... 4
3. Copy the following numbers and find their sum:

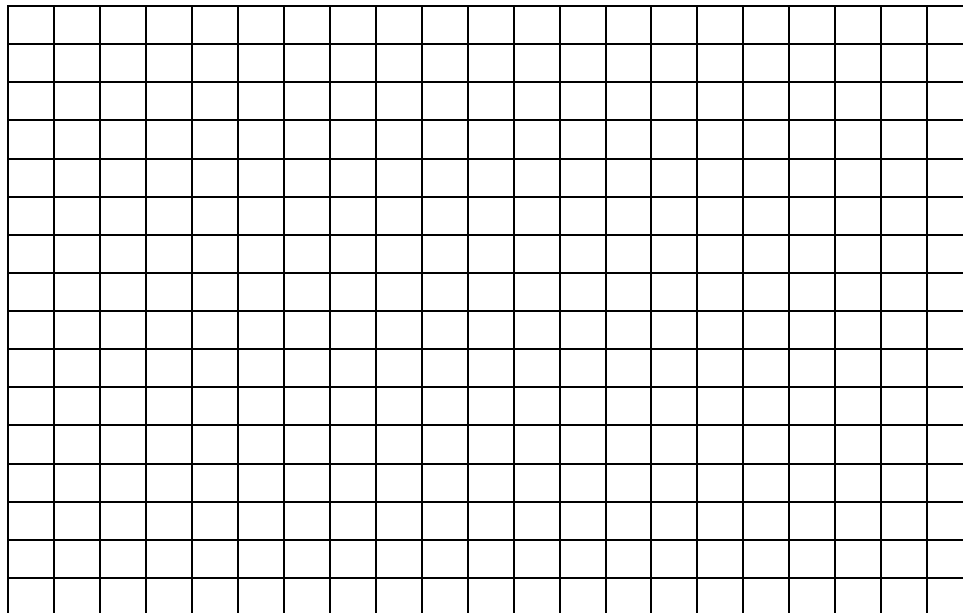
|       |      |    |      |     |       |       |     |       |    |       |      |       |       |       |      |     |       |       |   |     |      |       |       |      |    |
|-------|------|----|------|-----|-------|-------|-----|-------|----|-------|------|-------|-------|-------|------|-----|-------|-------|---|-----|------|-------|-------|------|----|
| 25684 | 3579 | 26 | 8002 | 704 | 92076 | 18430 | 257 | 79460 | 10 | 12895 | 8205 | 70882 | 99669 | 47169 | 7280 | 455 | 22895 | 75000 | 8 | 276 | 8836 | 32940 | 66666 | 4884 | 10 |
|-------|------|----|------|-----|-------|-------|-----|-------|----|-------|------|-------|-------|-------|------|-----|-------|-------|---|-----|------|-------|-------|------|----|

4. Bought three tubs of butter weighing  $25\frac{7}{16}$ ,  $29\frac{3}{4}$  and  $27\frac{1}{2}$  pounds. The empty tubs weighed  $5\frac{3}{16}$ ,  $5\frac{3}{4}$  and  $5\frac{1}{2}$  pounds. How much did the butter cost at  $24\frac{3}{4}$  cents a pound?..... 6
5. Find the cost of each of the following :
  - 5 gals. 3 qts. 1 pt. of vinegar at 20 cents a gallon..... 6
  - 10 acres, 50 sq. rods of land at \$48 an acre..... 4
6. Find in tons the weight of the water in a full tank the capacity of which is 100 barrels ( $62\frac{1}{2}$  lbs. in a cubic foot)..... 6
7. Write the table of linear measure..... 2
8. James Jones buys of John Wilson for cash Jan. 1, 1890, 5 gals. vinegar at \$.20; 27 lbs. sugar at 10 cents; 5 lbs. oat meal at 5 cents. Make out a bill of the above and receipt it for Wilson..... 10
9. Find the amount of \$2,560 for 2 yrs. 7 mos. 22 days at 5 % 8
10. A house worth \$1,600 rents for \$9 per month and the owner pays \$36 a year taxes; what rate per cent. does it pay the owner? 6
11. A certain  $4\frac{1}{2}$  % stock sells at 77. How much annual income will be produced by \$385 invested in it?..... 6
12. Explain the difference between true discount and bank discount..... 4
13. Find the proceeds, bank discount and date of maturity of a note for \$2,000 at 90 days at 5 %, dated and discounted July 1, 1889..... 6
14. If \$75 premium be paid for insuring  $\frac{3}{8}$  of a store at  $1\frac{1}{4}$  %, find the value of the store..... 4
15. It is necessary to raise a tax of \$3,200 on an assessed valuation of \$180,000. The poll tax is \$140. Find the rate and A's tax on \$5,000..... 6
16. Find the square root of 4057.69..... 6
17. If slates average 4 mm in thickness, find the number of slates in a pile 3 d m high..... 2

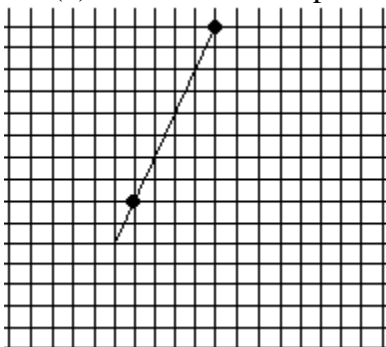
Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

(1) Draw axes and plot the following points on the grid below:

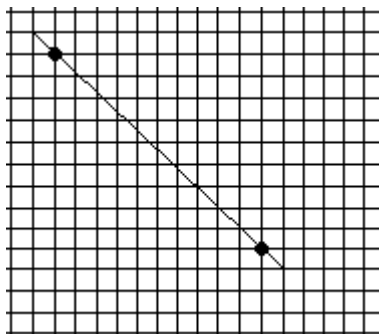
- |           |            |             |            |
|-----------|------------|-------------|------------|
| A. (5, 2) | B. (3, -3) | C. (-1, -4) | D. (-2, 4) |
| E. (2, 0) | F. (0, 3)  | G. (-5, -3) | H. (-4, 5) |



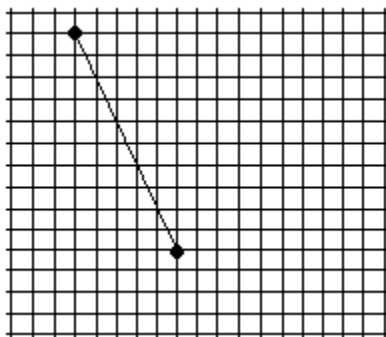
(2) Calculate the slope of each of these lines by *counting units*.



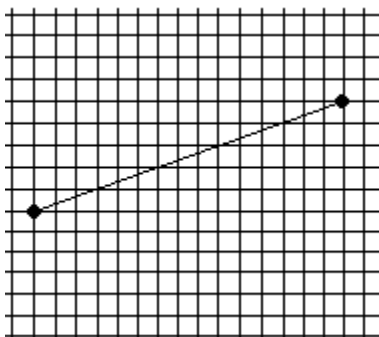
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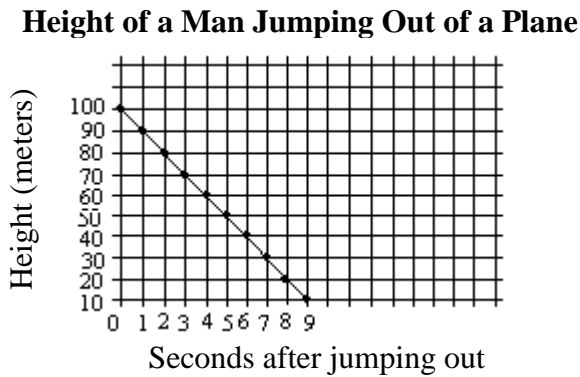


\_\_\_\_\_

(3) Use the slope formula to find the slope through each of these pairs of lines:

- A. (4, 4) and (6, 6) \_\_\_\_\_
- B. (3, 2) and (5, 8) \_\_\_\_\_
- C. (-2, 2) and (2, 1) \_\_\_\_\_
- D. (1, 5) and (7, 1) \_\_\_\_\_
- E. (9, 3) and (2, 3) \_\_\_\_\_

(4) Answer the questions about the graph below:



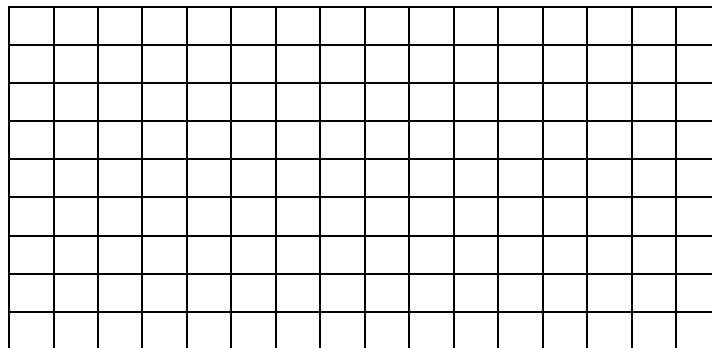
What is being measured on the *x-axis*? \_\_\_\_\_

What is being measured on the *y-axis*? \_\_\_\_\_

What is the *rate of change* in this graph? \_\_\_\_\_

How far does the man fall *per second*? \_\_\_\_\_

\*\*\***Bonus** On the grid below, draw a line with slope 2, through the point (1, 1) (you will need to draw axes).



**Document C**

Name \_\_\_\_\_

Date \_\_\_\_\_

1. a. We define  $x$  as a year between 2008 and 2013, and  $y$  as the total number of smartphones sold that year, in millions. The table shows values of  $x$ , and corresponding  $y$  values.

|  |      |      |      |      |      |       |
|--|------|------|------|------|------|-------|
| Year<br>( $x$ )                              | 2008 | 2009 | 2010 | 2011 | 2012 | 2013  |
| Number of smartphones in millions<br>( $y$ ) | 3.7  | 17.3 | 42.4 | 90   | 125  | 153.2 |

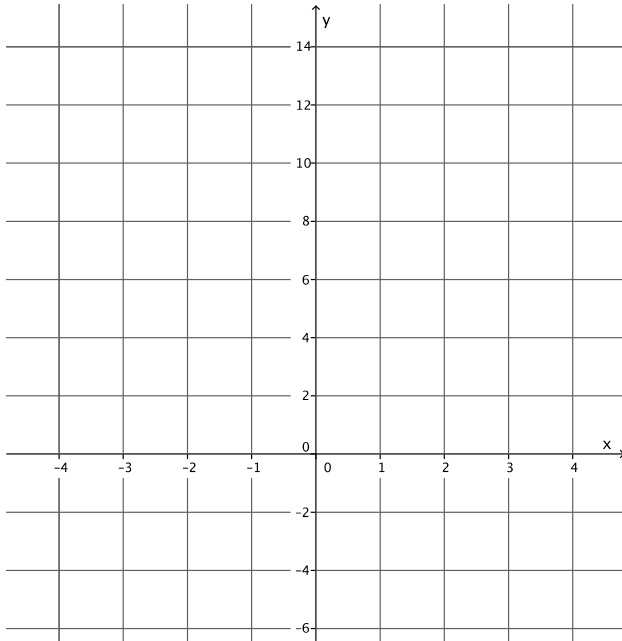
- i. How many smartphones were sold in 2009?
  
- ii. In which year were 90 million smartphones sold?
  
- iii. Is  $y$  a function of  $x$ ? Explain why or why not.

- b. Randy began completing the table below to represent a particular linear function. Write an equation to represent the function he used, and complete the table for him.

|                   |    |    |   |               |   |   |    |
|-------------------|----|----|---|---------------|---|---|----|
| Input<br>( $x$ )  | -3 | -1 | 0 | $\frac{1}{2}$ | 1 | 2 | 3  |
| Output<br>( $y$ ) | -5 |    | 4 |               |   |   | 13 |

**Document C**

- c. Create the graph of the function in part (b).



- d. At NYU in 2013, the cost of the weekly meal plan options could be described as a function of the number of meals. Is the cost of the meal plan a linear or non-linear function? Explain.

8 meals: \$125/week  
10 meals: \$135/week  
12 meals: \$155/week  
21 meals: \$220/week