# QUARRY LANE SCHOOL

## Summer Packet for Rising 6th graders

I. Translate Verbal Phrases to Numeric/ Algebraic expressions

1. What is the numeric expression for "the sum of five and seven"?

2. How would you write "three times the difference between nine and two" as a numeric expression?

3. What's the numeric expression for "twelve decreased by six"?

4. Translate "the product of four and nine increased by three" into a numeric expression.

5. How do you express "ten less than the quotient of sixteen and four" numerically?

6. Write a numeric expression for "the sum of six and twice the quantity of eight minus five."

7. What's the numeric expression for "the difference between three times a number and four"?

8. If "a number decreased by nine" is expressed numerically, what's the result?

9. Translate "twice a number added to five" into a numeric expression.

10. How would you write "the quotient of fourteen and two decreased by three" as a numeric expression?

11. What's the numeric expression for "the sum of twice a number and seven"?

12. Express "seven times a number decreased by two" as a numeric expression.

13. Translate "five less than the product of three and a number" into numeric form.

14. What's the numeric expression for "the difference between six times a number and ten"?

15. How would you write "the sum of three times a number and nine" as a numeric expression?

16. If "a number increased by eight" is written numerically, what's the expression?

17. Translate "the product of five and a number increased by two" into numeric form.

18. What's the numeric expression for "four less than three times a number"?

19. Express "eight divided by twice a number" as a numeric expression.

20. How would you write "the difference between twice a number and six" as a numeric expression?

II. Evaluate

1. $3+5\times2$

2. $(4+3)\times2$

3. $6\div2+4$

4. $5\times(2+3)$

5. $8-4\div2$

6. $(10-3)\times 2$

7. $9+6\div 3$

8. $(6+2)\div 2$

9. $7+3\times 2-1$

10. $12\div(2+2)$

11. $15-3\times 2$

12. (8÷2)+5

13. 7×2+10÷2

14. 18÷3×2

15. 4×(3+5)÷2

16. (7−2)×4

17. 5+9÷3×2

18. $16 \div 4 + 3 \times 2$

19. $(5 + 3 \times 2) - 4$

20. $6 \times 2 - 3 + 1$

III. Translate verbal phrases to algebraic expressions.

1. Three times a number.

2. Twenty four pieces of candy were divided among some students.

3. The number of people increased by 15

4. The number of inches in any number of feet.

5. Four more than the number of weeks in a group of days.

6. Four less than the amount of cents in a number of dimes.

7. Thirteen more students than teachers.

8. Money earned babysitting at ten dollars per hour.

9. Thirty pencils were divided among some students.

10. Three dollars more than the cost of the sandwich.

IV. Evaluate the following expressions containing variables.

1. $3x+5$ when $x=4$

2. $7y-2$ when $y=3$

3. $2a+3b$ when $a=1$ and $b=2$

4. $4m^2-n$ when $m=2$ and $n=5$

5. $5(x+2)$ when $x=3$

6. $2y^2-3z$ when y=4 and $z$=1

7. $3a-4b+2c$ when $a$=1, $b$=2 and c= -1

8. $4t^5+3$ when $t$=10

9. $3(x-2)^4$ when $x$=6

10. $6y+2z-4$ when $y$=2 and z= 1

V. Answer the following

1. What is a function in mathematics? Provide a simple definition.

2. Identify whether the following relation is a function :
   {(1,2),(2,3),(3,4),(4,5),(1,3)}. Explain your answer.

3. Consider the following table. Determine if it represents a function:

| $x$ | $y$ |
|---|---|
| 1 | 2 |
| 2 | 3 |
| 3 | 2 |
| 4 | 5 |

4. For the function $f(x)=3x-2$, find $f(4)$

5. What does the term "domain" refer to in a function?

6. Explain what it means for a function to be one-to-one.

7. Given the function, $g(x)=x^2$, calculate $g(3)$

8. Describe the difference between a linear function and a quadratic function.

9. Determine whether the following graph represents a function:A graph showing a straight line passing through points (1, 2), (2, 4), (3, 6), and (4, 8)

10. What is the range of the function, $h(x)=2x$, if the domain is $x$={1,2,3,4,5}?

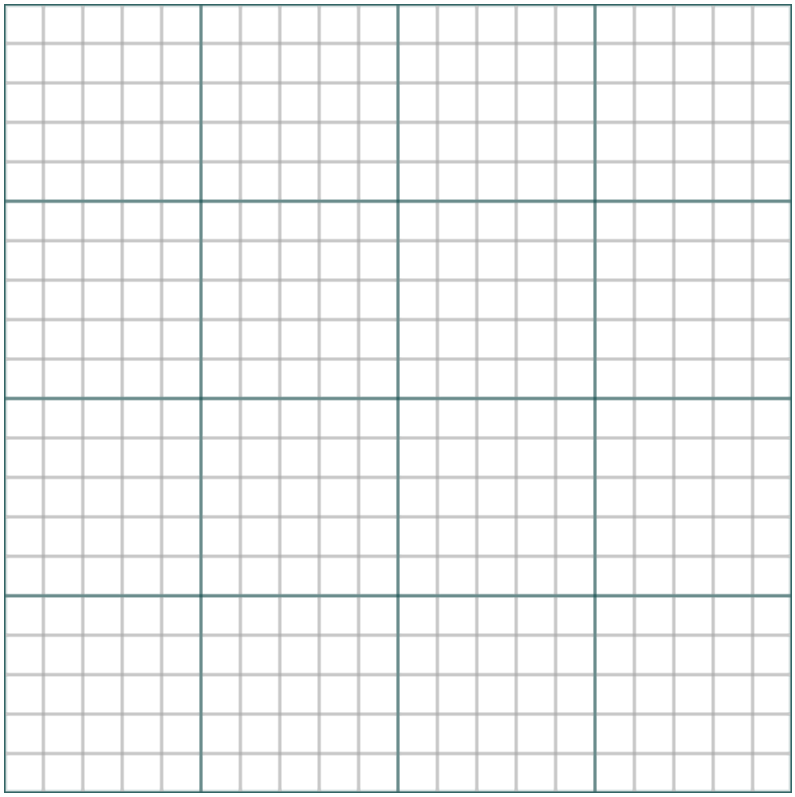
VI. Answer, Construct scatter plots and analyze trends in scatter plots.

1. What is a scatter plot? Provide a simple definition.

2. Explain the purpose of a scatter plot. How is it used to represent data?

3. Construct a scatter plot using the following data:

| Age (years) | Height (inches) |
|---|---|
| 10 | 52 |
| 11 | 55 |
| 12 | 58 |
| 13 | 61 |
| 14 | 64 |



4. What are the independent and dependent variables in a scatter plot?

5. Analyze the scatter plot below and describe the relationship between the variables. (A scatter plot showing the number of hours spent studying on the x-axis and the test score on the y-axis)

6. What does it mean if the points on a scatter plot are close to forming a straight line?

7. What type of relationship is shown in a scatter plot where the points are spread out with no clear pattern?

8. Identify any outliers in the scatter plot below and explain how they affect the overall trend. (A scatter plot with most points clustered together, except for one point far away from the others)

9. If you wanted to predict the height of a 15-year-old based on the scatter plot data, what height would you estimate?

10. Explain how you could use a line of best fit to make predictions from a scatter plot.

VII. Answer the following -Compare and order integers

1. What is the smallest integer in the following set: -3, 4, -1, 0, 2?

2. Which integer is greater: -7 or -3? Explain your reasoning.

3. Order the following integers from least to greatest: 5, -2, 0, -8, 3.

4. Compare the integers using <, >, or =: -6 ___ -9.

5. Which integer is less: 4 or -5?

6. Arrange the following integers in descending order: -1, 3, -5, 7, 0.

7. If you are at -4 on a number line and move 3 spaces to the right, where do you end up?

8. True or False: -2 is greater than -5.

9. Find the middle integer between -3 and 3.

10. Compare the integers using <, >, or =: -10 ___ -10.

VIII . Answer the following

1. Find the absolute value: |−7|

2. Evaluate the expression: |4| + |-3|

3. What is the absolute value of l−15+5l

4. Calculate the expression: |-2| / |3|

5. Find the absolute value of the following expression: |10 - 14|

6. Evaluate: |−8|−|5|

7. What is the absolute value of $|-6|+|2-8|$

8. Calculate the expression: $|3|\div|-1|$

9. Evaluate the absolute value of: $|-9+4|$

10. Find the absolute value of the following expression: $|-12|+|-7|$

## IX. Add and/or subtract Integers

1. 5+(−3)
2. −7+4
3. 12−15
4. −8+(−5)
5. 9−(−3)
6. −10+6
7. −3−7
8. 15+(−20)
9. −4−(−8)
10. −2+10

## X. Simplify the following

1. $(3x-5)+(2x+7)$ when $x=-2$

2. $(4y+6)-(2y-3)$ when $y=3$

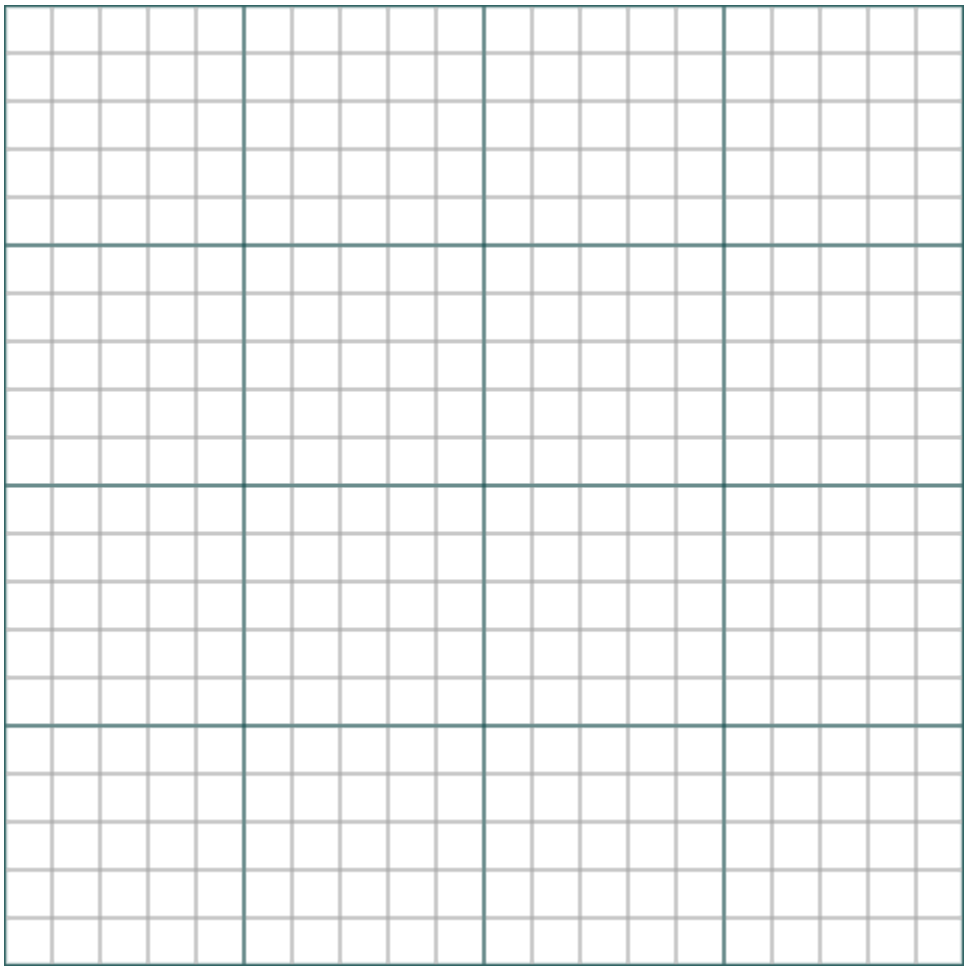
3. $x(x-4)$ when $x=-3$

4. $8yy+2$ When $y=4$

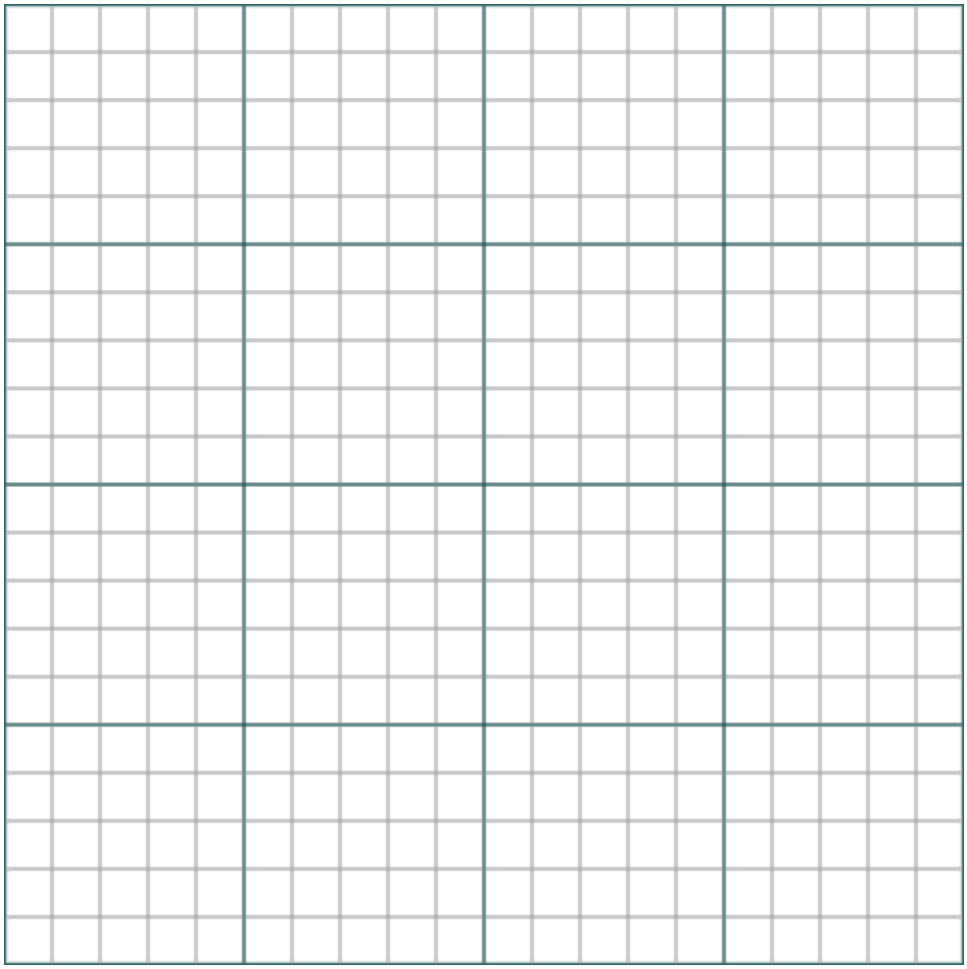
5. $2x-3y$ when $x=5$

XI. Plot the ordered pairs and answer the questions.

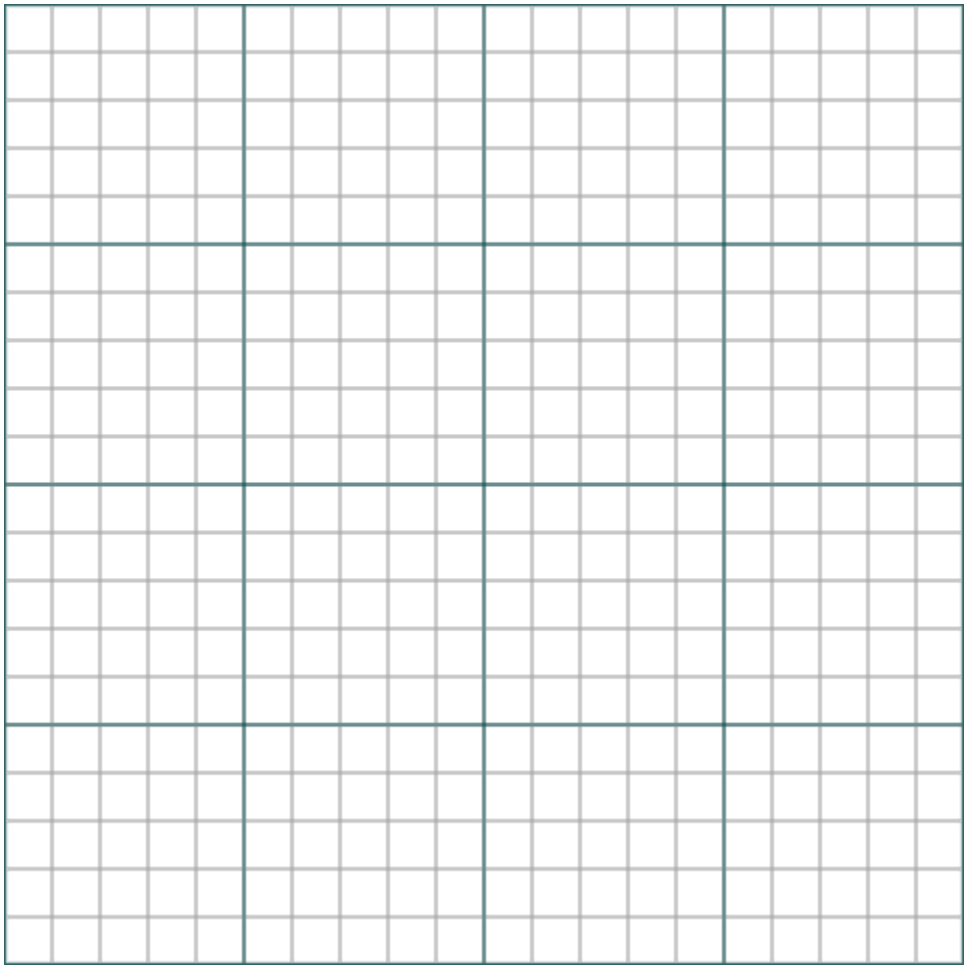
1. Plot the following ordered pairs on the coordinate plane: (2, 3), (-1, 4), (3, -2), and (-3, -3).



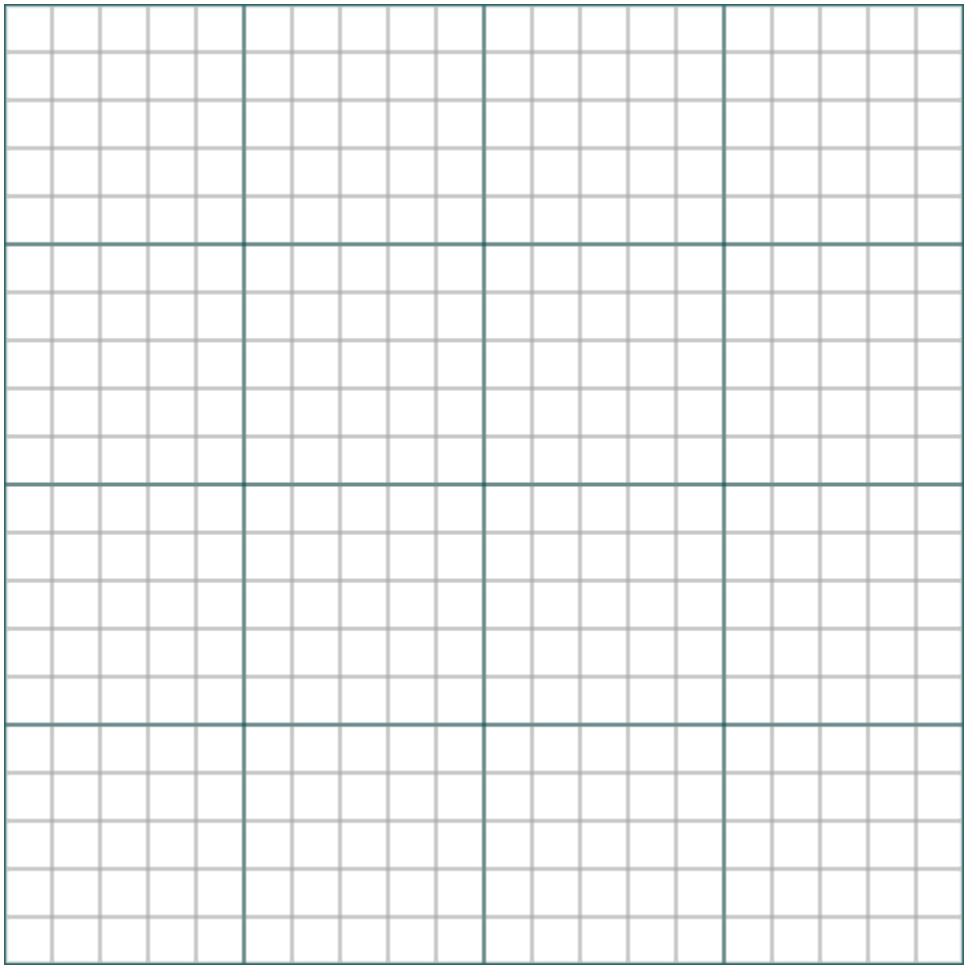
2. Graph the points (0, 5), (5, 0), (-4, 2), and (2, -4) on the coordinate plane.



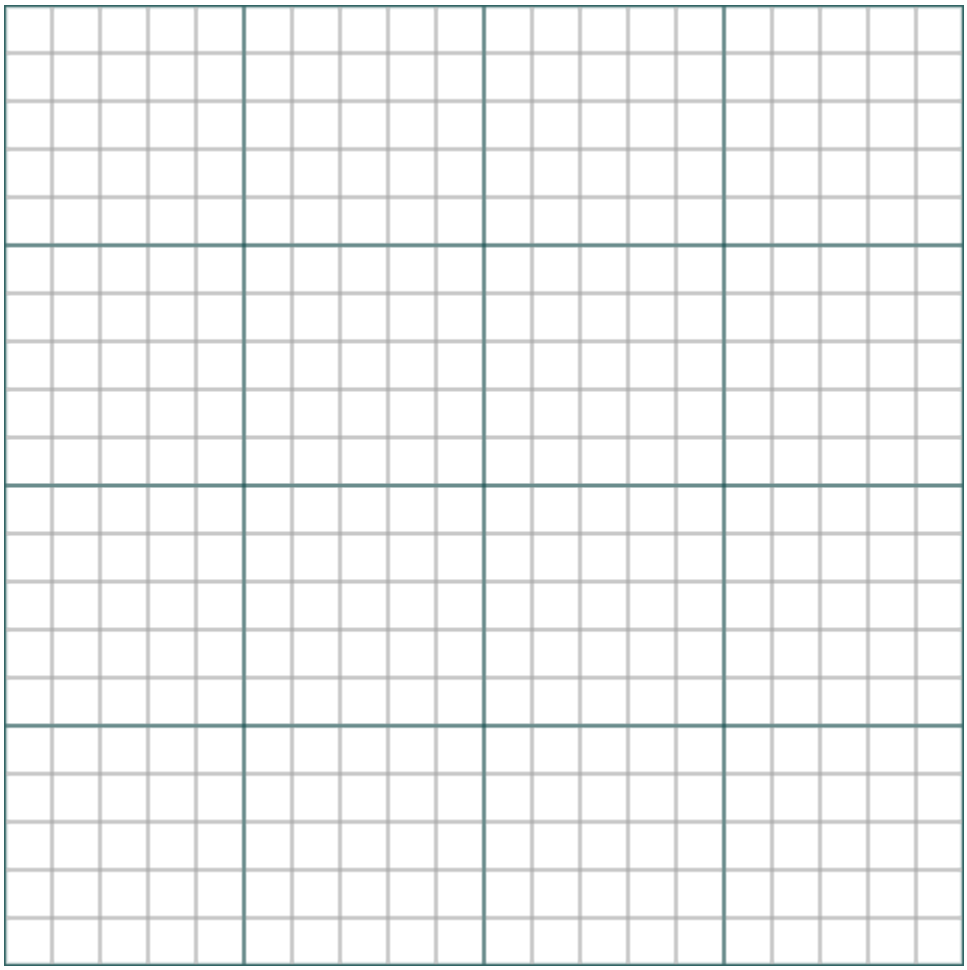
3. Draw the points (1, 1), (2, 2), (3, 3), and (4, 4) on the coordinate plane. What do you notice about the points?



4. Plot the ordered pairs (-5, 5), (-4, 4), (-3, 3), and (-2, 2) on the coordinate plane. Describe the pattern you observe.

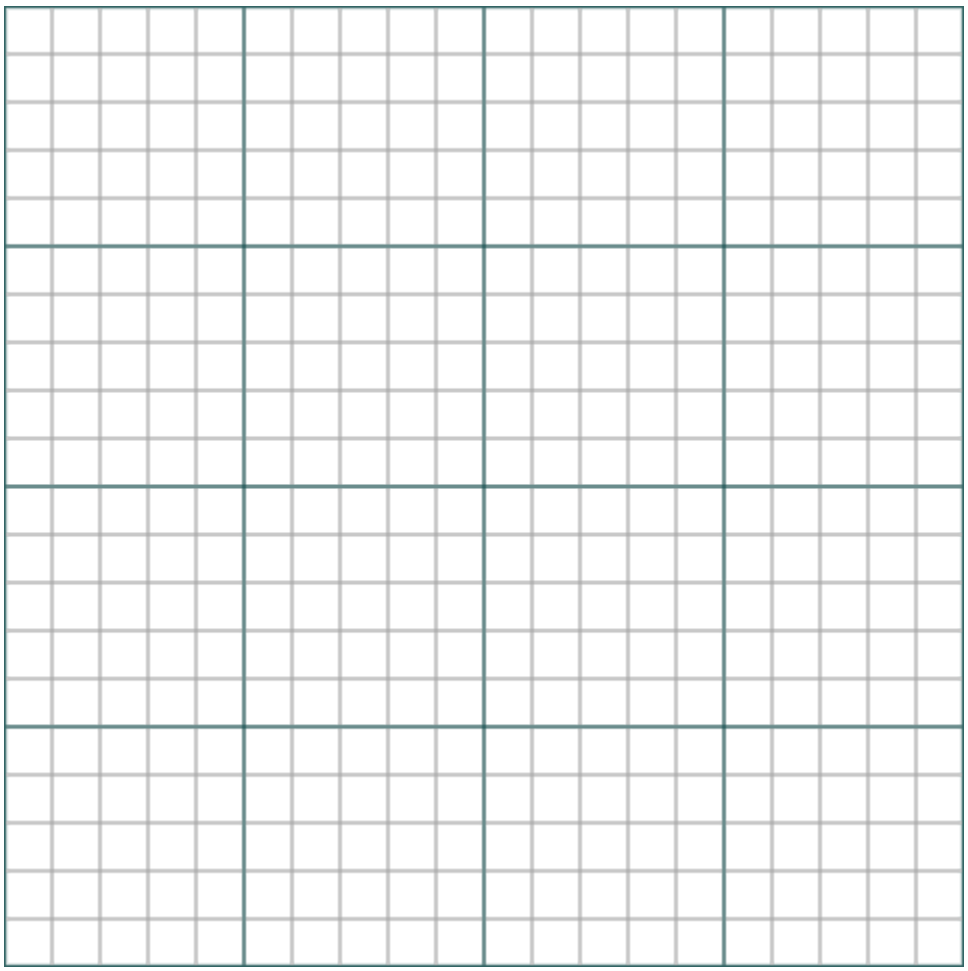


5. Graph the following points: (0, 0), (1, -3), (-2, 2), and (3, -1).

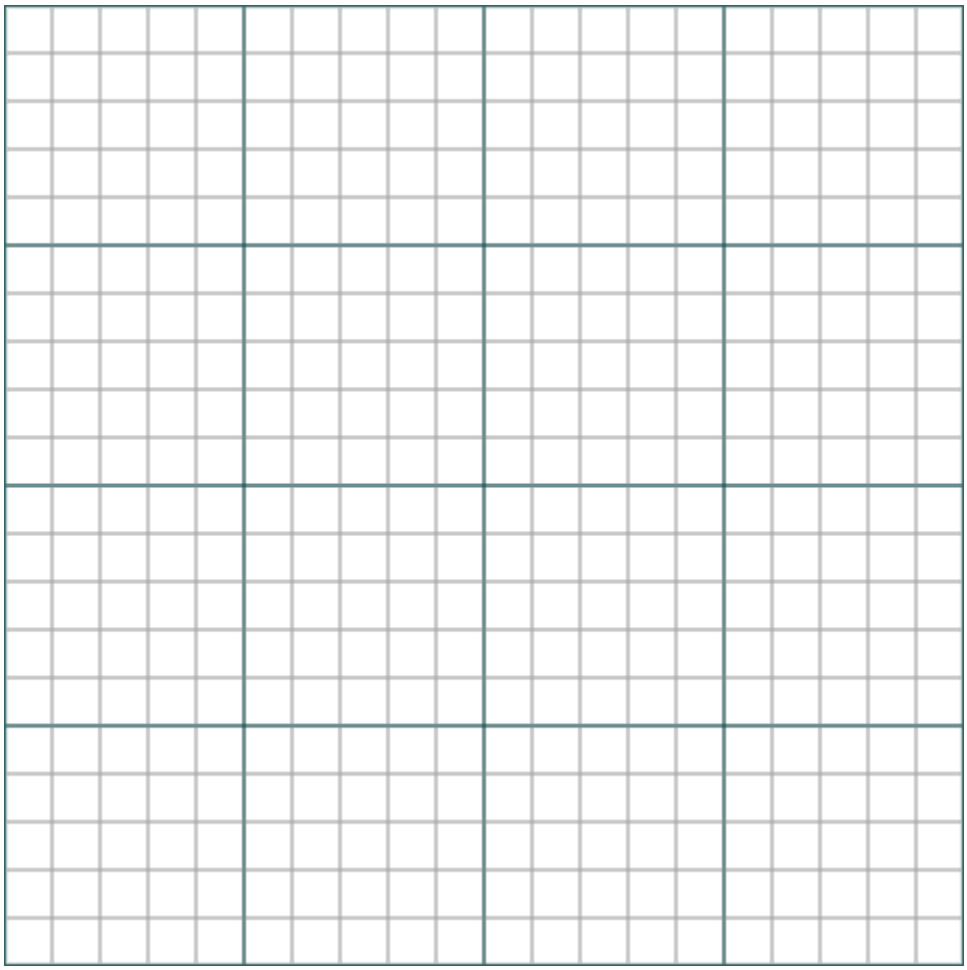


XII. Translate the following

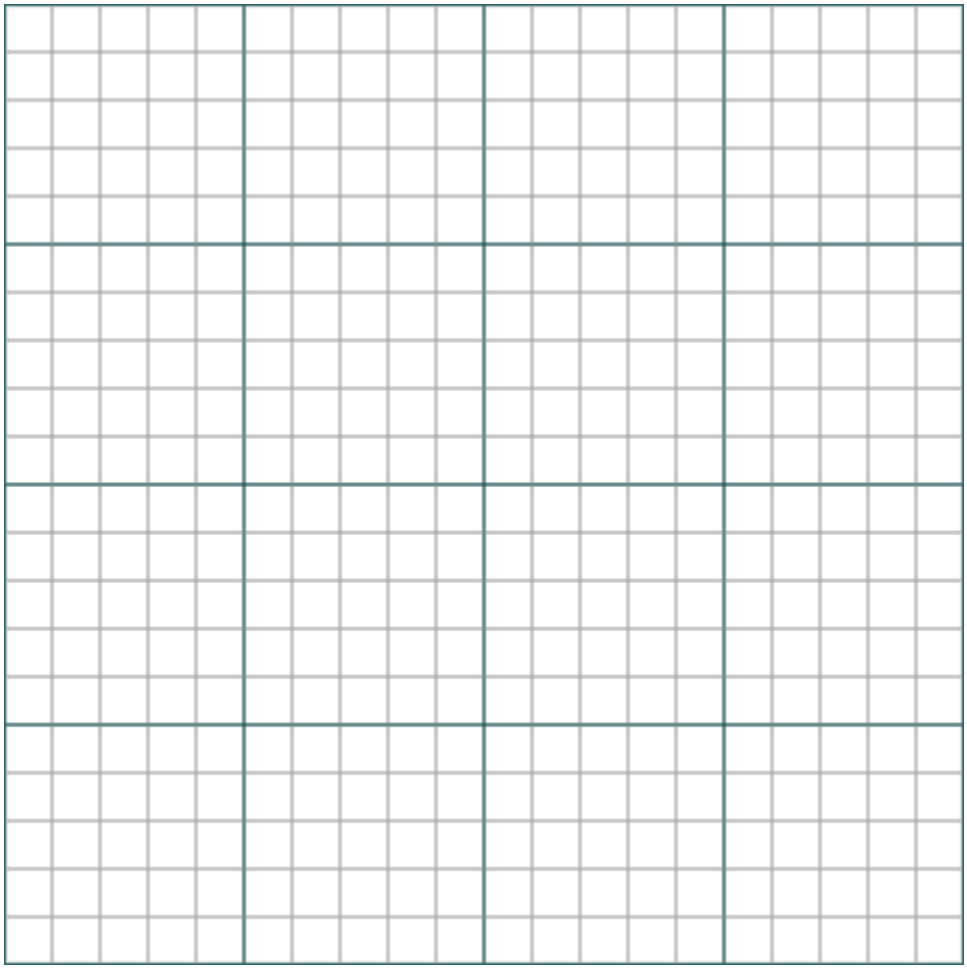
1. Translate triangle ABC 3 units to the right and 2 units up. If the coordinates of A are (1, 3), B are (4, 5), and C are (2, 2), what are the new coordinates of the vertices?



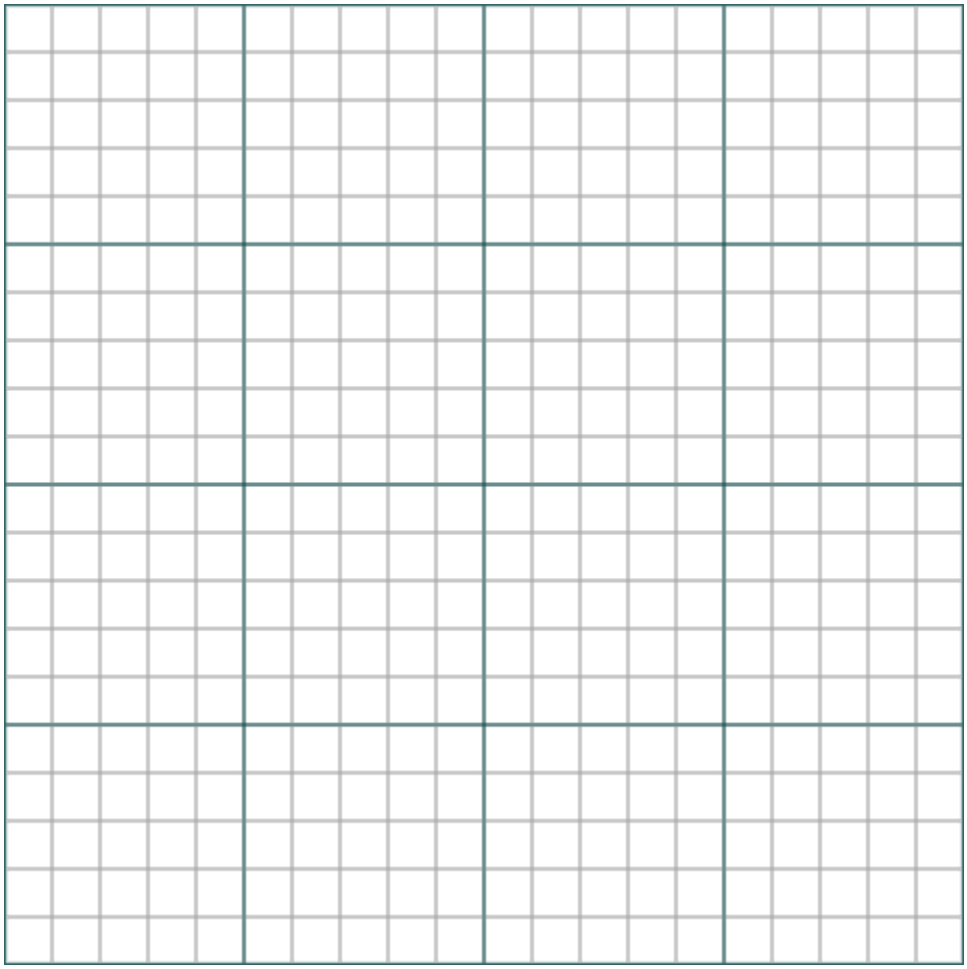
2. Translate rectangle PQRS 4 units to the left and 1 unit down. If the coordinates of P are (-2, 3), Q are (1, 3), R are (1, 1), and S are (-2, 1), what are the new coordinates of the vertices?



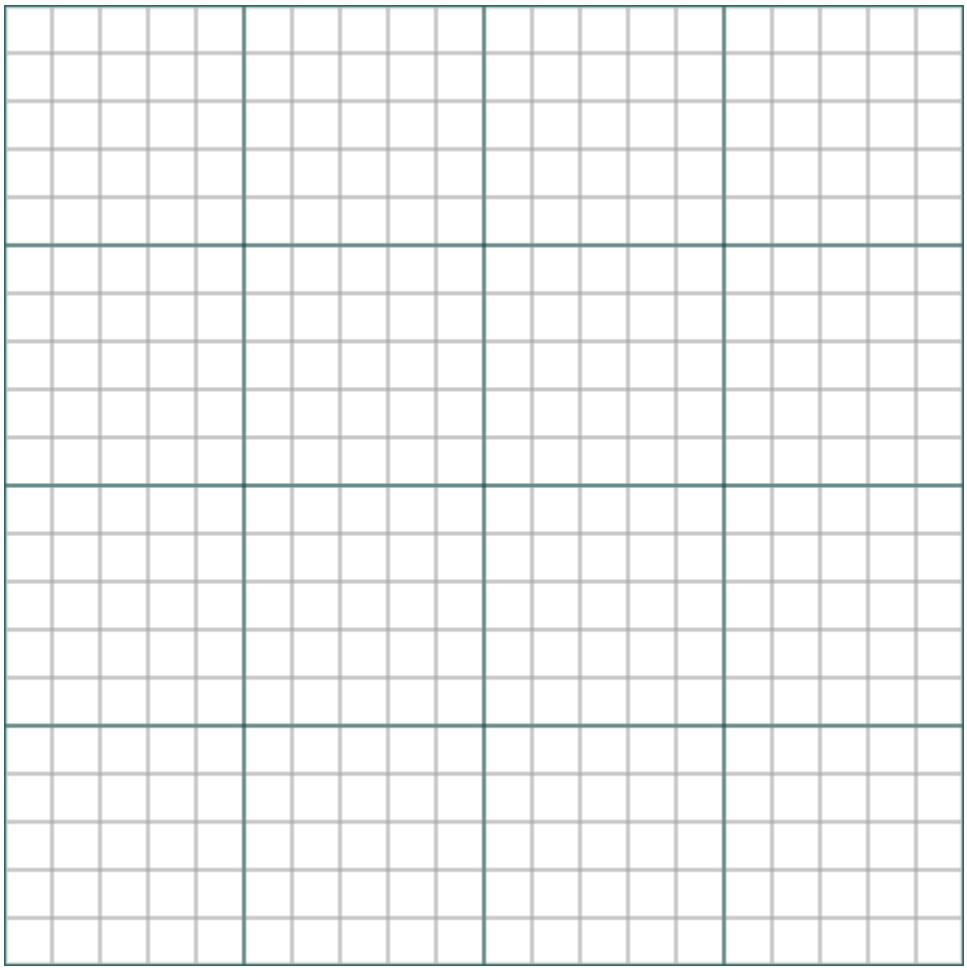
3. Translate parallelogram WXYZ 5 units to the right and 3 units down. If the coordinates of W are (2, 5), X are (4, 7), Y are (7, 8), and Z are (5, 6), what are the new coordinates of the vertices?



4. Translate trapezoid LMNO 2 units to the left and 4 units up. If the coordinates of L are (3, 2), M are (5, 2), N are (6, 4), and O are (2, 4), what are the new coordinates of the vertices?

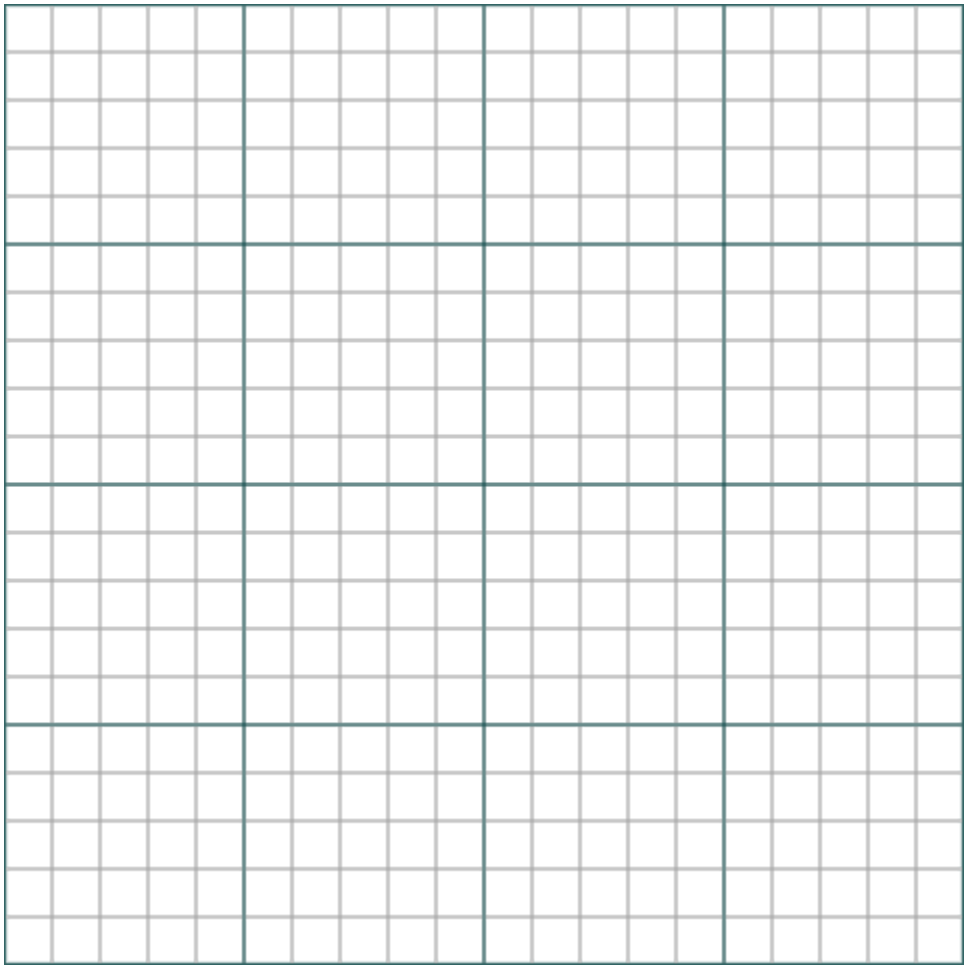


5. Translate square EFGH 3 units to the right and 2 units down. If the coordinates of E are (-1, 4), F are (2, 4), G are (2, 7), and H are (-1, 7), what are the new coordinates of the vertices?

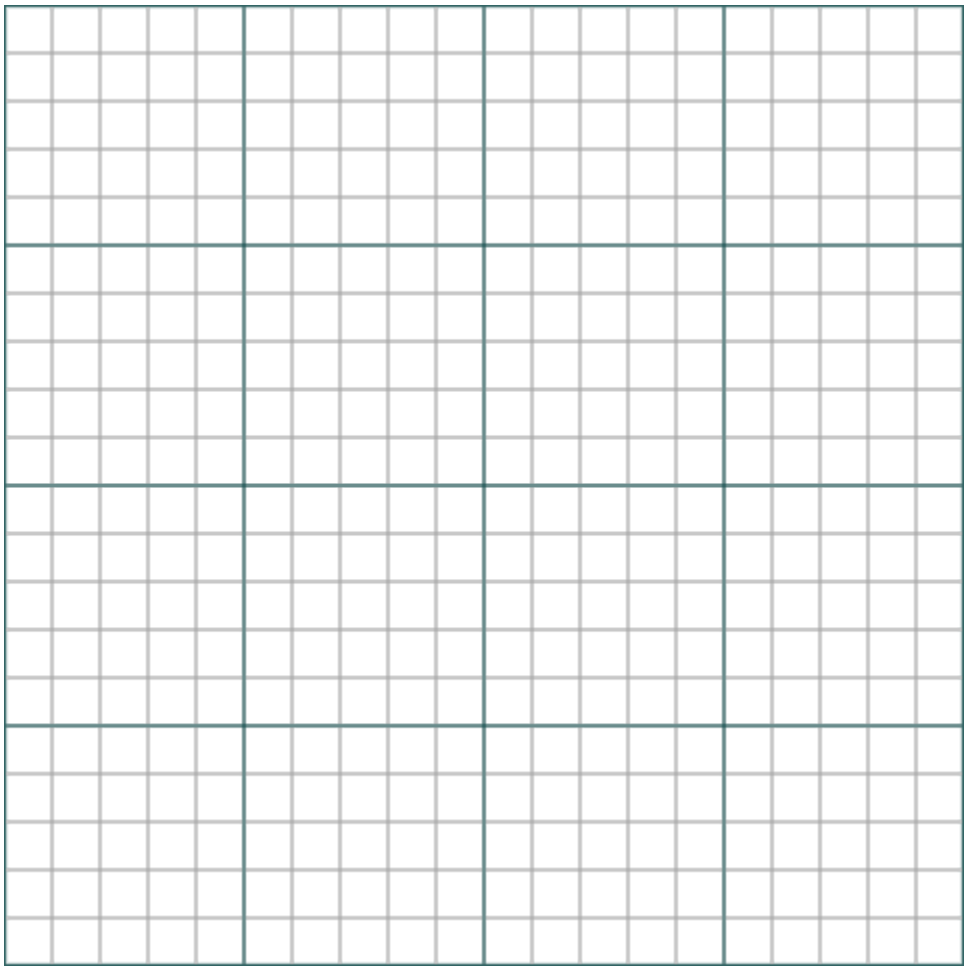


XIII. Reflections:

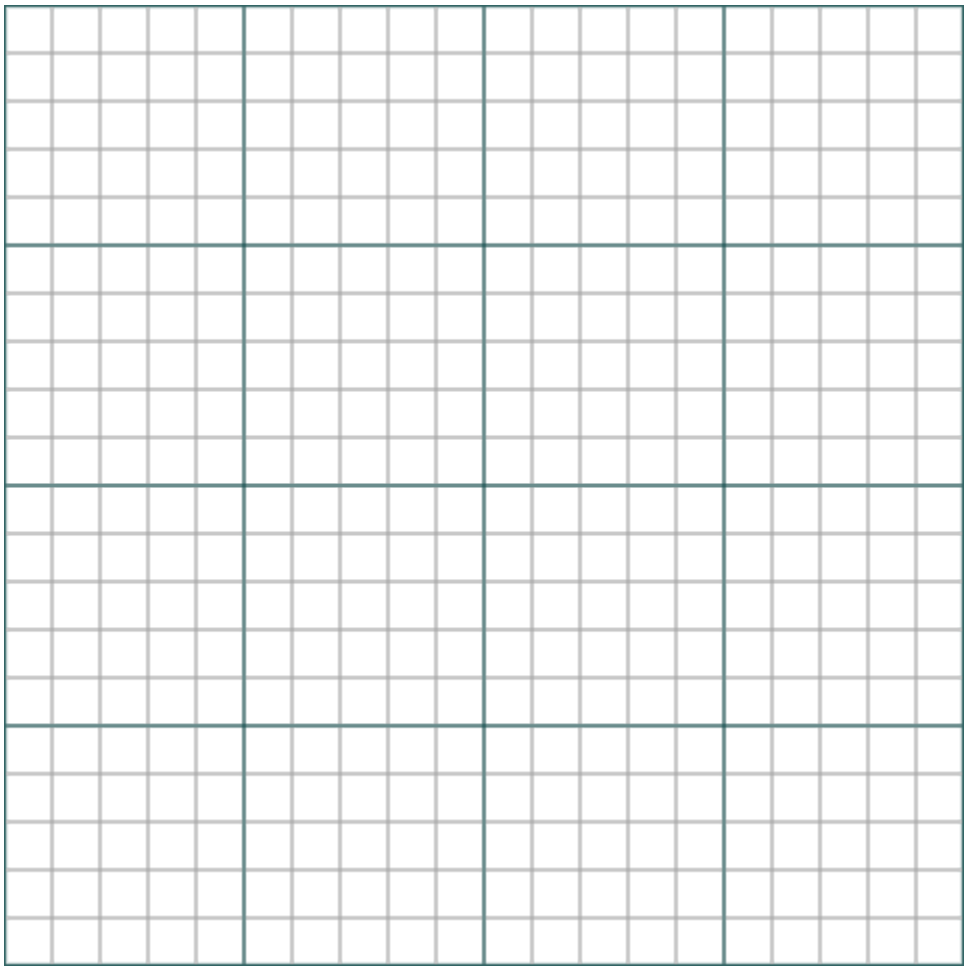
1. Reflect triangle ABC over the x-axis. If the coordinates of A are (1, 3), B are (4, 5), and C are (2, 2), what are the new coordinates of the vertices?



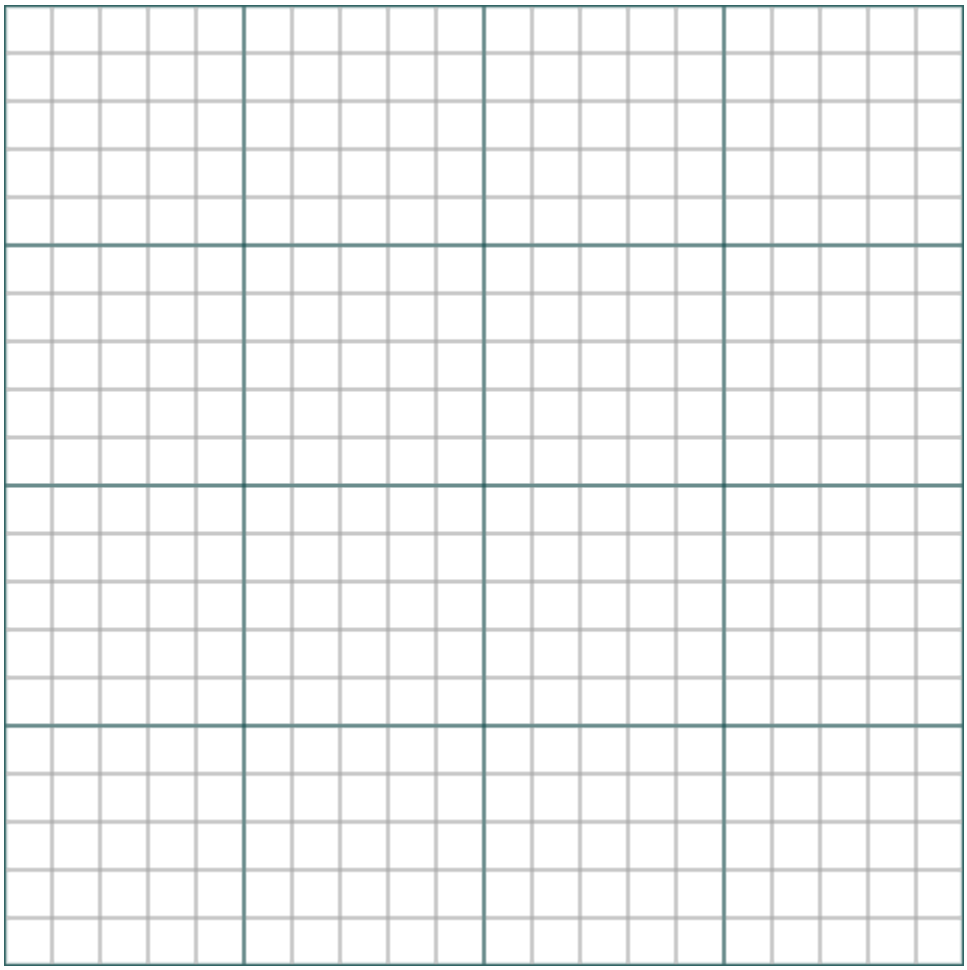
2. Reflect rectangle PQRS over the y-axis. If the coordinates of P are (-2, 3), Q are (1, 3), R are (1, 1), and S are (-2, 1), what are the new coordinates of the vertices?



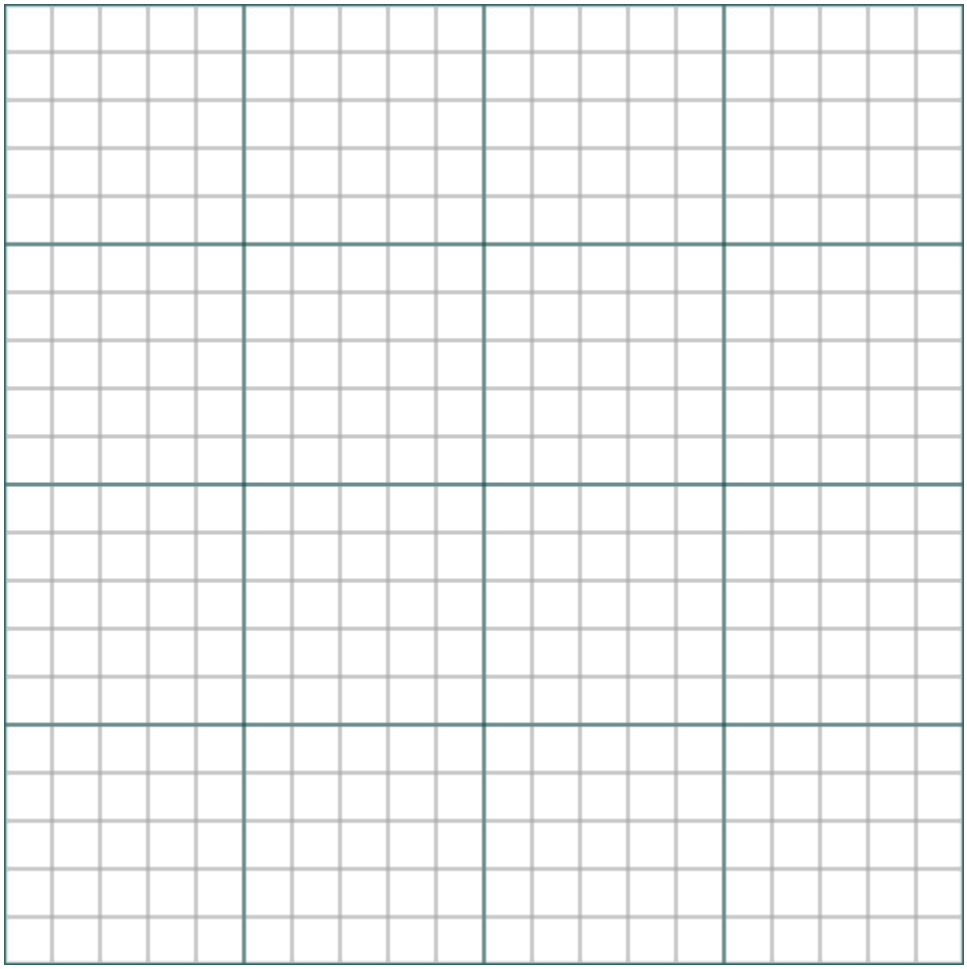
3. Reflect parallelogram WXYZ over the x-axis. If the coordinates of W are (2, 5), X are (4, 7), Y are (7, 8), and Z are (5, 6), what are the new coordinates of the vertices?



4. Reflect trapezoid LMNO over the y-axis. If the coordinates of L are (3, 2), M are (5, 2), N are (6, 4), and O are (2, 4), what are the new coordinates of the vertices?



5. Reflect square EFGH over the x-axis. If the coordinates of E are (-1, 4), F are (2, 4), G are (2, 7), and H are (-1, 7), what are the new coordinates of the vertices?



## XIV. Convert fractions to terminating repeating decimals

1. 2/5

2. 3/8

3. 5/6

4. 7/10

5. 1/20

## XV. Compare Fractions and Decimals

1. Compare 3/5 and 0.6. Which is greater, the fraction or the decimal?

2. Which is larger, 7/10 or 0.75?

3. Compare ⅔ and 0.67. Are they equal, or is one greater than the other?

4. Which is smaller, $\frac{5}{8}$ or 0.625?

5. Compare 1/4 and 0.3. Is one fraction greater than, less than, or equal to the decimal?

XVI. Write each decimal as a fraction or mixed number in simplest form

1. 3.635

2. -1.3

3. 0.55

4. -0.265

5. 0.55

XVII. Solve the following using distributive property

1. $4(2x+5)+3(3x-2) = 0$.

2. $5(3x+4)-2(4x-7)=0$

3. $6x+18+3x=0$

4. $2(3x-4)+5(2x+3)-6=0$

5. $4(2x+3) + 3(5x-1)=0$

XVIII. Solve

1. Five times a number decreased by seven is equal to eighteen. Find the number.

2. Twice the sum of a number and three is equal to fourteen. What is the number?

3. The difference between three times a number and four is equal to eleven. What is the number?

4. Seven more than twice a number is equal to twenty-five. Find the number.

5. The sum of four times a number and twelve is equal to the product of the number and ten. What is the number?

XIX. Solve the following

1. Lisa sold twice as many adult tickets as children tickets for a concert. If the total number of tickets sold is 72, how many of each type of ticket did she sell?

2. Sarah bought three identical t-shirts and a hat for $50. If the hat costs $8, how much does each t-shirt cost?

3. John has saved twice as much money as his brother and together they have saved $45. How much has each saved?

4. Emma read three times as many pages on the weekend as she did on a weekday. If she read a total of 80 pages, how many pages did she read each day?

5. You are planning a party and you buy 5 pizzas and 3 sodas. The total cost is $47, and each soda costs $2. How much does each pizza cost?

XX. Solve

1. Finding the Area of a Triangle that has a base of 8 cm and a height of 5 cm.

2. Finding the Perimeter of a Triangle that has sides of lengths 7 cm, 10 cm, and 5 cm.

3. Finding the Area and Perimeter of a Right Triangle that has legs of lengths 6 cm and 8 cm. What is the area and the perimeter of the triangle?

4. Finding the Area of a Rectangle that has a length of 12 cm and a width of 7 cm.

5. Finding the Perimeter of a Rectangle that has a length of 9 cm and a width of 4 cm.

XXI. Graph the inequalities on a number line.

1. $x<3$

2. $x \geq -4$

3. $2x+5 > 15$

4. $3-x < 7$

XXII. Solve the Word Problems. Show your work.

1. In a bag of marbles, the ratio of red to blue marbles is 5:3. If there are 40 blue marbles, how many red marbles are there?

2. If 4 pencils cost $1.20, how much would 15 pencils cost?

3. In a group of students, the ratio of boys to girls is 3:5. If there are 24 more girls than boys, how many students are there in total?

4. If 12 workers can complete a project in 8 days, how many days would it take for 18 workers to complete the same project?

5. A recipe calls for 2 cups of flour and 3 eggs to make 12 cookies. If you want to make 36 cookies, how many cups of flour and eggs do you need?

XXIII. Find missing measures of similar triangles.

1. Given two triangles, $\triangle ABC$ and $\triangle DEF$, where $\angle A = \angle D$ and $\angle B = \angle E$, explain why $\triangle ABC \sim \triangle DEF$. Then, if $AB$=6 cm, $BC$=8 cm, and $AC$=10 cm, and $DE$=9 cm, find the lengths of $EF$ and $DF$.

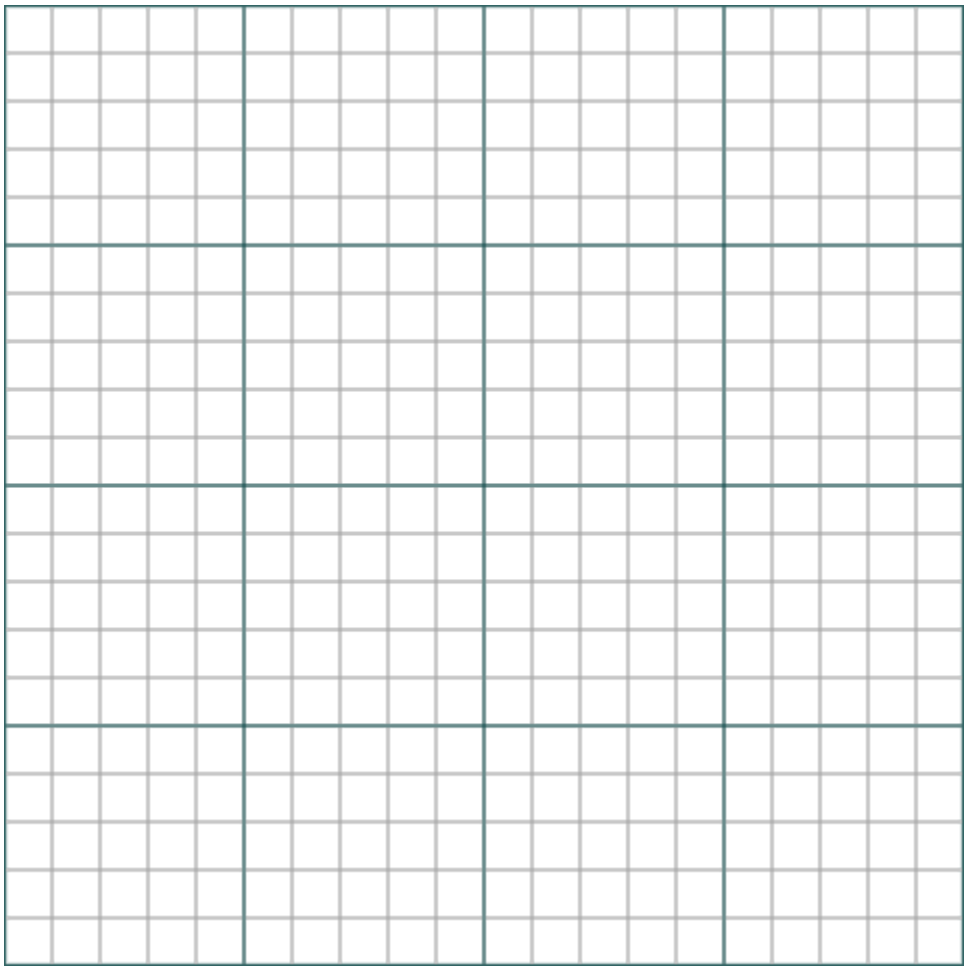
2. Triangles $\triangle MNO$ and $\triangle PQR$ have sides $MN$=4 cm, $NO$=6 cm, $PQ$=8 cm, and $QR$=12 cm, with $\angle N = \angle Q$. Find the ratio of the areas of the two triangles.

3. In similar triangles, $\triangle STU \sim \triangle VWX$, the sides of $\triangle STU$ are $ST=7$ cm, $TU=9$ cm, and $SU=10$ cm. If the corresponding side lengths in $\triangle VWX$ are $VW=14$ cm, $WX=18$ cm, and $VX=x$ cm, find the value of $x$.

4. A tree casts a shadow of 15 meters, while a 2-meter tall pole casts a shadow of 3 meters. Using similar triangles, determine the height of the tree.

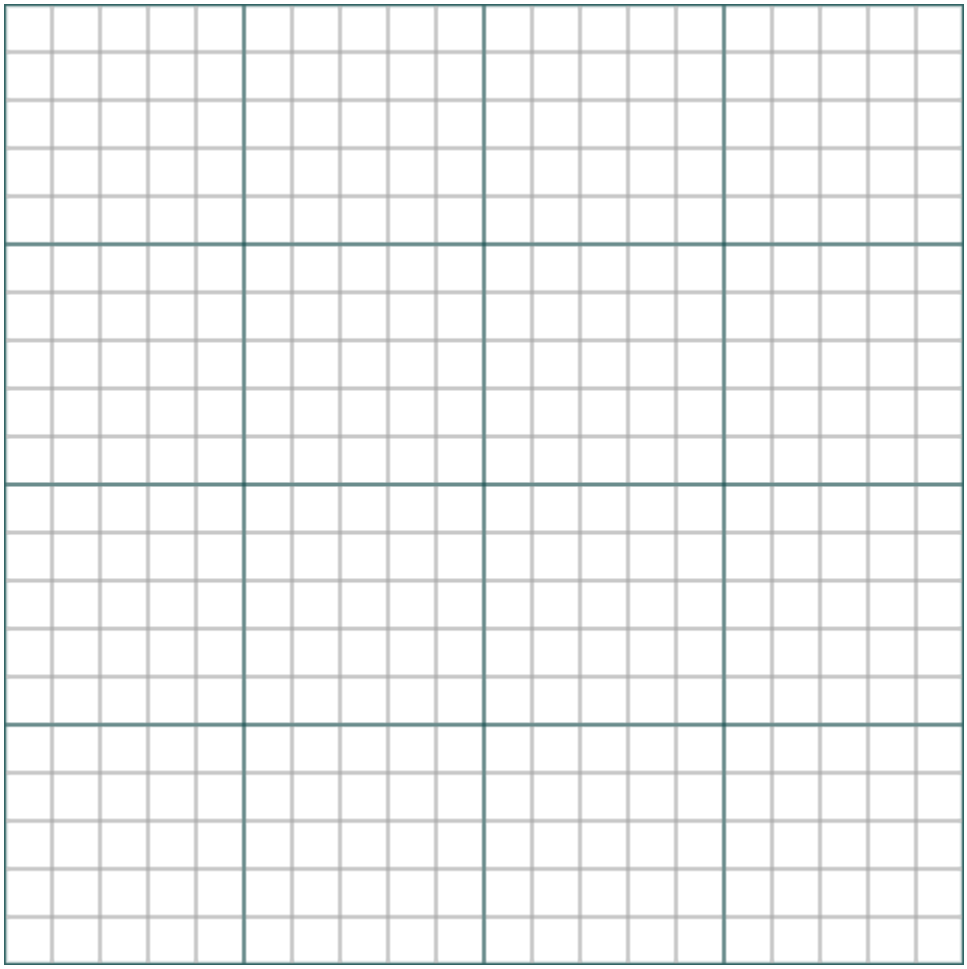
XXIV. Answer the following

1. If you have a triangle with vertices at points $A(2,3)$, $B(4,5)$, and $C(6,7)$, and you apply a dilation with a scale factor of 2 centered at the origin $(0,0)$, what will be the coordinates of the new vertices?



2. A rectangle has a length of 5 units and a width of 3 units. If the rectangle undergoes a dilation with a scale factor of 3, what will be the new length and width of the rectangle?

3. Identifying Dilations on a Grid: On a coordinate grid, a square with vertices at (1,1), (1,3), (3,3) and (3,1) is dilated by a scale factor of 0.5 centered at the origin. What are the coordinates of the vertices of the dilated square?



4. A triangle has vertices at (2,2), (4,6) and (6,2). Describe how the shape and size of the triangle will change if it undergoes a dilation with:

   a. A scale factor of 1.5

   b. A scale factor of 0.75

5. Imagine you have a photo that is 4 inches wide and 6 inches tall. You want to enlarge the photo using a photocopier with a scale factor of 1.25. What will be the new dimensions of the enlarged photo?

XXV. Answer the following

1. Convert 25% to a fraction in simplest form.

2. How do you express 50% as a fraction?

3. What is 75% expressed as a fraction in simplest form?

4. Change 10% into a fraction and simplify it.

5. Write 40% as a fraction and reduce it to its simplest form.

6. Express 33.33% as a fraction in simplest form.

7. Convert 20% to a fraction and simplify it.

8. How can you express 60% as a fraction in its simplest form?

9. Change 12.5% into a fraction and simplify it.

10. Write 90% as a fraction in its simplest form.

XXVI. Answer the following

1. If 20% of a number is 15, what is the number?

2. 25% of a number is 50. What is the number?

3. What is 30% of 80?

4. 40 is 10% of what number?

5. If 70% of a number is 84, what is the number?

6. 15% of a number is 12. What is the number?

7. What number is 45% of 200?

8. 60 is 75% of what number?

9. What is 20% of 150?

10. If 35% of a number is 28, what is the number?

XXVII. Solve Word Problems on Percent of Change.

1. A jacket originally costs $80, but it is now on sale for $60. What is the percent decrease in the price of the jacket?

2. The price of a book increased from $15 to $18. What is the percent increase?

3. A car was purchased for $25,000 and later sold for $20,000. What is the percent decrease in the price of the car?

4. A company's revenue increased from $200,000 to $250,000. What is the percent increase in revenue?

5. The population of a town decreased from 10,000 to 8,500. What is the percent decrease in population?

6. The number of students in a school increased from 500 to 600. What is the percent increase in the number of students?

7. A pair of shoes originally cost $120, but the price was increased to $144. What is the percent increase in the price?

8. A stock's value dropped from $150 to $120. What is the percent decrease in the stock's value?

9. The attendance at a concert increased from 800 people to 1,000 people. What is the percent increase in attendance?

10. The water level in a reservoir decreased from 5,000 gallons to 4,500 gallons. What is the percent decrease in the water level?

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I. Translate Verbal Phrases to Numeric/ Algebraic expressions

1. What is the numeric expression for "the sum of five and seven"?

5+7

2. How would you write "three times the difference between nine and two" as a numeric expression?

3 (9-2)

3. What's the numeric expression for "twelve decreased by six"?

12-6

4. Translate "the product of four and nine increased by three" into a numeric expression.

4 x 9+3

5. How do you express "ten less than the quotient of sixteen and four" numerically?

16 ÷4-10

6. Write a numeric expression for "the sum of six and twice the quantity of eight minus five."

6 + 2(8-5)

7. What's the numeric expression for "the difference between three times a number and four"?

3x -4 (Let the number be 'x')

8. If "a number decreased by nine" is expressed numerically, what's the result?

X - 9 (Let the number be 'x')

9. Translate "twice a number added to five" into a numeric expression.

2x +5 (Let the number be 'x')

10. How would you write "the quotient of fourteen and two decreased by three" as a numeric expression?

$14 \div 2 - 3$

11. What's the numeric expression for "the sum of twice a number and seven"?

$2x + 7$ (Let the number be 'x')

12. Express "seven times a number decreased by two" as a numeric expression.

$7x - 2$ (Let the number 'x')

13. Translate "five less than the product of three and a number" into numeric form.

$3x - 5$ (Let the number be 'x')

14. What's the numeric expression for "the difference between six times a number and ten"?

$6x - 10$ (Let the number be 'x')

15. How would you write "the sum of three times a number and nine" as a numeric expression?

$3x + 9$ (Let the number be 'x')

16. If "a number increased by eight" is written numerically, what's the expression?

$x + 8$ (Let the number be 'x')

17. Translate "the product of five and a number increased by two" into numeric form.

$5x + 2$ (Let the number be 'x')

18. What's the numeric expression for "four less than three times a number"?

$3x - 4$ (Let the number be 'x')

19. Express "eight divided by twice a number" as a numeric expression.

$8 \div 2x$ (Let the number be 'x')

20. How would you write "the difference between twice a number and six" as a numeric expression?

$2x - 6$ ( Let the number be 'x' )

II. Evaluate

1. 3+5×2

= 3+10

= 13

2. (4+3)×2

= 7 x 2

= 14

3. 6÷2+4

= 3+4

= 7

4. 5×(2+3)

= 5 x 5

= 25

5. 8-4÷2

= 8-2

= 6

6. (10−3)×2

= 7 x 2

= 14

7. 9+6÷3

= 9+2

= 11

8. (6+2)÷2

= 8÷2

= 4

9. 7+3×2−1

= 7+6-1

= 13-1

= 12

10. 12÷(2+2)

= 12 ÷4

= 3

11. 15−3×2

= 15- 6

= 9

12. (8÷2)+5

= 4 + 5

= 9

13. 7×2+10÷2

= 14 + 5

= 19

14. 18÷3×2

= 18 ÷ 6

= 3

15. 4×(3+5)÷2

= 4(8) ÷ 2

= 32 ÷ 2

= 16

16. (7−2)×4

= 5 x 4

= 20

17. 5+9÷3×2

= 5 + 3 x 2

= 5 + 6

= 11

18. 16÷4+3×2

= 4 + 6

= 10

19. (5+3×2)−4

= (5+6) - 4

= 11-4

= 9

20. 6×2−3+1

= 12 - 3 + 1

= 9 + 1

= 10

III. Translate verbal phrases to algebraic expressions.

1. Three times a number.

Let the number be 'x'

$3x$

2. Twenty four pieces of candy were divided among some students.

Let the number be x

$\frac{24}{x}$

3. The number of people increased by 15

Let the number of people be 'p'

$p+15$

4. The number of inches in any number of feet.

$12f$

5. Four more than the number of weeks in a group of days.

$4+\frac{d}{7}$

6. Four less than the amount of cents in a number of dimes.

$10d-4$

7. Thirteen more students than teachers.

$t + 13 = 5$

8. Money earned babysitting at ten dollars per hour.

$10x = m$

9. Thirty pencils were divided among some students.

$30 \div 5$

10. Three dollars more than the cost of the sandwich.

$s + 3$

IV. Evaluate the following expressions containing variables.

1. $3x+5$ when $x=4$

$= 3(4)+5$

$= 12+5$

$= 17$

2. $7y-2$ when $y=3$

$= 7(3) - 2$

$= 21-2$

$= 19$

3. $2a+3b$ when $a=1$ and $b=2$

$= 2(1) + 3(2)$

$= 2+6$

$= 8$

4. $4m^2-n$ when $m=2$ and $n=5$

$= 4(2)^2 - 5$

$= 4(4) - 5$

$= 16-5$

$= 11$

5. $5(x+2)$ when $x=3$

$= 5(3+2)$

$= 5(5)$

$= 25$

6. $2y^2-3z$ when y=4 and $z$=1

$2(4)^2-3(1) = 2(16)-3$
$= 32-3$
$= 29$

7. $3a-4b+2c$ when $a$=1, $b$=2 and c= -1

$= 3(1)+4(2)+2(-1)$
$= 3+8-2$
$= 11-2$
$= 9$

8. $4t^5+3$ when $t$=10

$= 4(10)^5+3$
$= 4(100000)+3$
$= 400000+3$
$= 400003$

9. $3(x-2)^4$ when $x$=6

$= 3(6-2)^4$
$= 3(4)^4$
$= 3(256)$
$= 768$

10. $6y+2z-4$ when $y$=2 and z= 1

$= 6(2)+2(1)-4$
$= 8+2-4$
$= 6-4$
$= 2$

V. Answer the following

1. What is a function in mathematics? Provide a simple definition.

A function is a relation between a set of inputs having one output only

2. Identify whether the following relation is a function :
{(1,2),(2,3),(3,4),(4,5),(1,3)}. Explain your answer.

No
1 has two outputs : 2 and 3

3. Consider the following table. Determine if it represents a function:

| $x$ | $y$ |
|---|---|
| 1 | 2 |
| 2 | 3 |
| 3 | 2 |
| 4 | 5 |

Yes!

4. For the function $f(x)=3x-2$, find $f(4)$

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

$f(4) = 12-2$

$= 10$

5. What does the term "domain" refer to in a function?

X values

6. Explain what it means for a function to be one-to-one.

No 2 input values have the same output value

7. Given the function, $g(x)=x^2$, calculate $g(3)$

$g(3) = (3)^2 = 9$

8. Describe the difference between a linear function and a quadratic function.

Linear = Straight line Quadratic - Parabolas

9. Determine whether the following graph represents a function:

A graph showing a straight line passing through points (1, 2), (2, 4), (3, 6), and (4, 8)

Yes

10. What is the range of the function, $h(x)=2x$, if the domain is $x=\{1,2,3,4,5\}$?

Range $\{2,4,6,8,10\}$

| x | y h(x) |
|---|---|
| 1 | 2 |
| 2 | 4 |
| 3 | 6 |
| 4 | 8 |
| 5 | 10 |

VI. Answer, Construct scatter plots and analyze trends in scatter plots.

1. What is a scatter plot? Provide a simple definition.

A graph that uses dots for multiple numeric variables

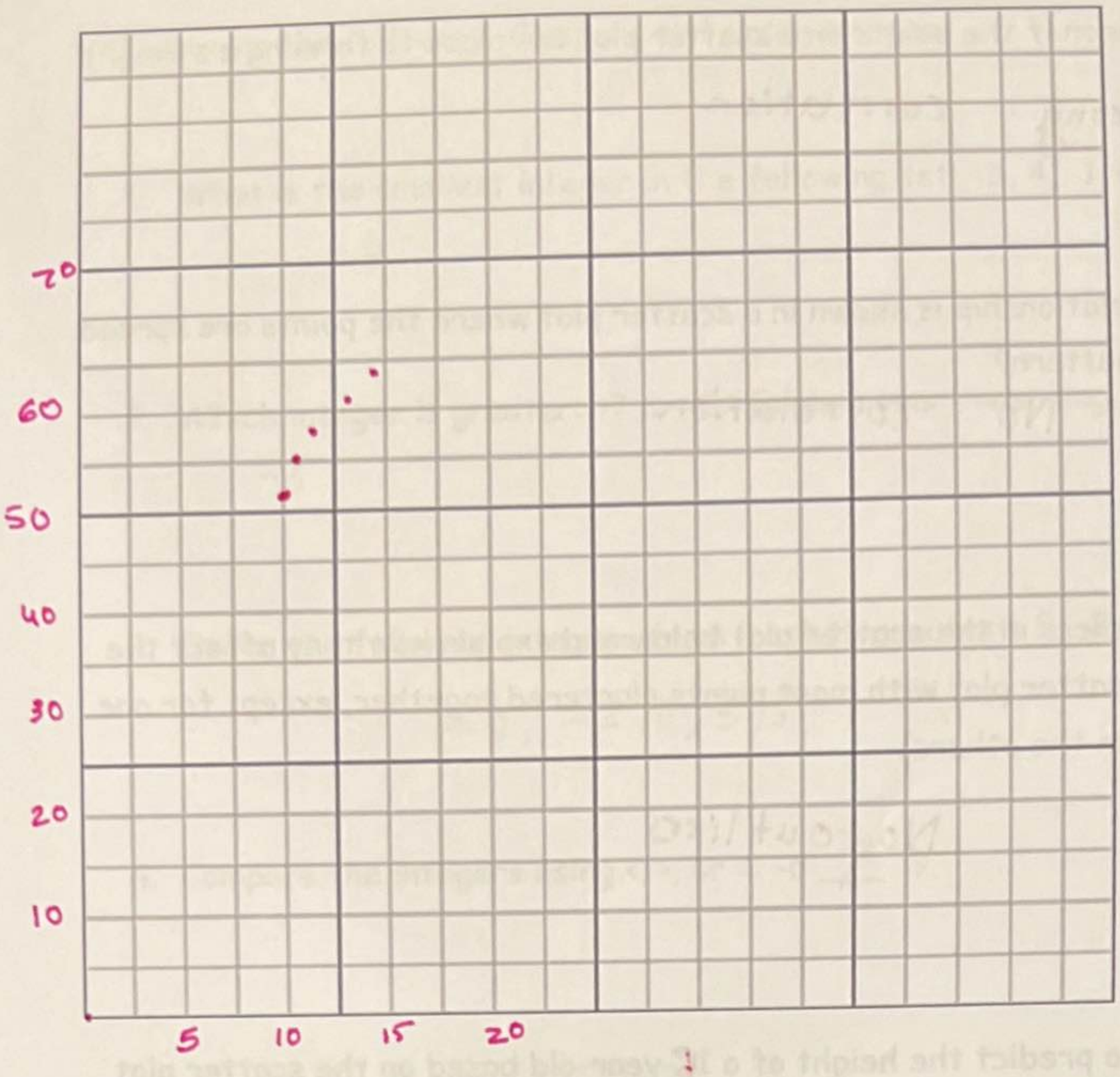
2. Explain the purpose of a scatter plot. How is it used to represent data?

To display what happens to one variable when the other is changed.

3. Construct a scatter plot using the following data:

| Age (years) | Height (inches) |
|---|---|
| 10 | 52 |
| 11 | 55 |
| 12 | 58 |
| 13 | 61 |
| 14 | 64 |

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4. What are the independent and dependent variables in a scatter plot?

Ages= Independent
Height = Dependent

5. Analyze the scatter plot below and describe the relationship between the variables. (A scatter plot showing the number of hours spent studying on the x-axis and the test score on the y-axis)

Positive Correlation

6. What does it mean if the points on a scatter plot are close to forming a straight line?

Strong correlation

7. What type of relationship is shown in a scatter plot where the points are spread out with no clear pattern?

No correlation

8. Identify any outliers in the scatter plot below and explain how they affect the overall trend. (A scatter plot with most points clustered together, except for one point far away from the others)

No outliers

9. If you wanted to predict the height of a 15-year-old based on the scatter plot data, what height would you estimate?

65 inches

10. Explain how you could use a line of best fit to make predictions from a scatter plot.

It helps to find the direction/that determine the correlation.

VII. Answer the following -Compare and order integers

1. What is the smallest integer in the following set: -3, 4, -1, 0, 2?

   -3

2. Which integer is greater: -7 or -3? Explain your reasoning.

   -3

3. Order the following integers from least to greatest: 5, -2, 0, -8, 3.

   -8, -2, 0, 3, 5

4. Compare the integers using <, >, or =: -6 > -9.

5. Which integer is less: 4 or -5?

   -5

6. Arrange the following integers in descending order: -1, 3, -5, 7, 0.

   7, 3, 0, -1, -5

7. If you are at -4 on a number line and move 3 spaces to the right, where do you end up?

   -1

8. True or False: -2 is greater than -5.

True

9. Find the middle integer between -3 and 3.

0

10. Compare the integers using <, >, or =: -10 = -10.

VIII . Answer the following

1. Find the absolute value: |-7|

7

2. Evaluate the expression: |4| + |-3|

4+3 = 7

3. What is the absolute value of |-15+5|

|-10| = 10

4. Calculate the expression: |-2| / |3|

2/3

5. Find the absolute value of the following expression: |10 - 14|

|-3| = 3

6. Evaluate: |-8|-|5|

= 8 - 5

= 3

7. What is the absolute value of $|-6|+|2-8|$

$= 6 + |-6|$
$= 6 + 6$
$= 12$

8. Calculate the expression: $|3| \div |-1|$

$= 3 \div 1$
$= 3$

9. Evaluate the absolute value of: $|-9+4|$

$= |-5|$
$= 5$

10. Find the absolute value of the following expression: $|-12|+|-7|$

$= 12 + 7$
$= 19$

## IX. Add and/or subtract Integers

1. $5+(-3) = 2$
2. $-7+4 = -3$
3. $12-15 = -3$
4. $-8+(-5) = -8-5 = -13$
5. $9-(-3) = 9+3 = 12$
6. $-10+6 = -4$
7. $-3-7 = -10$
8. $15+(-20) = -5$
9. $-4-(-8) = -4+8 = 4$
10. $-2+10 = 8$

X. Simplify the following

1. $(3x-5)+(2x+7)$ when $x=-2$

$= 3(-2)-5 + 2(-2)+7$
$= -6-5-4+7$
$= -11-4+7$
$= -15+7$
$= -8$

2. $(4y+6)-(2y-3)$ when $y=3$

$= 4(3)+6 - 2(3)-3$
$= 12+6-6-3$
$= 18-9$
$= 9$

3. $x(x-4)$ when $x=-3$

$= -3(-3-4)$
$= 9+12$
$= 21$

4. $8yy+2$ When $y=4$

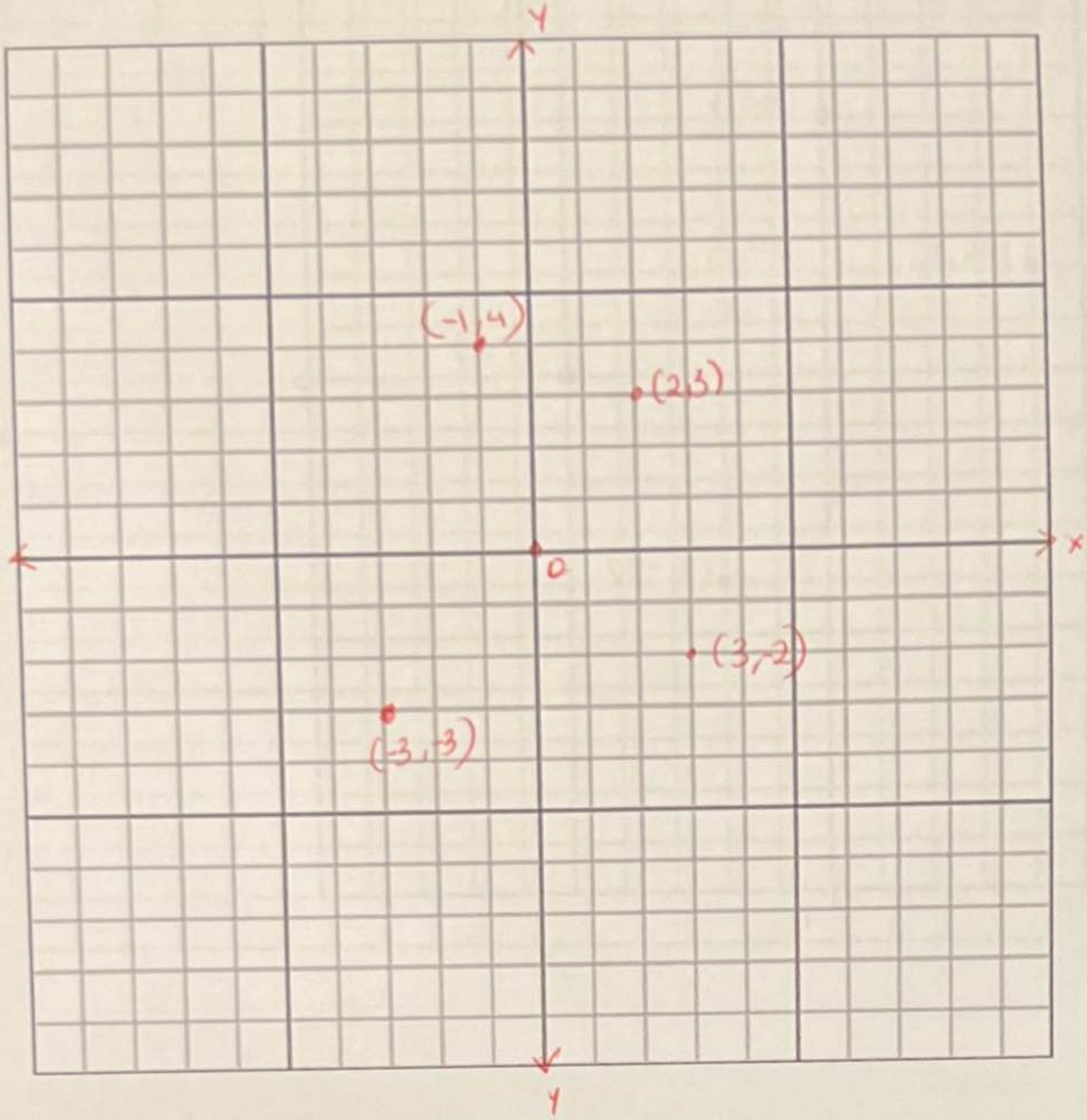
$= 8 \cdot 4 \cdot 4 + 2$
$= 32 \cdot 4 + 2$
$= 128+2$
$= 130$

5. $2x-3y$ when $x=5$

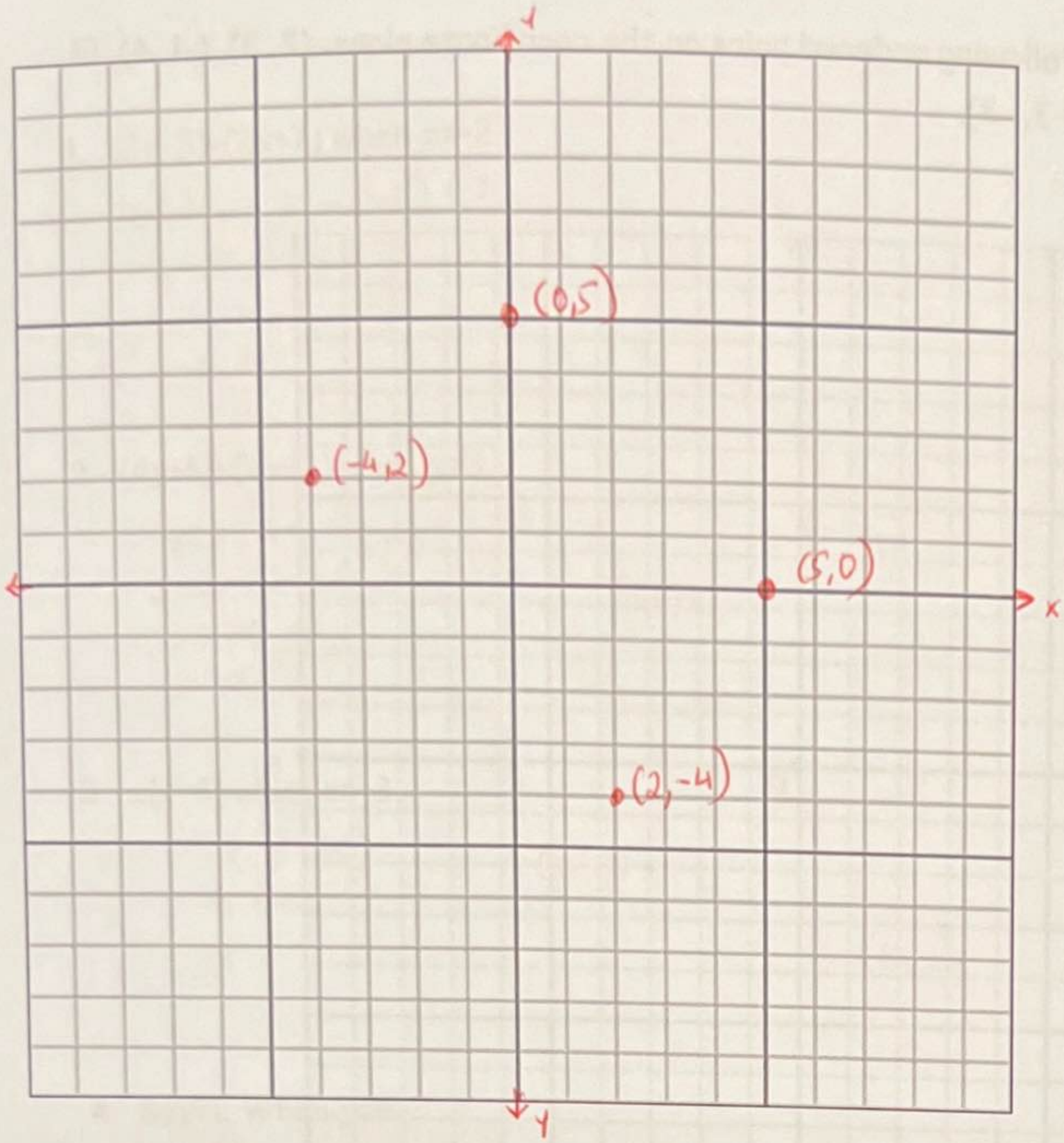
$2(5)-3y$
$10-3y$

XI. Plot the ordered pairs and answer the questions.

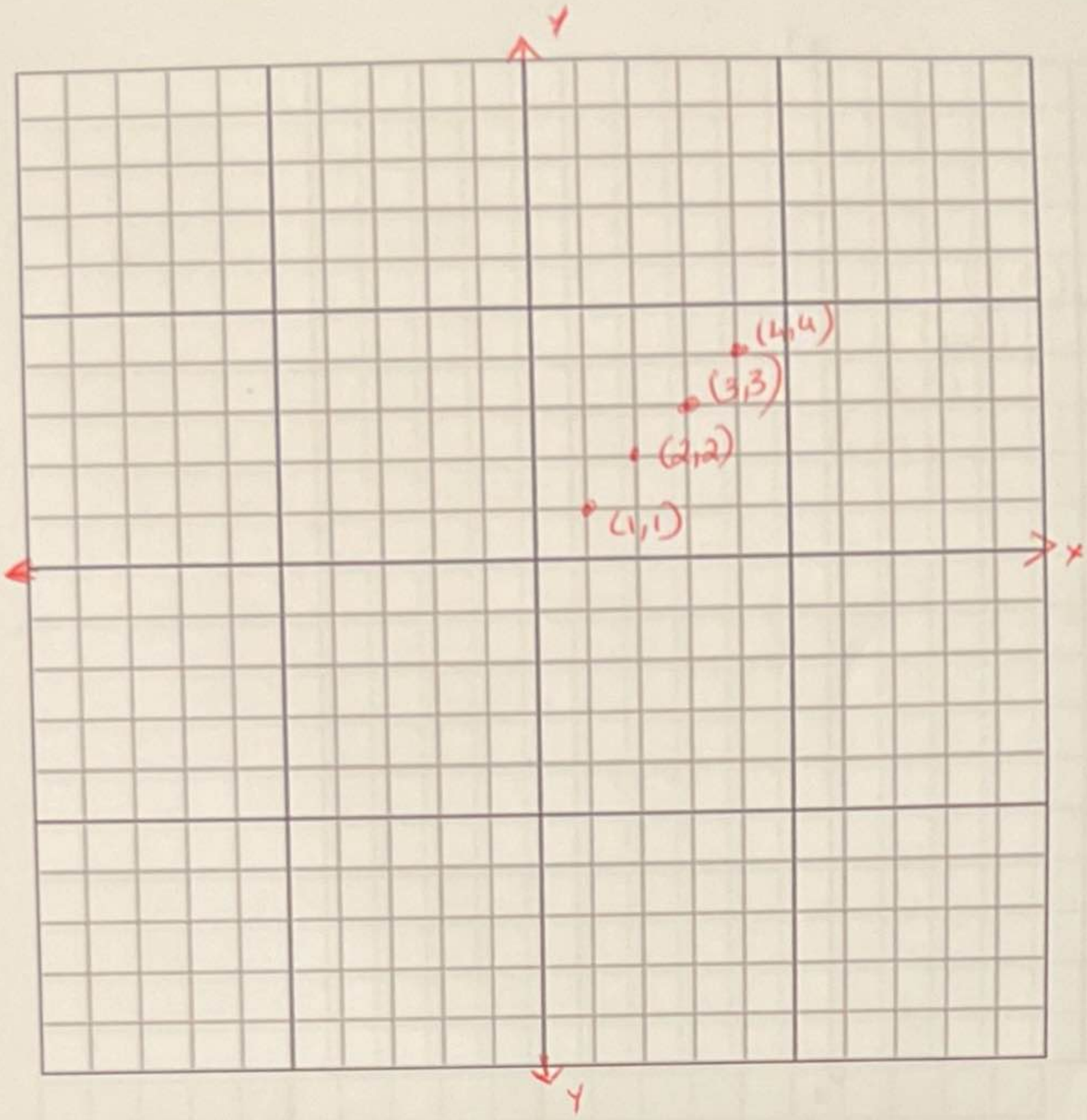
1. Plot the following ordered pairs on the coordinate plane: (2, 3), (-1, 4), (3, -2), and (-3, -3).



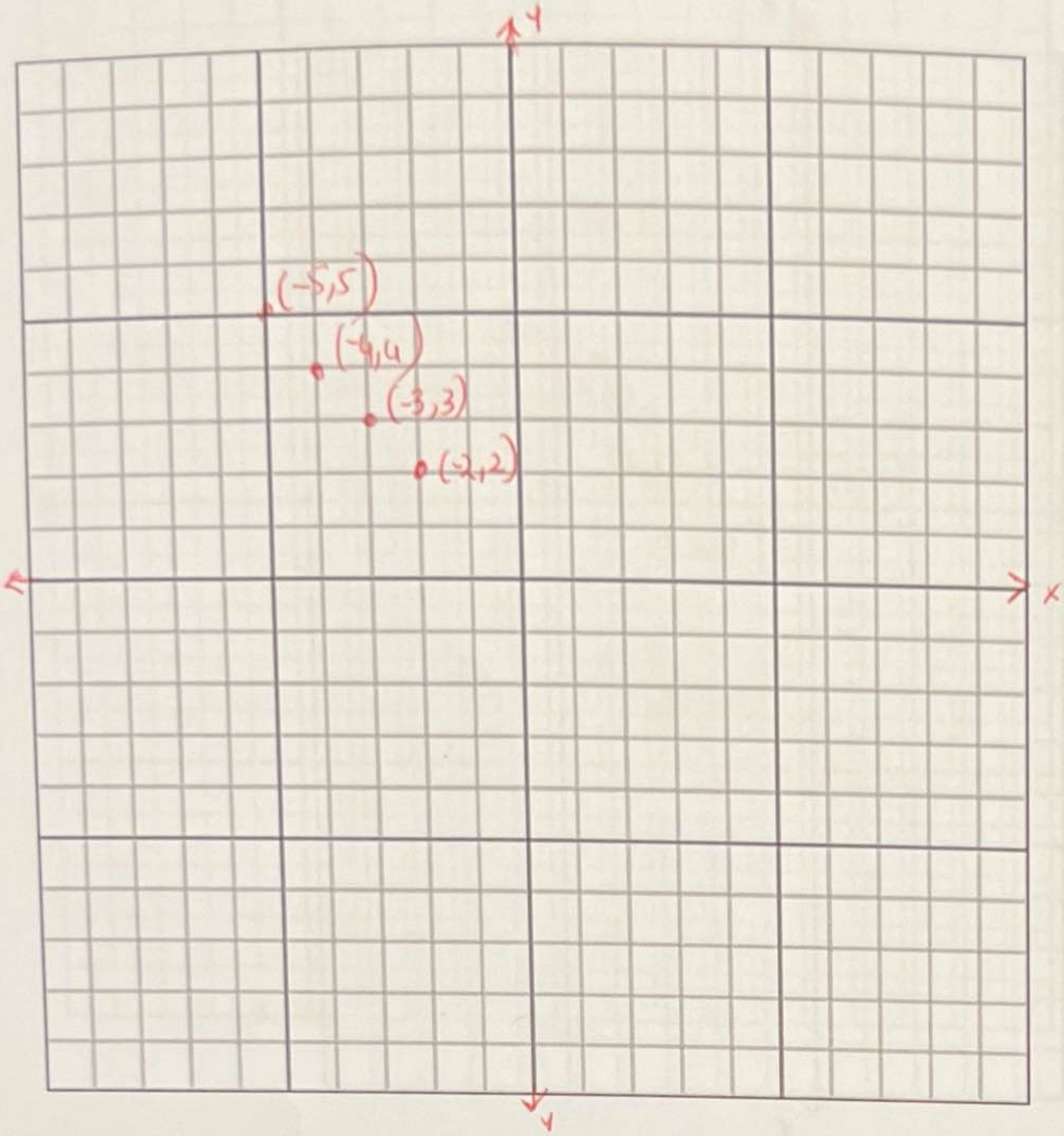
2. Graph the points (0, 5), (5, 0), (-4, 2), and (2, -4) on the coordinate plane.



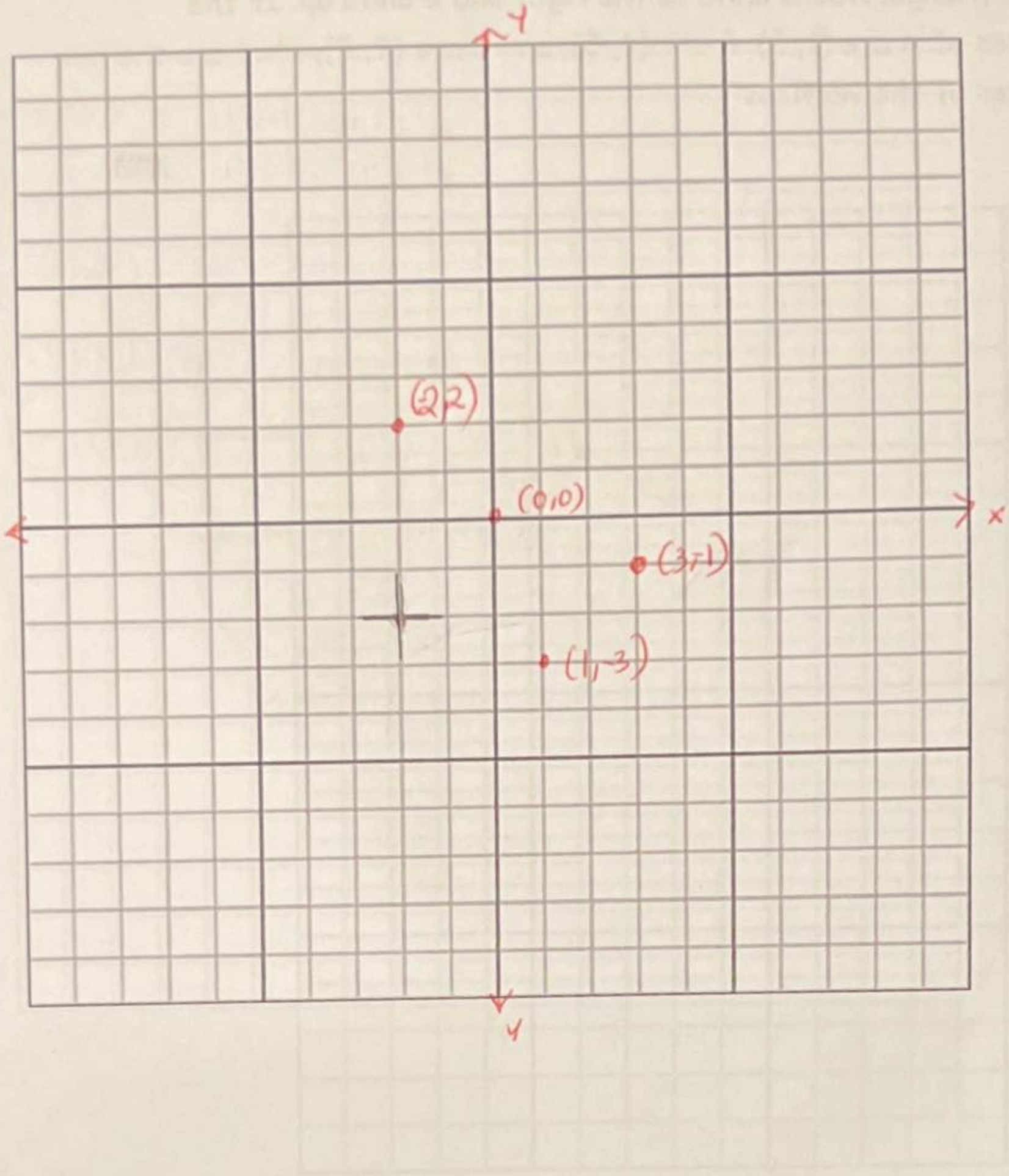
3. Draw the points (1, 1), (2, 2), (3, 3), and (4, 4) on the coordinate plane. What do you notice about the points? → They make a straight line



4. Plot the ordered pairs (-5, 5), (-4, 4), (-3, 3), and (-2, 2) on the coordinate plane. Describe the pattern you observe. → Downward Slope + Decreasing Pattern



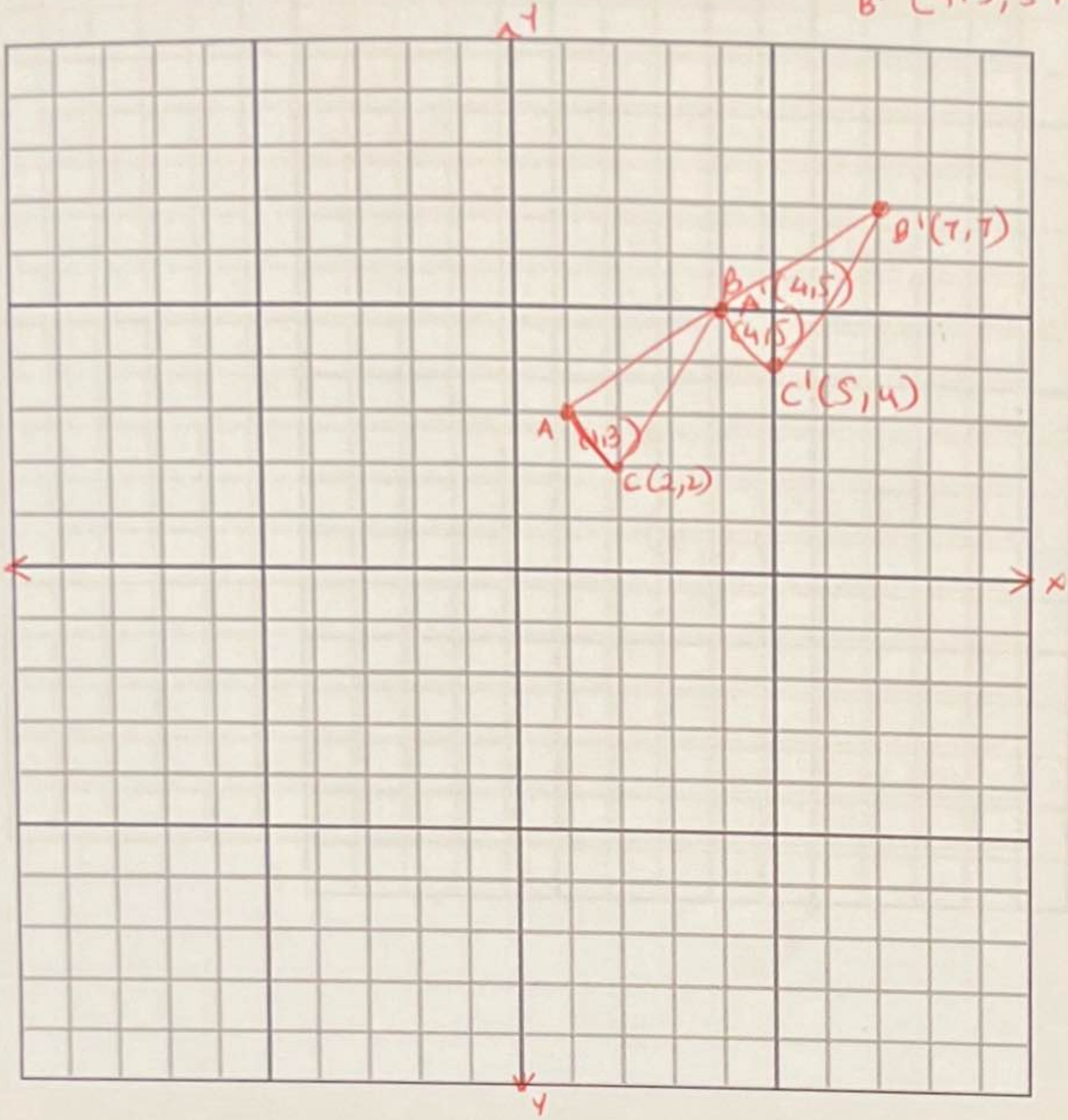
5. Graph the following points: (0, 0), (1, -3), (-2, 2), and (3, -1).



XII. Translate the following

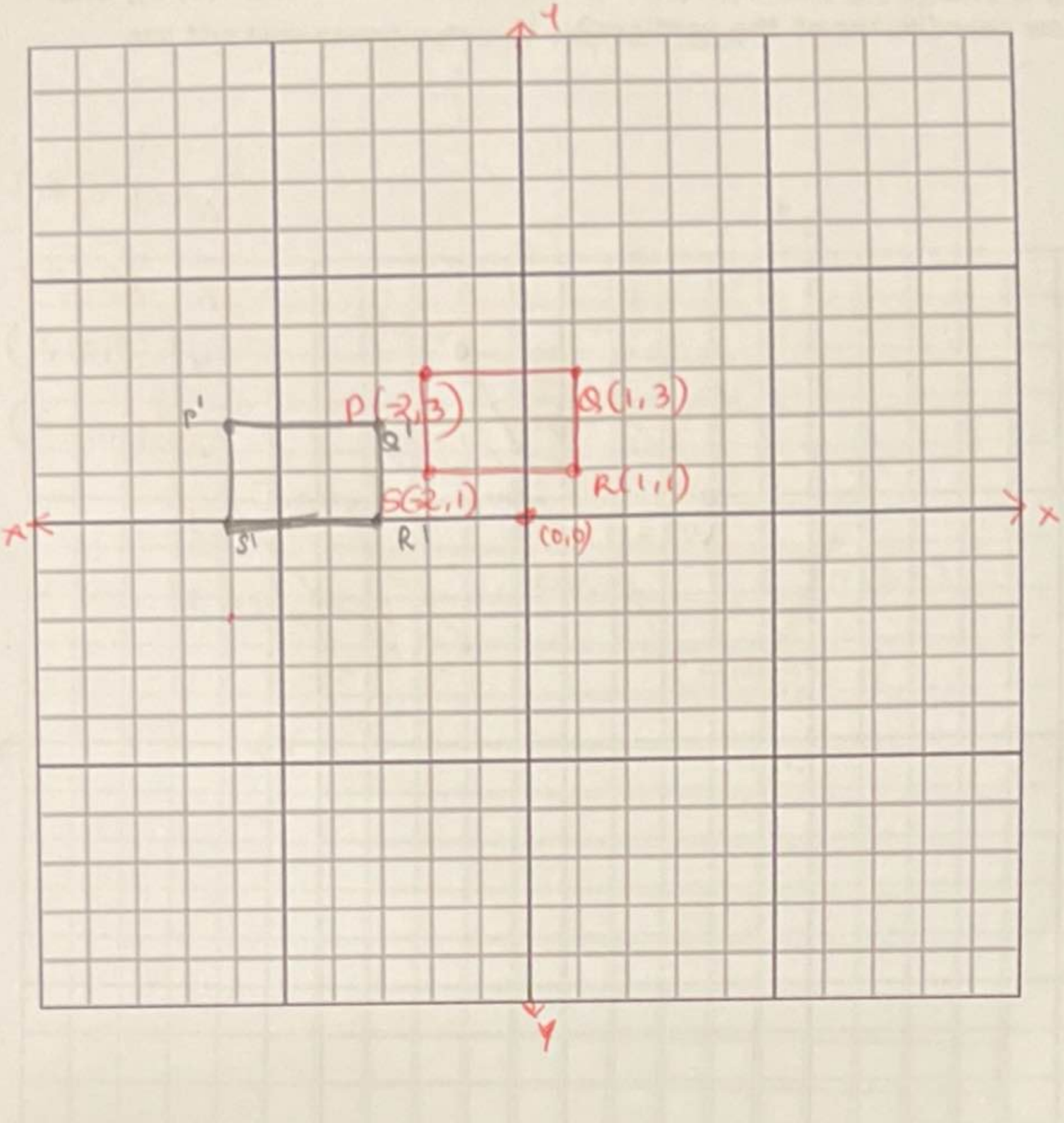
1. Translate triangle ABC 3 units to the right and 2 units up. If the coordinates of A are (1, 3), B are (4, 5), and C are (2, 2), what are the new coordinates of the vertices?

A' (1+3, 3+2)  C' (2+3, 2+2)
B' (4+3, 5+2)



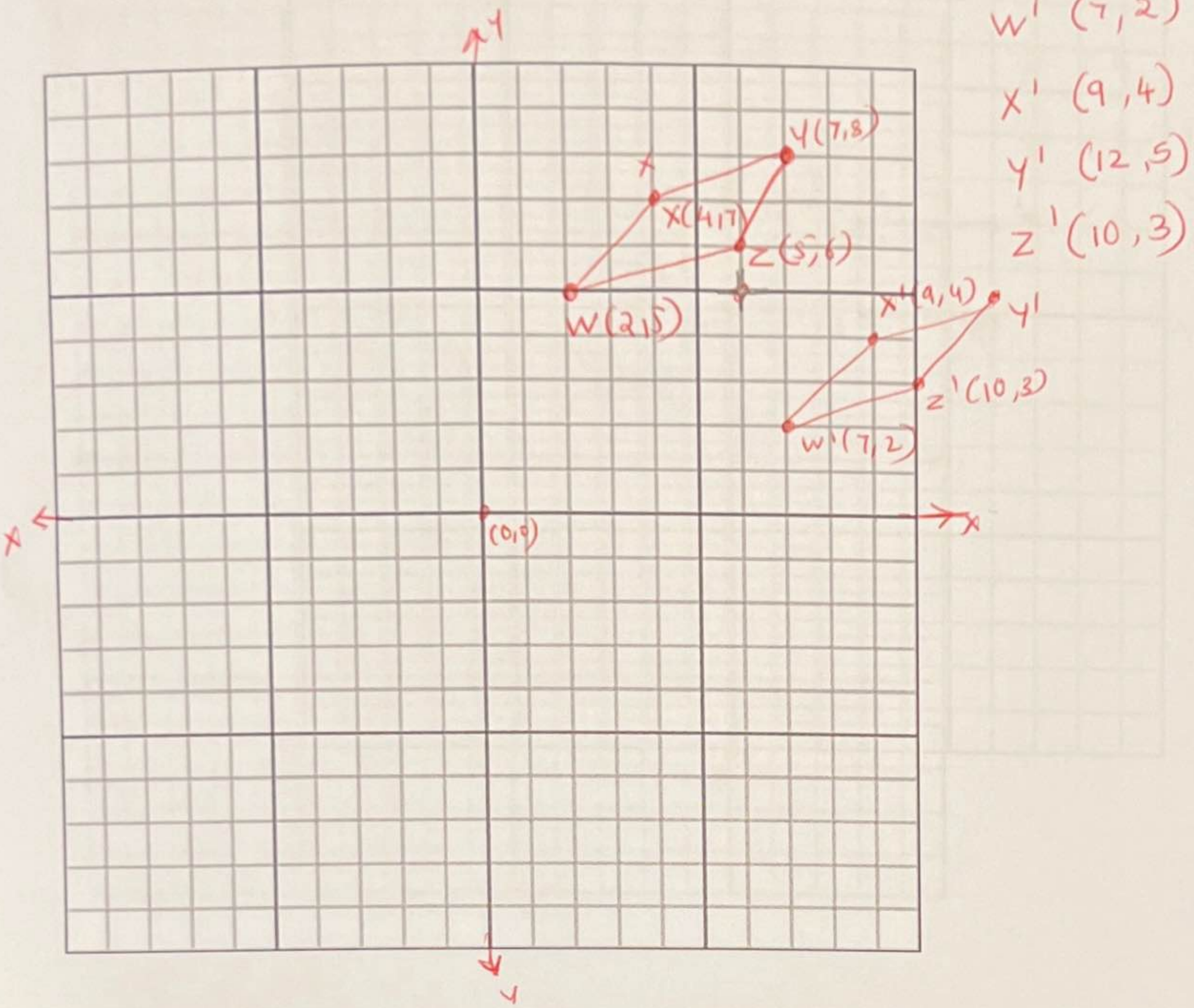

A' (4,5)
B' (7,7)
C' (5,4)

2. Translate rectangle PQRS 4 units to the left and 1 unit down. If the coordinates of P are (-2, 3), Q are (1, 3), R are (1, 1), and S are (-2, 1), what are the new coordinates of the vertices?

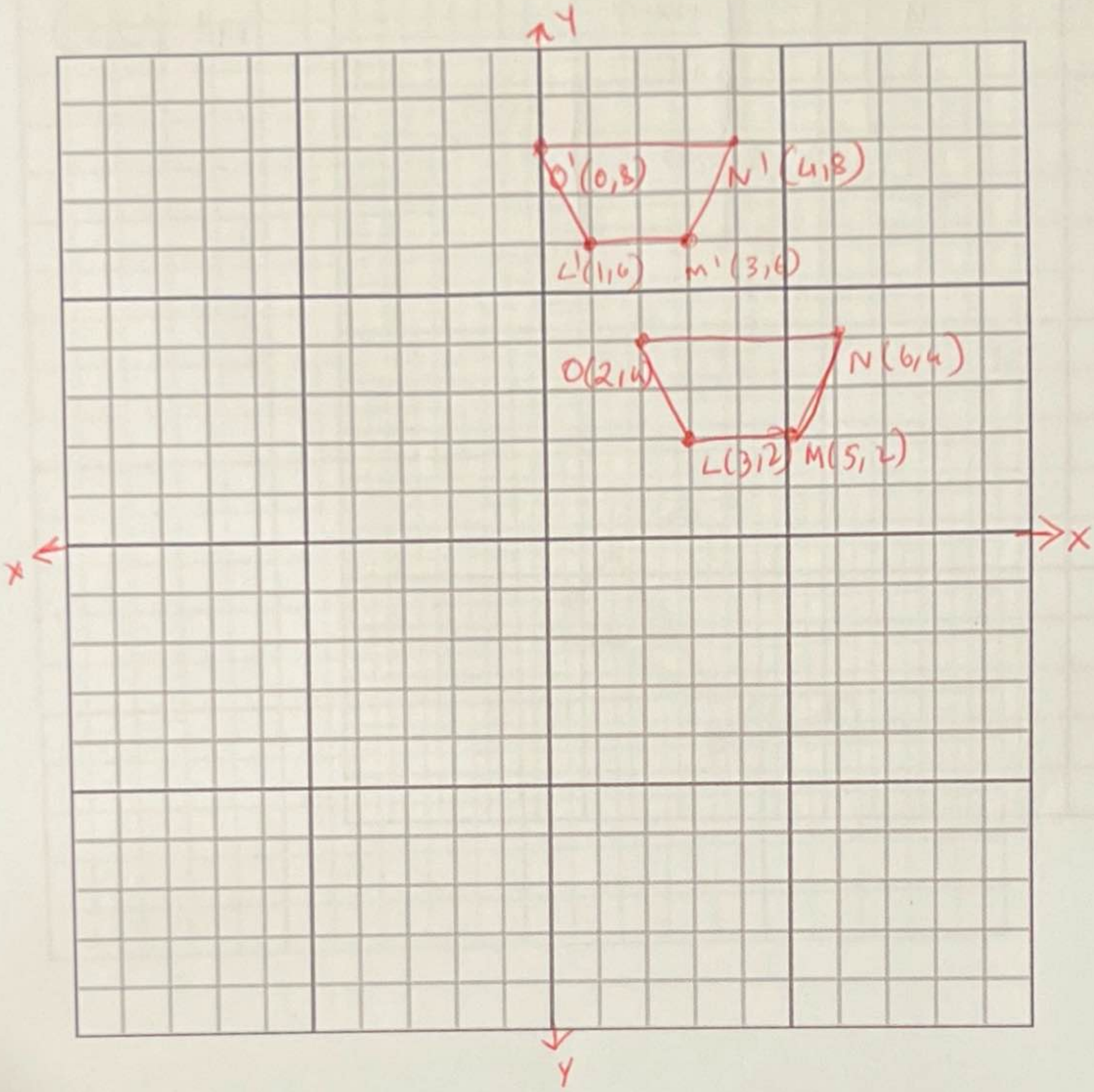



P'(-6, 2)
Q'(-3, 2)
R'(-3, 0)
S'(-6, 0)

3. Translate parallelogram WXYZ 5 units to the right and 3 units down. If the coordinates of W are (2, 5), X are (4, 7), Y are (7, 8), and Z are (5, 6), what are the new coordinates of the vertices?

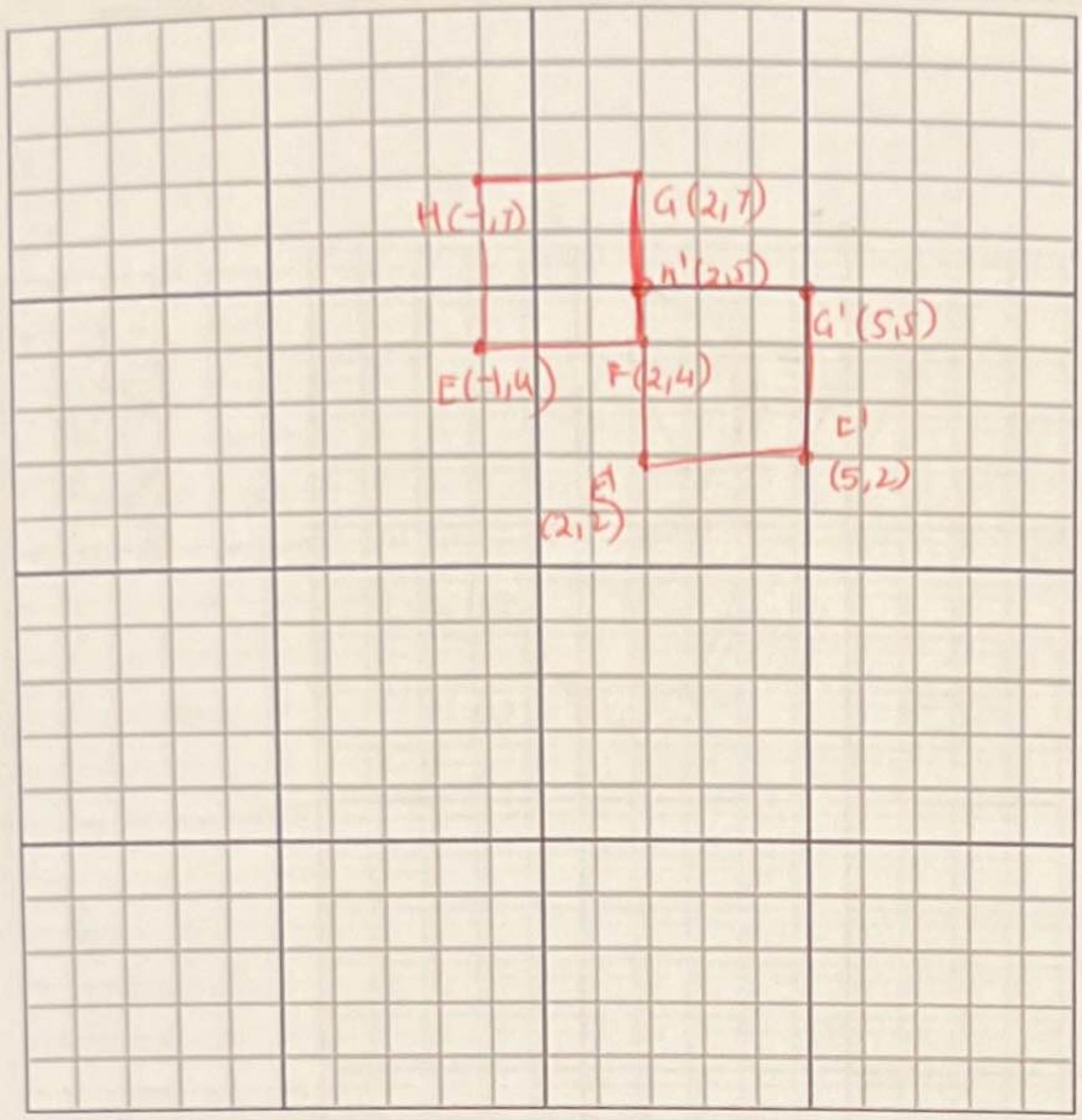


4. Translate trapezoid LMNO 2 units to the left and 4 units up. If the coordinates of L are (3, 2), M are (5, 2), N are (6, 4), and O are (2, 4), what are the new coordinates of the vertices?




L' (1, 6)
M' (3, 6)
N' (4, 8)
O' (0, 8)

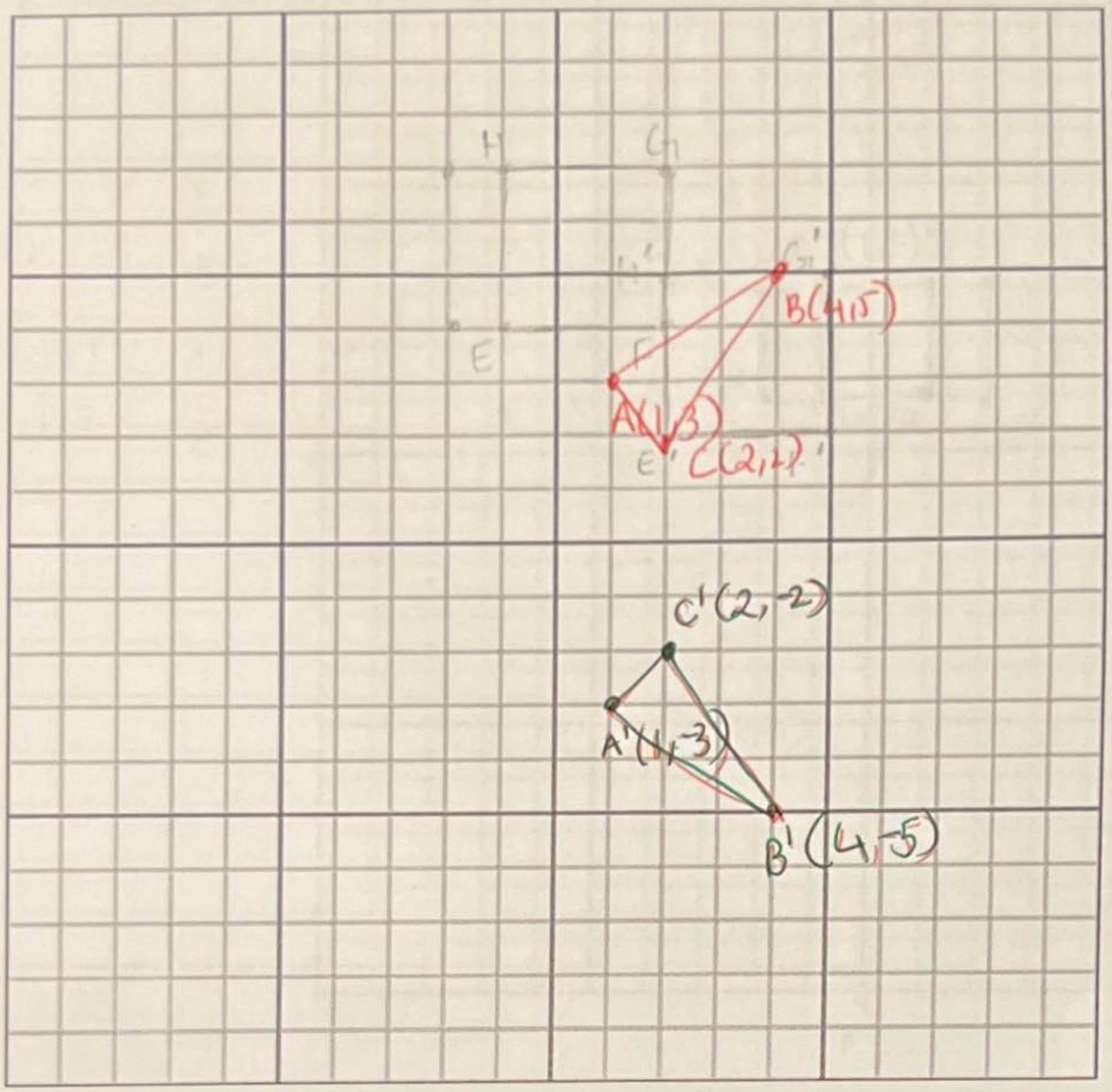
5. Translate square EFGH 3 units to the right and 2 units down. If the coordinates of E are (-1, 4), F are (2, 4), G are (2, 7), and H are (-1, 7), what are the new coordinates of the vertices?




E' (2,2)
F' (5,2)
G' (5,5)
H' (2,5)

XIII. Reflections:

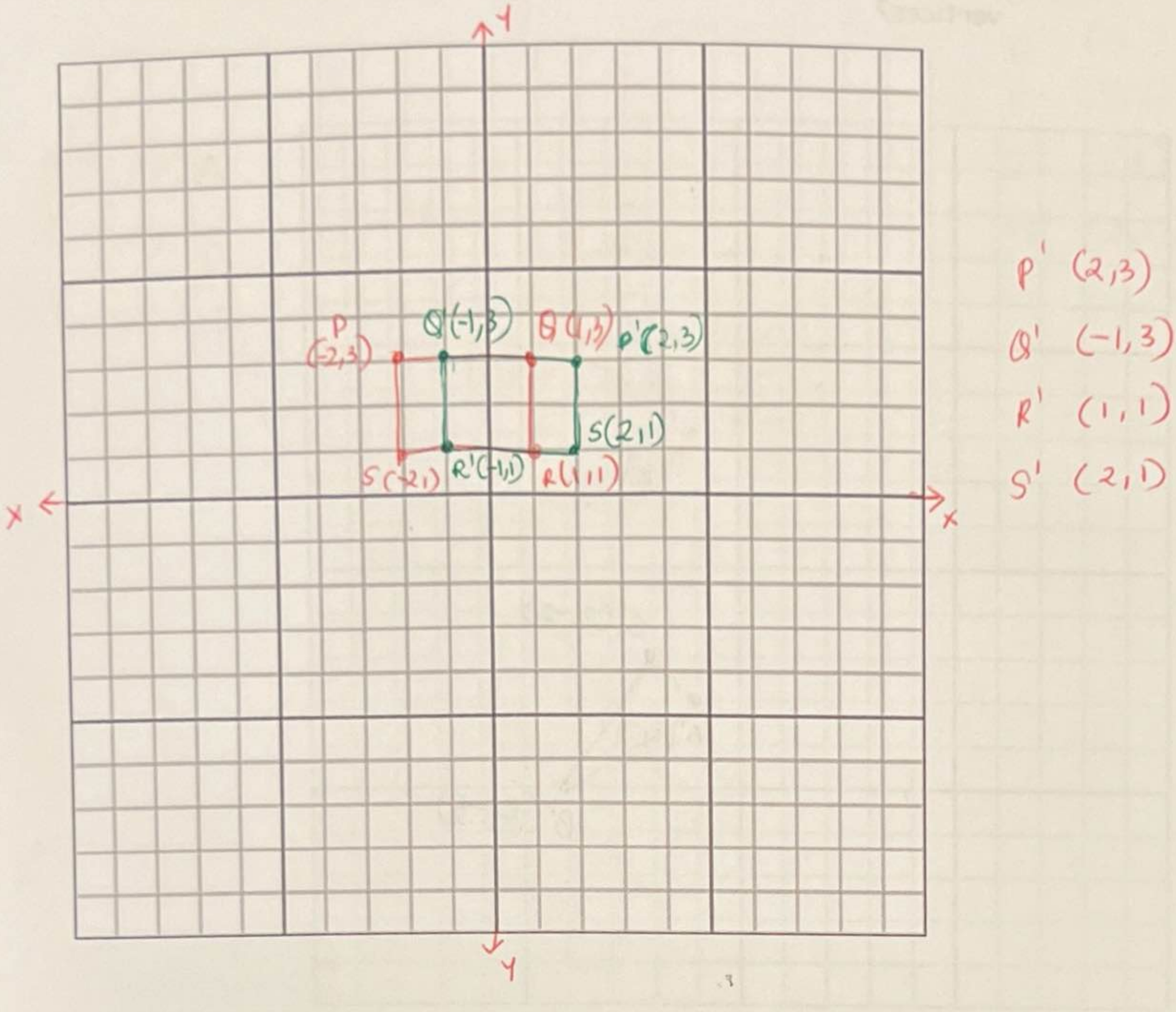
1. Reflect triangle ABC over the x-axis. If the coordinates of A are (1, 3), B are (4, 5), and C are (2, 2), what are the new coordinates of the vertices?



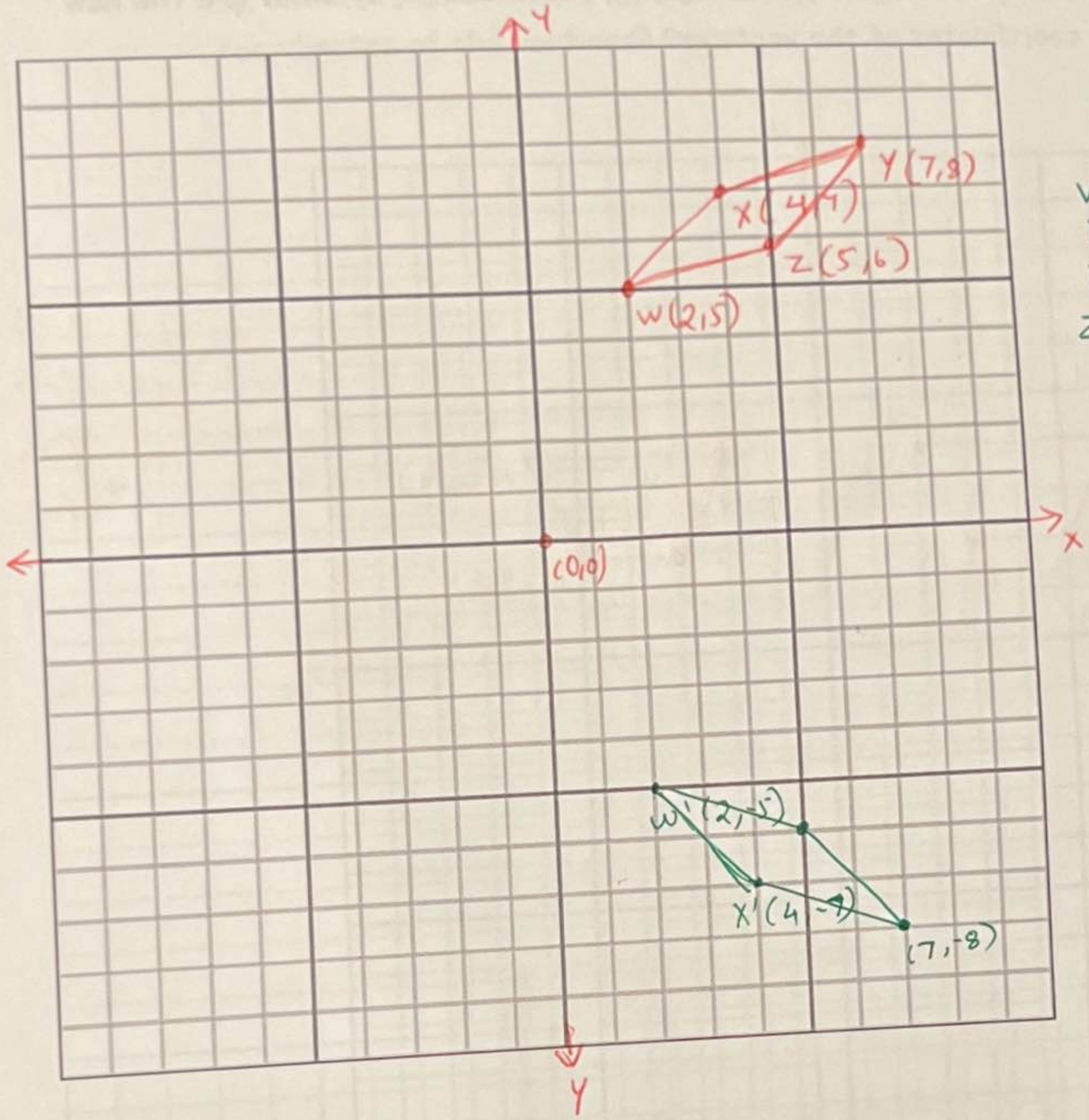

A'(1,-3)
B'(4,-5)
C'(2,-2)

E' = (-1+3, 4-2) = (2,2)
F' = (2+3, 4-2) = (5,2)
G' = (2+3, 7-2) = (5,5)
H' = (-1+3, 7-2) = (2,5)

2. Reflect rectangle PQRS over the y-axis. If the coordinates of P are (-2, 3), Q are (1, 3), R are (1, 1), and S are (-2, 1), what are the new coordinates of the vertices?

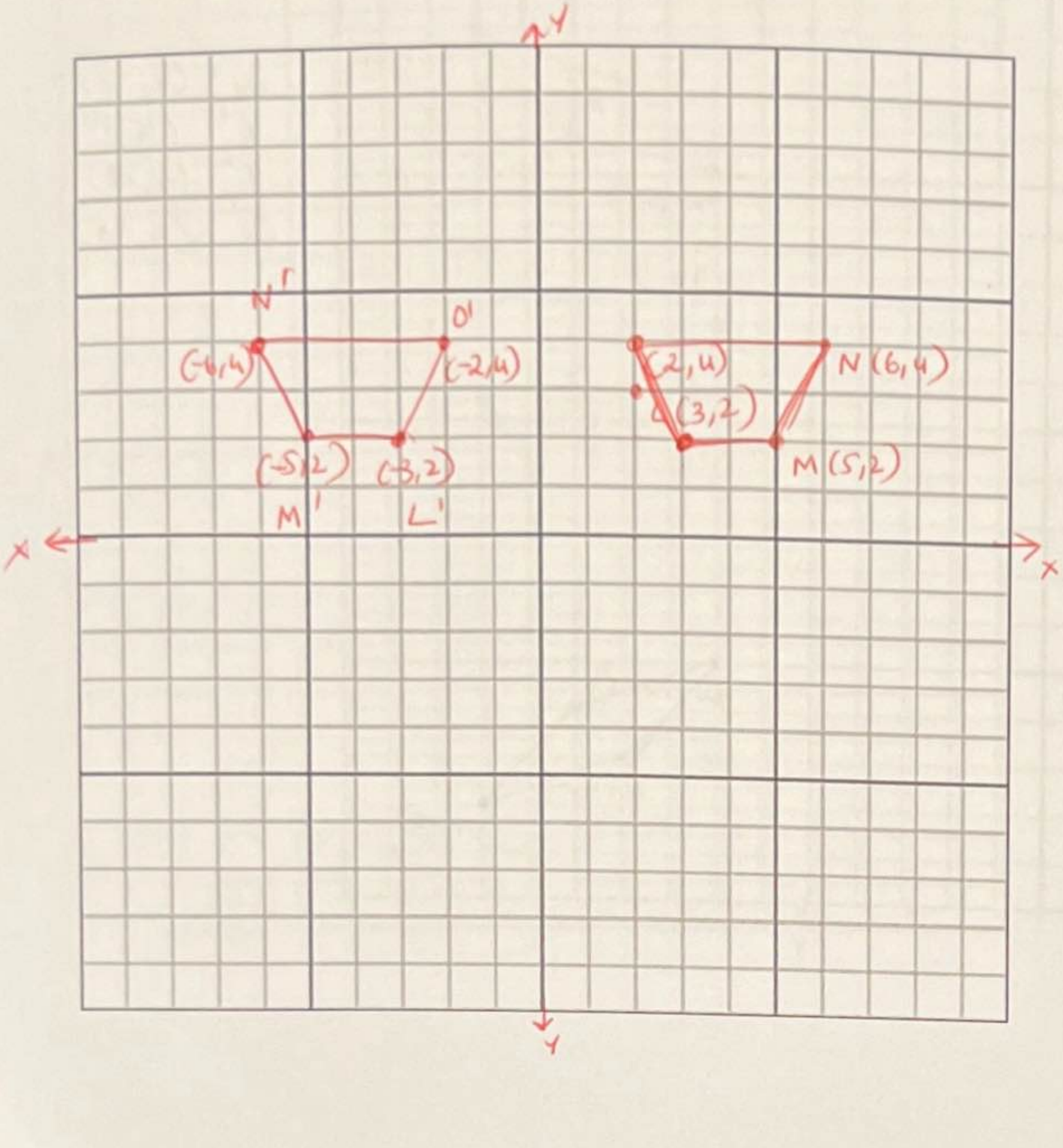


3. Reflect parallelogram WXYZ over the x-axis. If the coordinates of W are (2, 5), X are (4, 7), Y are (7, 8), and Z are (5, 6), what are the new coordinates of the vertices?



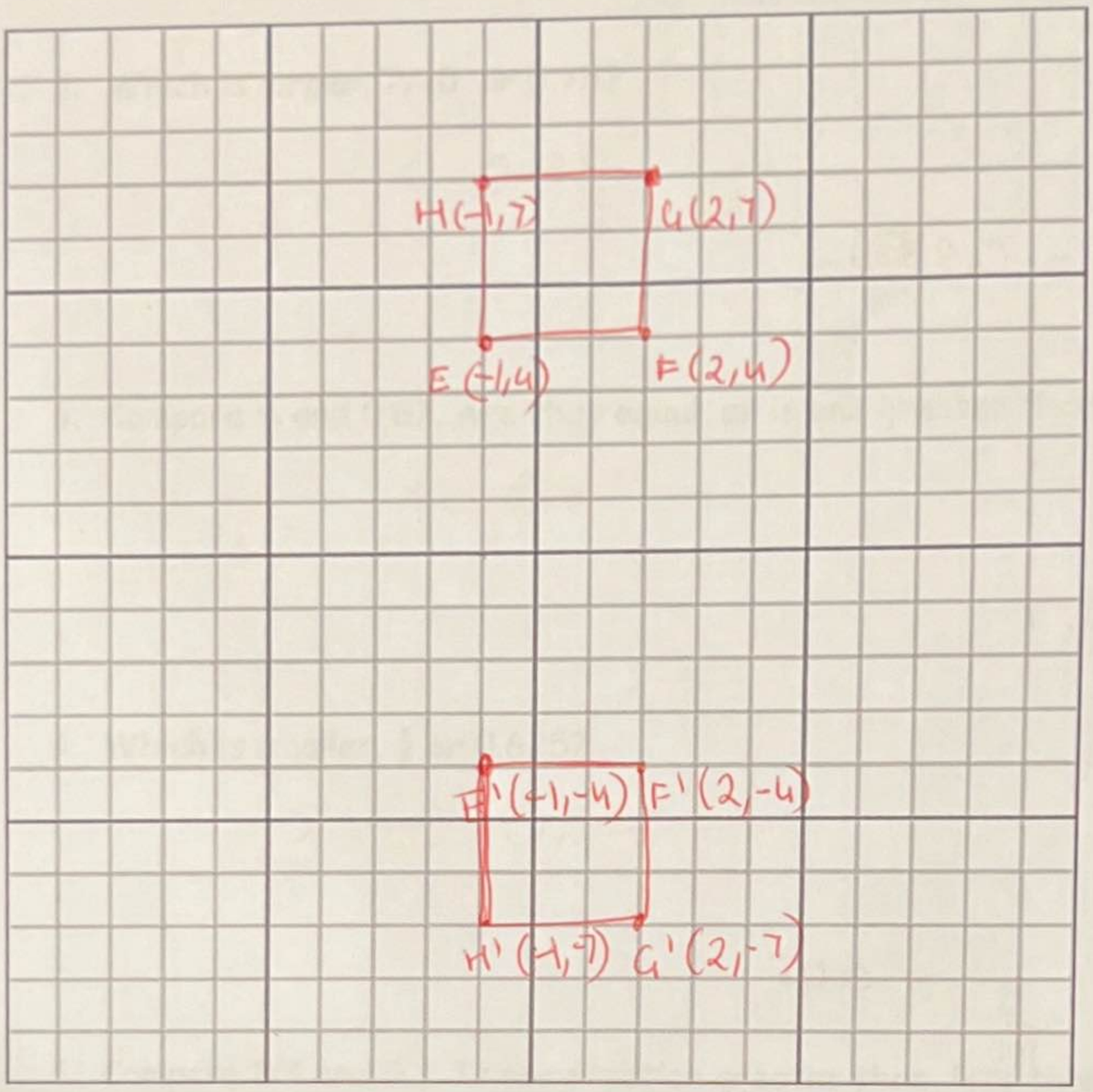

W' (2, -5)
X' (4, -7)
Y' (7, -8)
Z' (5, -6)

4. Reflect trapezoid LMNO over the y-axis. If the coordinates of L are (3, 2), M are (5, 2), N are (6, 4), and O are (2, 4), what are the new coordinates of the vertices?




L' (-3, 2)
M' (-5, 2)
N' (-6, 4)
O' (-2, 4)

5. Reflect square EFGH over the x-axis. If the coordinates of E are (-1, 4), F are (2, 4), G are (2, 7), and H are (-1, 7), what are the new coordinates of the vertices?




E' (-1, -4)
F' (2, -4)
G' (2, -7)
H' (-1, -7)

XIV. Convert fractions to terminating repeating decimals

1. 2/5 $= \frac{2}{5} = \frac{4}{10} = 0.4$

2. 3/8 $= \frac{3}{8} = 0.375$

3. 5/6 $= \frac{5}{6} = 0.8\overline{333}$

4. 7/10 $= 0.7$

5. 1/20 $= \frac{5}{100} = 0.05$

## XV. Compare Fractions and Decimals

1. Compare 3/5 and 0.6. Which is greater, the fraction or the decimal?

$\frac{3}{5} = 0.6$

2. Which is larger, 7/10 or 0.75?

$\frac{7}{10} < 0.75$

3. Compare ⅔ and 0.67. Are they equal, or is one greater than the other?

$\frac{2}{3} < 0.67$

4. Which is smaller, $\frac{5}{8}$ or 0.625?

$\frac{5}{8} = 0.625$

5. Compare 1/4 and 0.3. Is one fraction greater than, less than, or equal to the decimal?

$\frac{1}{4} < 0.3$

XVI. Write each decimal as a fraction or mixed number in simplest form

1. 3.635 $= 3\frac{635}{1000} = 3\frac{127}{200}$

2. -1.3 $= -1\frac{3}{10}$

3. 0.55 $= \frac{55}{100} = \frac{11}{20}$

4. -0.265 $= -\frac{265}{1000} = -\frac{53}{200}$

5. 0.55 $= \frac{55}{100} = \frac{11}{20}$

XVII. Solve the following using distributive property

1. $4(2x+5)+3(3x-2)=0$.

$8x+20+9x-6=0$

$17x+14=0$

$17x=-14$

$x=\frac{-14}{17}$

2. $5(3x+4)-2(4x-7)=0$

$15x+20-8x+14=0$

$15x-8x+34=0$

$7x=-34$

$x=\frac{-34}{7}$

3. $6x+18+3x=0$

$9x=-18$

$x=\frac{-18}{9}$

$x=-2$

4. $2(3x-4)+5(2x+3)-6=0$

$6x-8+10x+15-6=0$

$16x-8+15-6=0$

$16x+7-6=0$

$16x+1=0$

$x=\frac{-1}{16}$

5. $4(2x+3) + 3(5x-1)=0$

$8x + 12 + 15x - 3 = 0$

$23x + 9 = 0$

$23x = -9$

$x = -\frac{9}{23}$

XVIII. Solve

1. Five times a number decreased by seven is equal to eighteen. Find the number.

Let the number be x

$5x - 7 = 18$ (Add 7 on both sides)

$5x = 25$ (Divide by 5 on both sides)

$x = 5$

2. Twice the sum of a number and three is equal to fourteen. What is the number?

Let the number be x

$2(x + 3) = 14$ → Use Distributive Property

$2x + 6 = 17$ → Subtract 6 on both sides

$x = \frac{8}{2} = 4$ → Divide by 2 on both sides

3. The difference between three times a number and four is equal to eleven. What is the number?

Let the number be x

$3x - 4 = 11$ (Add 4 on both sides)

$3x = 15$ (Divide by 3 on both sides)

$x = 3$

4. Seven more than twice a number is equal to twenty-five. Find the number.

Let the number be x

$2x + 7 = 25$ → Subtract 7 on both sides.

$2x = 18$ → Divide by 2 on both sides

$x = 9$

5. The sum of four times a number and twelve is equal to the product of the number and ten. What is the number?

Let the number be 'x'

$4x + 12 = 10x$ → Subtract 10x and 12 on both sides

$-6x = -12$ → Divide by -6 on both sides

$x = 2$

XIX. Solve the following

1. Lisa sold twice as many adult tickets as children tickets for a concert. If the total number of tickets sold is 72, how many of each type of ticket did she sell?

Let the children's tickets be 'x'

$2x + x = 72$

$3x = 72$ → Divide by 3 on both sides

$\boxed{x = 24}$ → Childrens' tickets

$\boxed{2x = 48}$ → Adult tickets

2. Sarah bought three identical t-shirts and a hat for $50. If the hat costs $8, how much does each t-shirt cost?

Let the t-shirts be x

$3x + 8 = 50$

$3x = 42$ → Divide by 3 on both sides

$\boxed{x = 14}$ → Each t-shirt

3. John has saved twice as much money as his brother and together they have saved $45. How much has each saved?

Let the money John's brother saved be 'x'

$2x + x = 45$

$3x = 45$

$x = 15$

$\boxed{2x = 2 \cdot 15 = 30}$ → John saved $30

4. Emma read three times as many pages on the weekend as she did on a weekday. If she read a total of 80 pages, how many pages did she read each day?

Let the pages she read on the weekend be 'x'

Each weekday

$x + 3x = 80$

$4x = 80$

$x = 20$

$3x = 3 \cdot 20 = 60$

20 → weekdays and 60 → weekends.

5. You are planning a party and you buy 5 pizzas and 3 sodas. The total cost is $47, and each soda costs $2. How much does each pizza cost?

Soda → 3×2

$5x + 6 = 47$

$-6 \quad -6$

$\frac{5x}{5} = \frac{41}{5}$ → Divide by 5 on both sides

$x = 8.2$

XX. Solve

1. Finding the Area of a Triangle that has a base of 8 cm and a height of 5 cm.

Area of a Triangle = $\frac{\text{base} \cdot \text{height}}{2}$

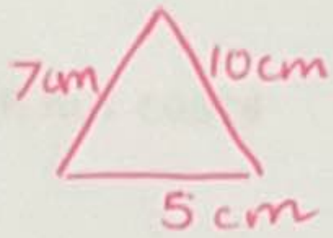
$= \frac{8 \cdot 5}{2}$

$= \frac{40}{2} = 20 cm^2$

2. Finding the Perimeter of a Triangle that has sides of lengths 7 cm, 10 cm, and 5 cm.

Perimeter of a Triangle = 7+10+5

= 22 cm



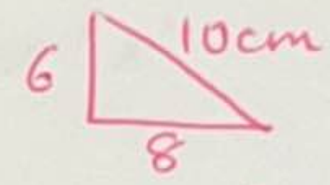

3. Finding the Area and Perimeter of a Right Triangle that has legs of lengths 6 cm and 8 cm. What is the area and the perimeter of the triangle?

Area $= \frac{b \cdot h}{2} = \frac{6 \cdot 8}{2} = 24 cm^2$

Perimeter = 6+8+10 = 24 cm

hypt = $\sqrt{100}$

= 10 cm




$hypt^2 = 6^2 + 8^2$

hypt = 36+64

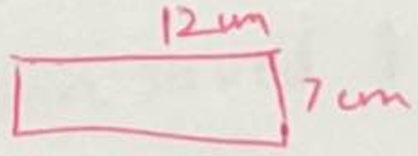
= 100

4. Finding the Area of a Rectangle that has a length of 12 cm and a width of 7 cm.

Area of a Rectangle = $l \cdot w$

$= 12 \cdot 7$

$= 84 cm^2$




5. Finding the Perimeter of a Rectangle that has a length of 9 cm and a width of 4 cm.

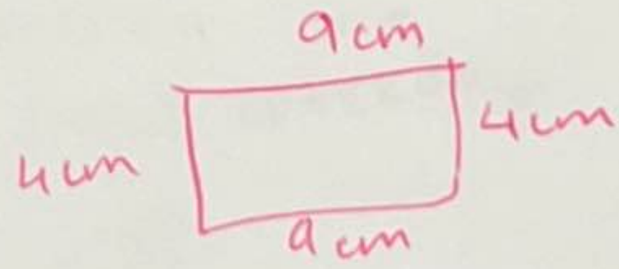
Perimeter of a Rectangle

$= 2(l + w)$

$= 2(9+4)$

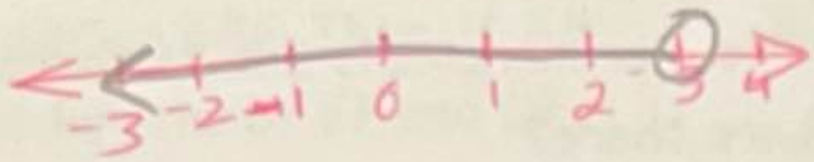
$= 2(13)$

$= 26$ cm

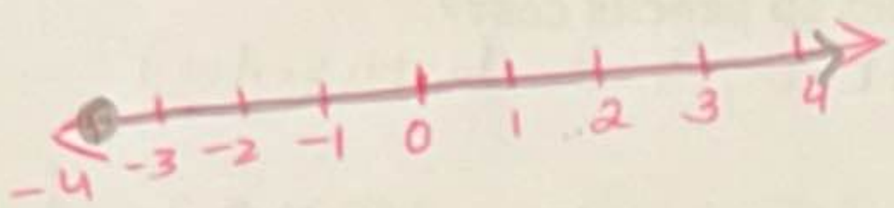


XXI. Graph the inequalities on a number line.

1. $x<3$




2. $x \geq -4$

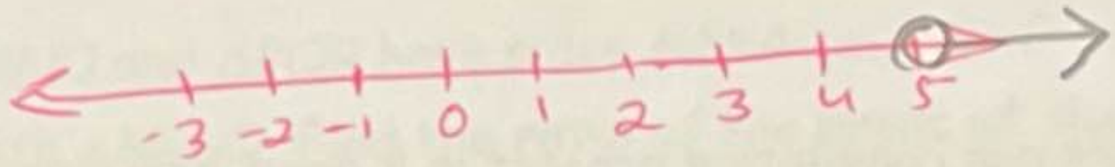



3. $2x+5 > 15$

$-5 \quad -5$

$2x > 10$

$x > 5$

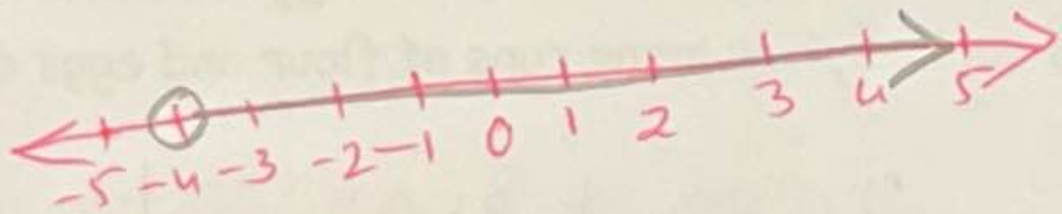



4. $3-x<7$

$-3 \quad -3$

$-x < 4$

$x > -4$



XXII. Solve the Word Problems. Show your work.

1. In a bag of marbles, the ratio of red to blue marbles is 5:3. If there are 40 blue marbles, how many red marbles are there?

$5x + 3x = 40$

$8x = 40$

$x = 5$

Red $= 5x = 5 \cdot 5 =$ **25**

2. If 4 pencils cost $1.20, how much would 15 pencils cost?

$\frac{4x}{4} = \frac{1.20}{4}$ (Divide by 4 on both sides)

$x = 0.30$

15 pencils $= 15 \times 0.30 =$ **4.50**

3. In a group of students, the ratio of boys to girls is 3:5. If there are 24 more girls than boys, how many students are there in total?

4. If 12 workers can complete a project in 8 days, how many days would it take for 18 workers to complete the same project?

Total work $= 12 \times 8 = 96$

Work rate per hour $= \frac{96 \text{ workdays}}{12 \text{ workers}} =$ **8 days**

5. A recipe calls for 2 cups of flour and 3 eggs to make 12 cookies. If you want to make 36 cookies, how many cups of flour and eggs do you need?

2 cups + 3 eggs = 12

To make 36 cookies

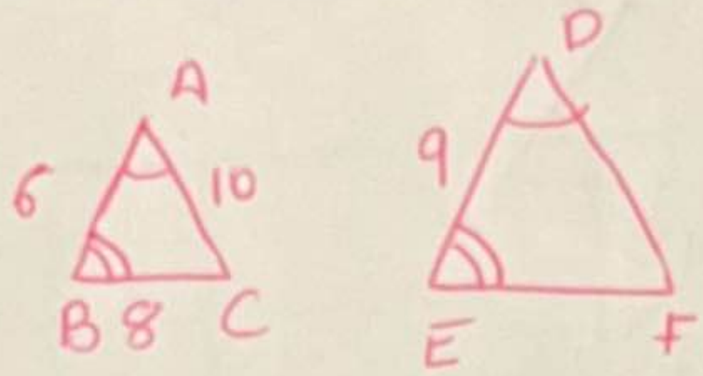
$\times 3$

$3(2) + 3(3) = 3(12)$

6 cups + 9 eggs =

XXIII. Find missing measures of similar triangles.

1. Given two triangles, $\triangle ABC$ and $\triangle DEF$, where $\angle A=\angle D$ and $\angle B=\angle E$, explain why $\triangle ABC \sim \triangle DEF$. Then, if $AB=6$ cm, $BC=8$ cm, and $AC=10$ cm, and $DE=9$ cm, find the lengths of $EF$ and $DF$.




$$\frac{AB}{DE} = \frac{BC}{EF}$$

$$\frac{6}{9} = \frac{8}{EF}$$

$$EF = \frac{8 \times 9}{6} = \frac{72}{6} = 12$$

$EF = 12$ cm

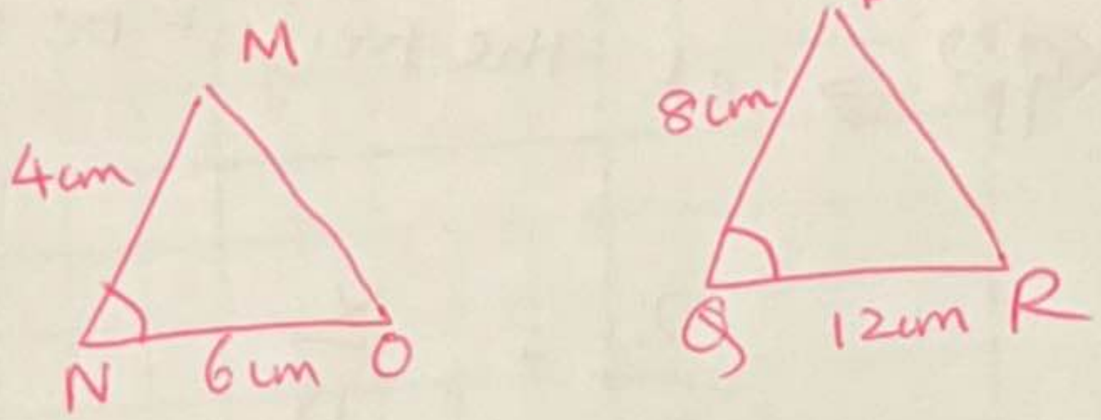
$$\frac{BC}{EF} = \frac{AC}{DF}$$

$$\frac{8}{12} = \frac{10}{DF}$$

$$DF = \frac{10 \times 12}{8} = \frac{120}{8} = 15$$

$DF = 15$ cm

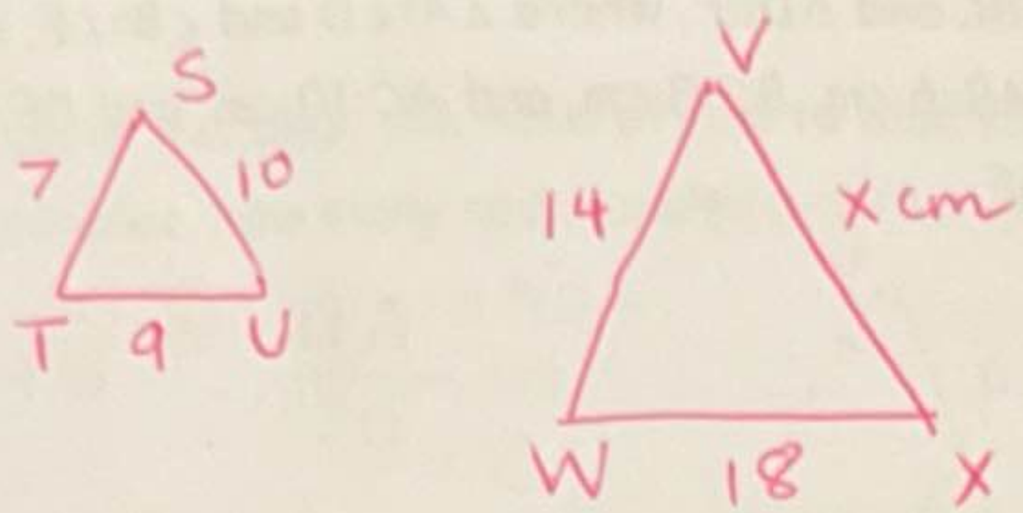
2. Triangles $\triangle MNO$ and $\triangle PQR$ have sides $MN=4$ cm, $NO=6$ cm, $PQ=8$ cm, and $QR=12$ cm, with $\angle N=\angle Q$. Find the ratio of the areas of the two triangles.




$$\frac{A(\triangle MNO)}{A(\triangle PQR)} = \left(\frac{MN}{PQ}\right)^2 = \left(\frac{4}{8}\right)^2 = \left(\frac{1}{2}\right)^2$$

$$\frac{A(\triangle MNO)}{A(\triangle PQR)} = \frac{1}{4}$$

3. In similar triangles, $\triangle STU \sim \triangle VWX$, the sides of $\triangle STU$ are $ST=7$ cm, $TU=9$ cm, and $SU=10$ cm. If the corresponding side lengths in $\triangle VWX$ are $VW=14$ cm, $WX=18$ cm, and $VX=x$ cm, find the value of $x$.




$$\frac{TU}{WX} = \frac{SU}{VX}$$

$$\frac{9}{18} = \frac{10}{x} \Rightarrow \frac{1}{2} = \frac{10}{x} \rightarrow \boxed{x = 10}$$

4. A tree casts a shadow of 15 meters, while a 2-meter tall pole casts a shadow of 3 meters. Using similar triangles, determine the height of the tree.

2 meter tall casts a shadow of 3m

→ Let the height be x

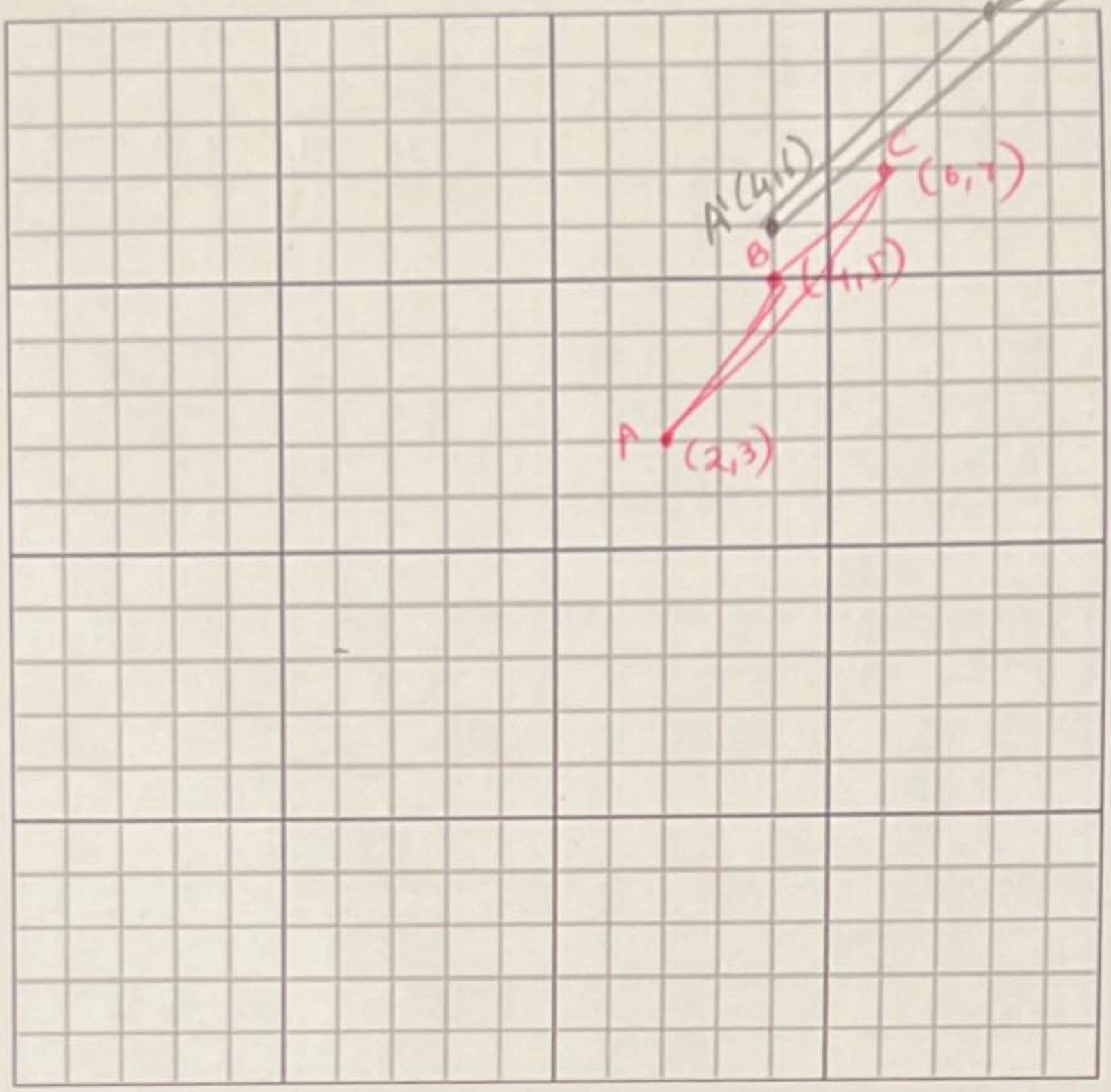
$$\frac{2}{3} = \frac{x}{15}$$

$$x = \frac{2 \times 15}{3} = \frac{30}{3} = 10 \text{ m}$$

10 meters

XXIV. Answer the following

1. If you have a triangle with vertices at points $A(2,3)$, $B(4,5)$, and $C(6,7)$, and you apply a dilation with a scale factor of 2 centered at the origin $(0,0)$, what will be the coordinates of the new vertices?




$A'(2\times2, 3\times2)$

$B'(4\times2, 5\times2)$

$C'(6\times2, 7\times2)$

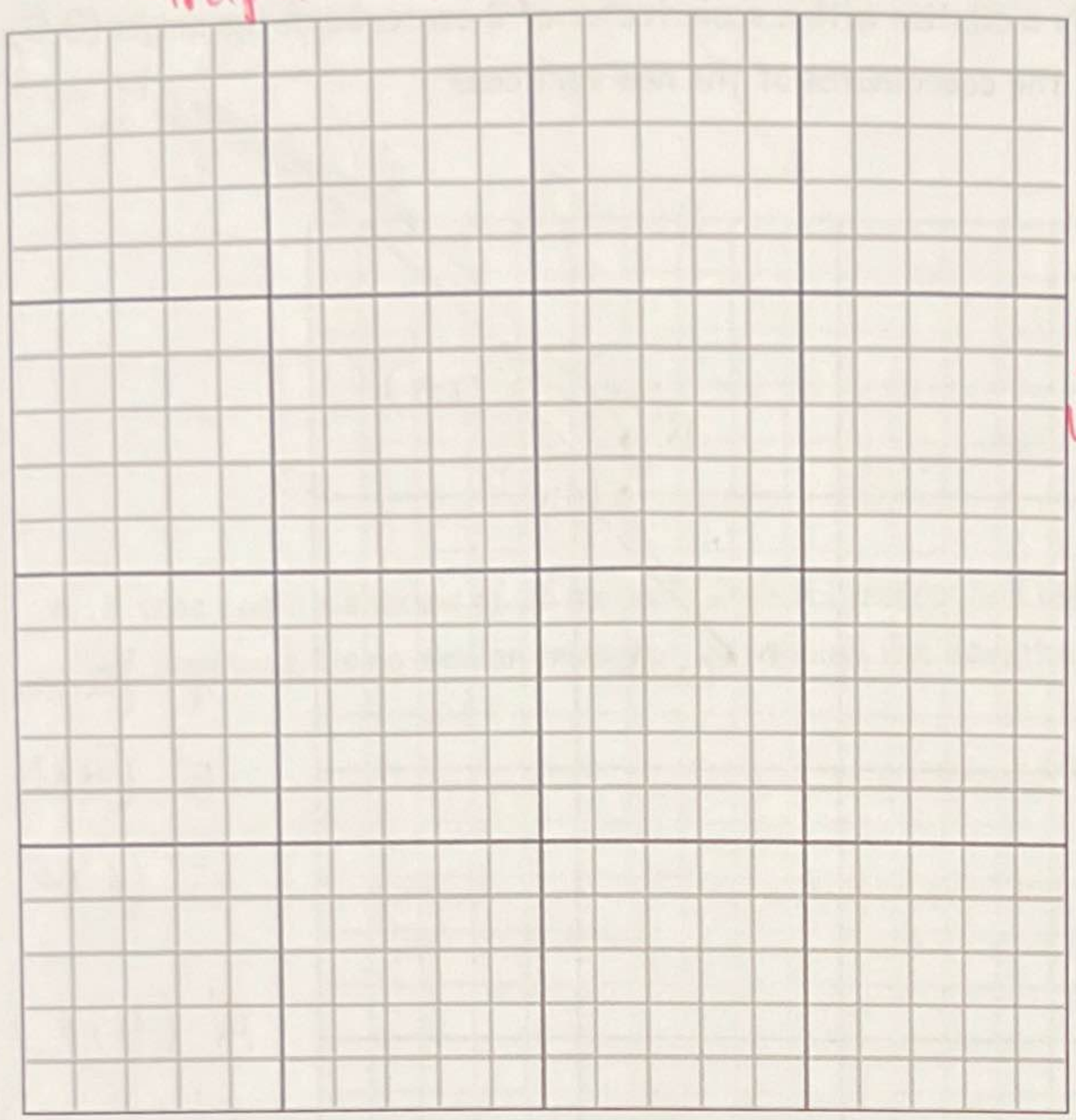
$A'(4,6)$

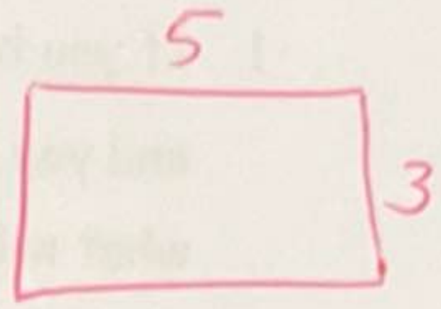
$B'(8,10)$

$C'(12,14)$

2. A rectangle has a length of 5 units and a width of 3 units. If the rectangle undergoes a dilation with a scale factor of 3, what will be the new length and width of the rectangle?

Graph → Not Needed



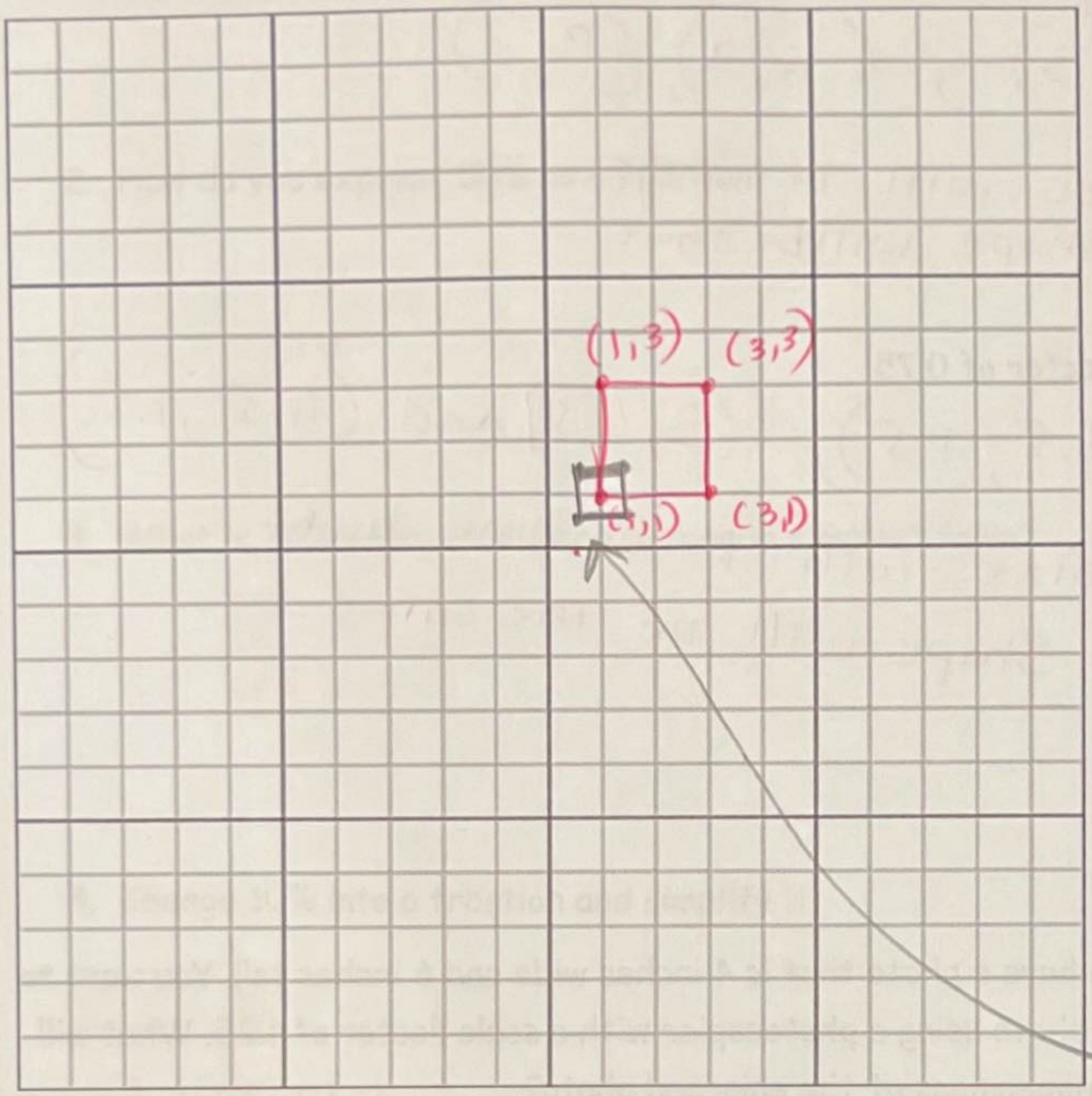



Scale factor of 3

L = 5 x 3 = 15 units

W = 3 x 3 = 9 units

3. Identifying Dilations on a Grid: On a coordinate grid, a square with vertices at (1,1), (1,3), (3,3) and (3,1) is dilated by a scale factor of 0.5 centered at the origin. What are the coordinates of the vertices of the dilated square?




Dialated by a scale factor of 0.5

(1,3) = (1x0.5, 3x0.5)

(3,3) = (3x0.5, 3x0.5)

(1,1) = (1x0.5, 1x0.5)

(3,1) = (3x0.5, 1x0.5)

Coordinates of the dialated Square

(0.5, 1.5),

(1.5, 1.5),

(0.5, 0.5) and

(1.5, 0.5)

4. A triangle has vertices at (2,2), (4,6) and (6,2). Describe how the shape and size of the triangle will change if it undergoes a dilation with:

a. A scale factor of 1.5

(2×1.5, 2×1.5) (4×1.5, 6×1.5), (6×1.5, 2×1.5)

(3, 3) , (6, 9), (9, 3)

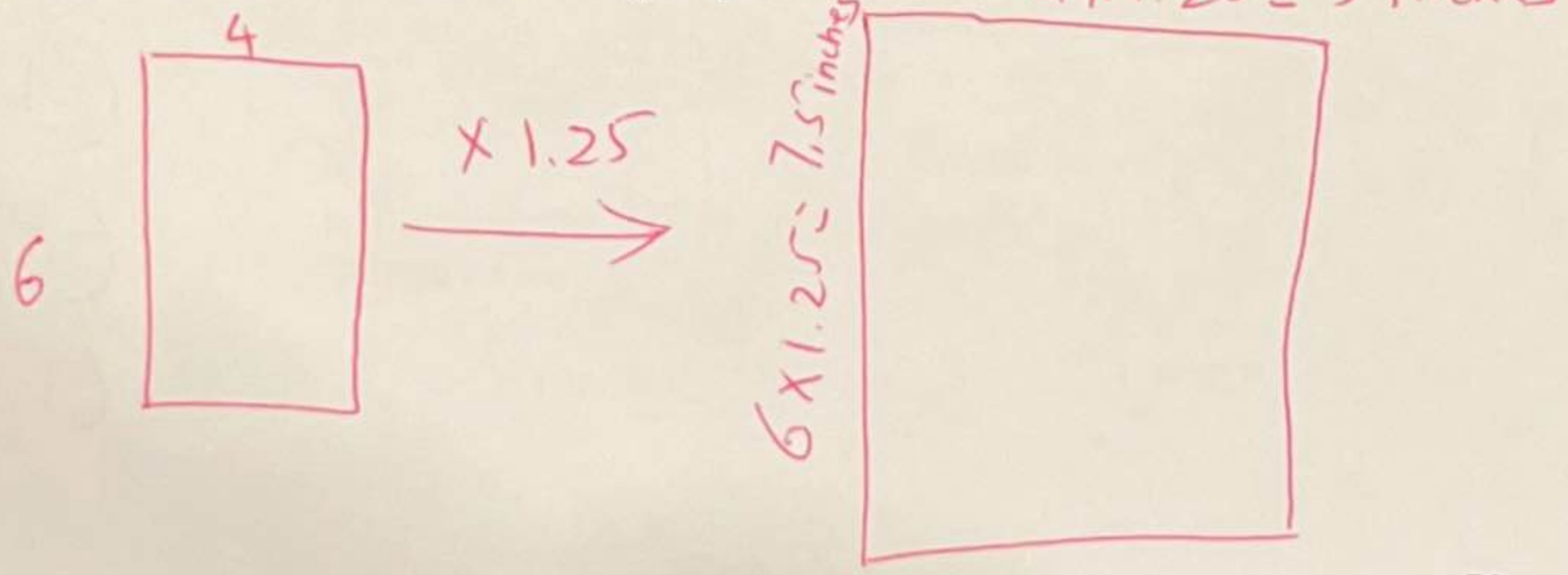
Size will be large
Shape willbe same

b. A scale factor of 0.75

(1.5, 1.5), (3, 4.5) and (4.5, 1.5)

Size will be smaller but
Shape will be the same.

5. Imagine you have a photo that is 4 inches wide and 6 inches tall. You want to enlarge the photo using a photocopier with a scale factor of 1.25. What will be the new dimensions of the enlarged photo?



XXV. Answer the following

1. Convert 25% to a fraction in simplest form.

$\frac{25}{100} = \frac{1}{4}$

2. How do you express 50% as a fraction?

$\frac{50}{100} = \frac{1}{2}$

3. What is 75% expressed as a fraction in simplest form?

$\frac{75}{100} = \frac{3}{4}$

4. Change 10% into a fraction and simplify it.

$\frac{10}{100} = \frac{1}{10}$

5. Write 40% as a fraction and reduce it to its simplest form.

$\frac{40}{100} = \frac{2}{5}$

6. Express 33.33% as a fraction in simplest form.

$\approx \frac{1}{3}$

7. Convert 20% to a fraction and simplify it.

$\frac{20}{100} = \frac{1}{5}$

8. How can you express 60% as a fraction in its simplest form?

$\frac{60}{100} = \frac{6}{10} = \frac{3}{5}$

9. Change 12.5% into a fraction and simplify it.

$\frac{12.5}{100} = \frac{1}{8}$

10. Write 90% as a fraction in its simplest form.

$\frac{90}{100} = \frac{9}{10}$

XXVI. Answer the following

1. If 20% of a number is 15, what is the number?

20% of $x = 15$

$x = \frac{1500}{20}$

$x = 75$

2. 25% of a number is 50. What is the number?

25% of $x = 50$

$x = 200$

3. What is 30% of 80?

30% of 80

$x = \frac{30}{100} \times 80$

$= 24$

4. 40 is 10% of what number?

40 is 10% of $x$

$x = 400$

5. If 70% of a number is 84, what is the number?

70% of $x = 84$

$x = 120$

6. 15% of a number is 12. What is the number?

15% of $x = 12$

$\frac{15}{100} \times X = 12$ $\quad x = \frac{1200}{15} = \boxed{80}$

7. What number is 45% of 200?

$\frac{45}{100} = \frac{x}{200}$

$x = \frac{45 \times 200}{100} = \boxed{90}$

8. 60 is 75% of what number?

75% of $x = 60$

$\frac{75}{100} \cdot x = 60$ $\quad x = \frac{60 \times 100^{20}}{75_{5,1}} = \boxed{80}$

9. What is 20% of 150?

$\frac{20}{100} = \frac{x}{150}$

$X = \frac{20 \times 150}{100} = \frac{3000}{100} = \boxed{30}$

10. If 35% of a number is 28, what is the number?

$\frac{35}{100} = \frac{28}{x}$

$x = \frac{2800}{35} = \boxed{80}$

6. The number of students in a school increased from 500 to 600. What is the percent increase in the number of students?

$\frac{600-500}{500} \times 100 = 20\%$

7. A pair of shoes originally cost $120, but the price was increased to $144. What is the percent increase in the price?

$\frac{144-120}{120} \times 100 = 20\%$

8. A stock's value dropped from $150 to $120. What is the percent decrease in the stock's value?

$\frac{150-120}{150} \times 100 = 20\%$

9. The attendance at a concert increased from 800 people to 1,000 people. What is the percent increase in attendance?

$\frac{200}{800} \times 100 = 25\%$

10. The water level in a reservoir decreased from 5,000 gallons to 4,500 gallons. What is the percent decrease in the water level?

$\frac{5000-4500}{5000} \times 100 = 10\%$

XXVII. Solve Word Problems on Percent of Change.

1. A jacket originally costs $80, but it is now on sale for $60. What is the percent decrease in the price of the jacket?

Percent decrease $= \frac{80-60}{80} \times 100 = \frac{20}{80} \times 100$

$= 25\%$

2. The price of a book increased from $15 to $18. What is the percent increase?

$\frac{18-15}{15} \times 100 = \frac{3}{15} \times 100 = 20\%$

3. A car was purchased for $25,000 and later sold for $20,000. What is the percent decrease in the price of the car?

$\frac{25000 - 20,000}{25000} \times 100 = \frac{5000}{25000} \times 100$

$= 20\%$

4. A company's revenue increased from $200,000 to $250,000. What is the percent increase in revenue?

$\frac{200,000 - 250,000}{200,000} \times 100$

$= 25\%$

5. The population of a town decreased from 10,000 to 8,500. What is the percent decrease in population?

$\frac{10000 - 8500}{10,000} \times 100$

$15\%$