LESSON MAKER PRO

Ratio Point Quest

Locate the point that splits a segment in a given ratio.

HIGH SCHOOL · HSG-GPE.B.6

CCSS.Math.Content.HSG-GPE.B.6 "Find the point on a directed line segment between two given points that partitions the segment in a given ratio."

NAME _____ DATE _____

SPLIT IT BY RATIO

If P divides directed segment AB in the ratio AP:PB = m:n, start at A and move m/(m+n) of the way toward B. Use P = A + m/(m+n)(B - A), and calculate the x-coordinate and y-coordinate separately.

WORKED EXAMPLE

Points A(-37,43) and B(23,-47) form a directed segment. Point P partitions AB so that AP:PB = 11:19. Find P.

1. Add the ratio parts: 11 + 19 = 30.
2. Find the change from A to B: (23 - (-37), -47 - 43) = (60,-90).
3. Move 11/30 of that change: P = (-37,43) + (11/30)(60,-90).
4. Simplify: P = (-15,10).

Answer: P(-15,10)

PRACTICE 6 problems

1 Point P partitions directed segment AB in the ratio AP:PB = 3:4. Find P if A(0,0) and B(18,12).

ANSWER _____

2 Point P partitions directed segment AB in the ratio AP:PB = 1:3. Find P if A(-8,16) and B(20,-12).

ANSWER _____

3 Point P partitions directed segment AB in the ratio AP:PB = 2:1. Find P if A(6,-12) and B(24,12).

ANSWER _____

4 Point P partitions directed segment AB in the ratio AP:PB = 7:8. Find P if A(-18,-6) and B(9,24).

ANSWER _____

5 Point P partitions directed segment AB in the ratio AP:PB = 5:1. Find P if A(6,22) and B(-18,-8).

ANSWER _____

6 Point P partitions directed segment AB in the ratio AP:PB = 8:5. Find P if A(12,-4) and B(-14,32).

ANSWER _____

APPLY IT Show your work

1 A gaming club is placing a checkpoint on a coordinate-map route from a starting portal at A(-24,18) to a final portal at B(36,-12). The checkpoint P must divide the route so that AP:PB = 2:3. What are the coordinates of P?

WORK SPACE

ANSWER _____

2 A student council is planning a campus festival and needs a water station between booth A(-28,-12) and booth B(22,38) on a coordinate map. The water station P must divide the segment so that AP:PB = 3:2. What are the coordinates of P?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Point P(0,0) lies on directed segment AB, where A(-16,8) and B(26,-13). Find AP:PB. Explain how the coordinate changes show the ratio.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Point P partitions directed segment AB in the ratio AP:PB = 3:4. Find P if A(0,0) and B(18,12).	**P(54/7,36/7)**
2	Point P partitions directed segment AB in the ratio AP:PB = 1:3. Find P if A(-8,16) and B(20,-12).	**P(-1,9)**
3	Point P partitions directed segment AB in the ratio AP:PB = 2:1. Find P if A(6,-12) and B(24,12).	**P(18,4)**
4	Point P partitions directed segment AB in the ratio AP:PB = 7:8. Find P if A(-18,-6) and B(9,24).	**P(-27/5,8)**
5	Point P partitions directed segment AB in the ratio AP:PB = 5:1. Find P if A(6,22) and B(-18,-8).	**P(-14,-3)**
6	Point P partitions directed segment AB in the ratio AP:PB = 8:5. Find P if A(12,-4) and B(-14,32).	**P(-4,236/13)**

PART 2 · APPLY IT

1. **P(0,6)** Use P = A + 2/5(B - A). The change from A to B is (60,-30), so 2/5 of the change is (24,-12).
2. **P(2,18)** Use P = A + 3/5(B - A). The change from A to B is (50,50), and moving 3/5 of that change from A gives (2,18).

CHALLENGE

AP:PB = 8:13. From A to P, the change is (16,-8). From P to B, the change is (26,-13), and 16:26 = 8:13 and 8:13 = 8:13.

Accept equivalent coordinate forms, such as decimals only when they are exact terminating equivalents. For the challenge, accept the equivalent ratio 16:26 as well as the simplified ratio 8:13.