Assessment submitted.
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Thank you for taking the Week 2: Assignment 2.

Week 2: Assignment 2

Your last recorded submission was on 2023-09-06, 19:22 IST **Due date: 2023-09-06, 23:59 IST.**

1) If a line in $\mathbb{P}^2$ contains two points at infinity, then the line must be l_∞, the line at infinity. ***1 point***

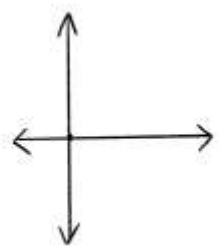
- (●) True
- ( ) False

2) When looking at the restriction to $\mathbb{R}^2$ of a line in $\mathbb{P}^2$, it is useful to remember that the line will approach the same point at infinity in both directions. Let l be a line in $\mathbb{P}^2$. Into how many pieces will l divide $\mathbb{P}^2$? ***1 point***

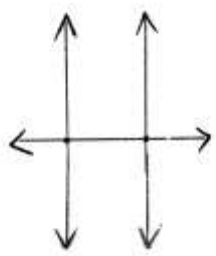
- ( ) 1
- (●) 2
- ( ) 3

3) Which of the following depicts the restriction to $\mathbb{R}^2$ of a triangle in $\mathbb{P}^2$ with exactly two ordinary points as vertices. ***1 point***

- ( )

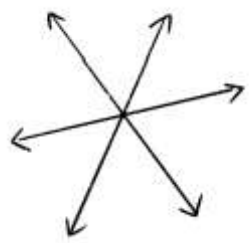


- (●)



- ( )

- ( )



4) Which of the following depicts the restriction to $\mathbb{R}^2$ of a triangle in $\mathbb{P}^2$ with exactly one ordinary point as a vertex. ***1 point***

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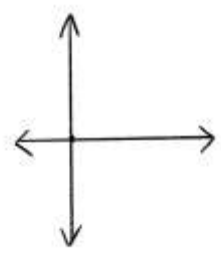

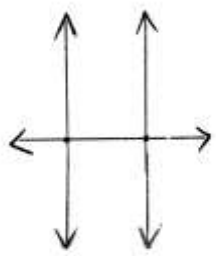

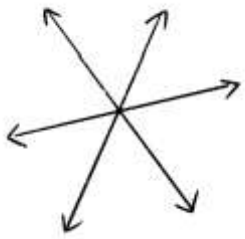

5) Into how many pieces does a triangle with three ordinary vertex points divide $\mathbb{P}^2$? ***1 point***

- 2
- 4
- 7
- 8
- It depends on the configuration of the lines in the triangle.

6) How many pieces do four lines divide $\mathbb{P}^2$ into, if no three lines are concurrent? ***1 point***

- 2
- 4
- 7
- 8
- It depends on the configuration of the lines.

7) If $A, B, \text{ and } C$ are collinear points in $\mathbb{R}^2$, then $H_{A,C}(B)$ must also be a point in $\mathbb{R}^2$. ***1 point***

- True
- False

8) Consider the points $0, 1/2 \text{ and } 1$ on the real number line. Which is the value of $H_{0,1}(1/2)$, the harmonic conjugate of $1/2$ with respect to 0 and 1? ***1 point***

- -2
- $-1/2$
- $-1/3$
- $1/3$
- $1/2$
- 2
- ∞

9) ***1 point***

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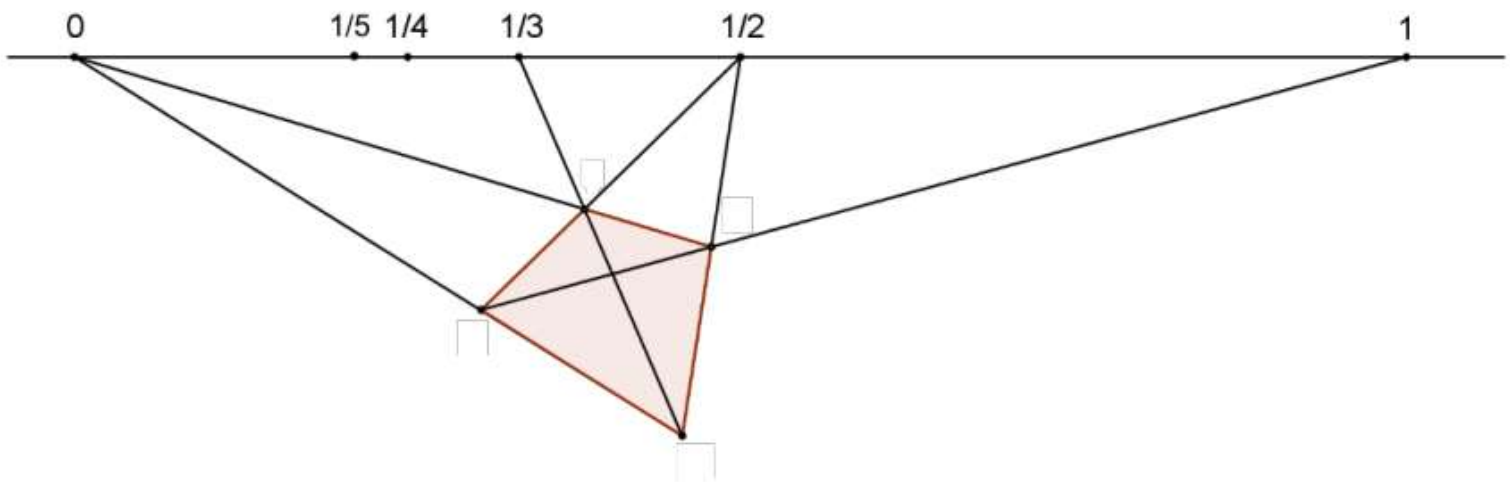
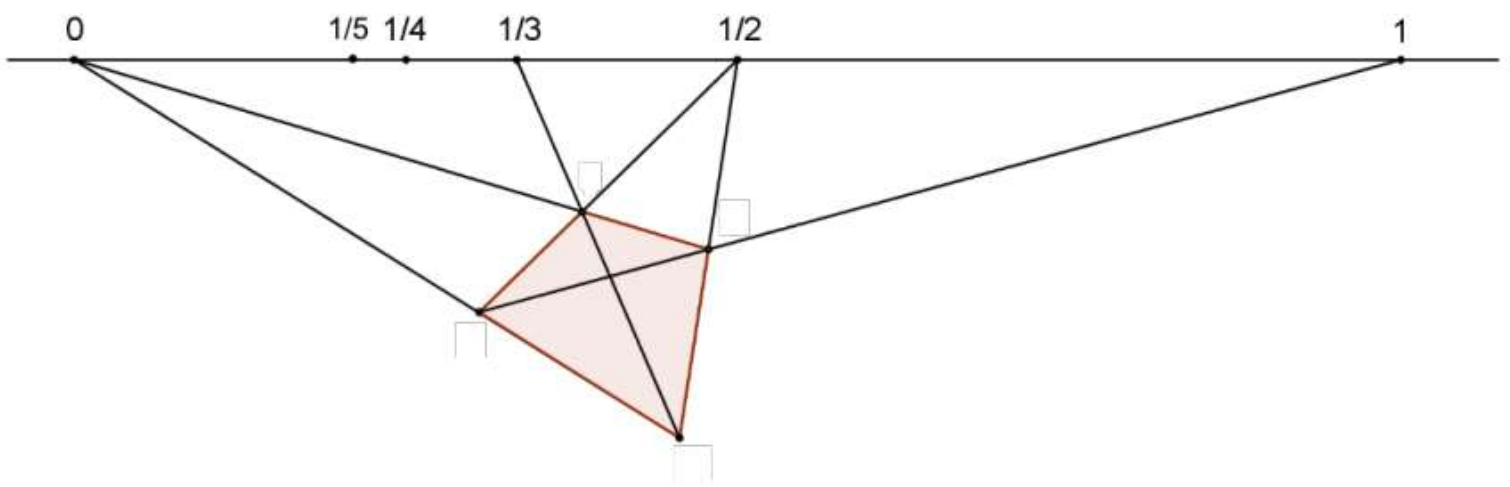
Using the following diagram, determine $H_{0,1/2}(1)$, the harmonic conjugate of 1 with respect to 0 and $1/2$.



- ○ 0
- ○ $1/5$
- ○ $1/4$
- ◉ $1/3$
- ○ $1/2$
- ○ 1
- ○ ∞

10) Using the same diagram, determine $H_{0,1/3}(1/2)$. (It may be helpful to trace the diagram onto a sheet of paper and draw some additional lines.) ***1 point***



- ○ 0
- ○ $1/5$
- ○ $1/4$
- ○ $1/3$
- ○ $1/2$
- ◉ 1
- ○ ∞

11) Suppose $H_{A,C}(B) = D$, for collinear points $A, B, C,$ and D. Determine $H_{A,C}(D)$. ***1 point***

- ○ B
- ○ D
- ○ ∞
- ◉ Not enough information to say

12) Define $H_{A,C}(A)$ to be $\lim_{X \to A} H_{A,C}(X)$, for any points A and C. Determine $H_{A,C}(A)$. ***1 point***

- ○ A
- ○ C

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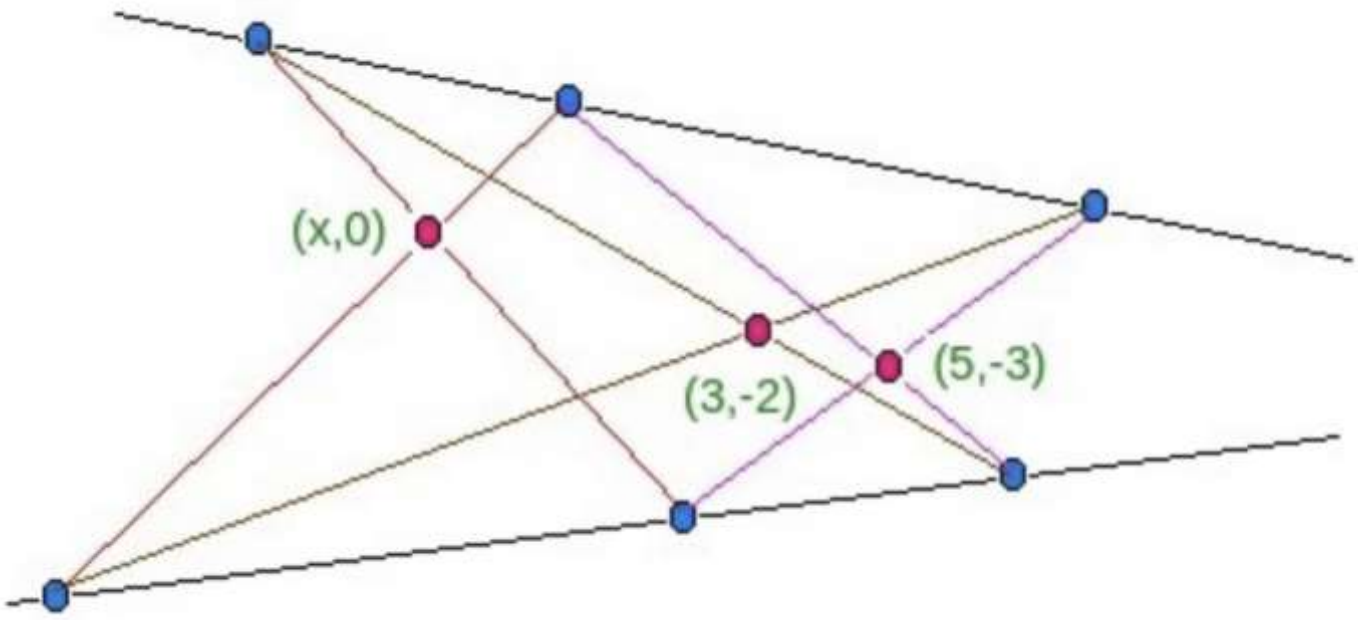
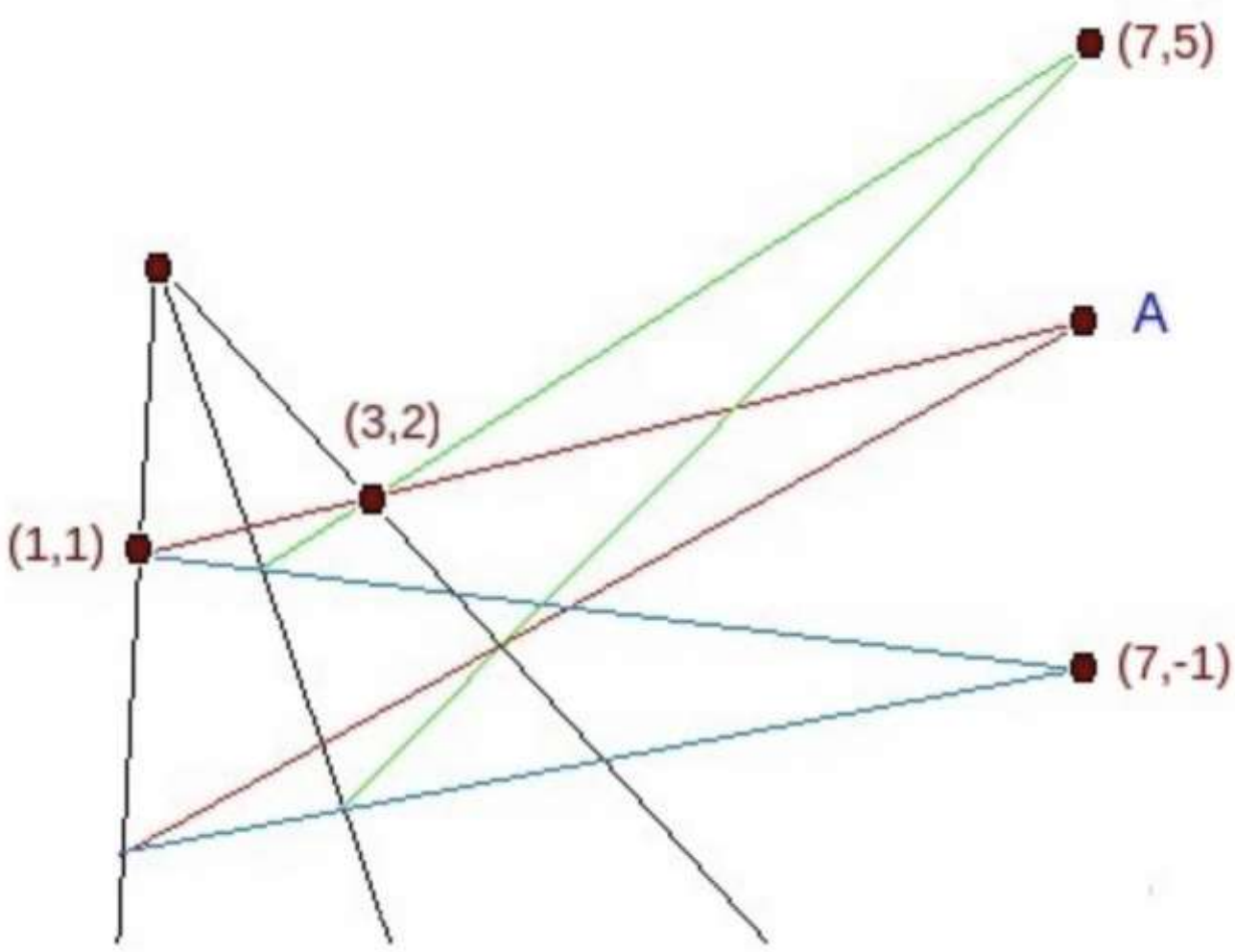
○ ∞
○ Not enough information to say

13) Find the value of x in the following picture: ***1 point***



◉ -1
○ 0
○ 1
○ $3/2$

14) Find the coordinates of point A in the following picture: ***1 point***



○ $(6, 3)$
○ $(7, 3)$
○ $(6, 4)$
◉ $(7, 4)$

15) Let π and π' be two planes in $\mathbb{R}^3$. If $\mathrm{l}_{[\pi]} = \mathrm{l}_{[\pi']}$, then we can say with certainty that ***1 point***

○ $\pi = \pi'$
◉ π is parallel to π'

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- π and π' are perpendicular to each other
- $\pi \neq \pi'$

16) If π and π' are two planes in $\mathbb{R}^3$, then either $\mathrm{l}_{[\pi]} = \mathrm{l}_{[\pi']}$, or $\mathrm{l}_{[\pi]}$ intersects $\mathrm{l}_{[\pi']}$ at a single point. ***1 point***

- (●) True
- ( ) False

17) Any two distinct points in $\mathbb{P}^3$ are incident with exactly one common line in $\mathbb{P}^3$. ***1 point***

- ( ) True
- (●) False

18) Any two distinct lines in $\mathbb{P}^3$ are incident with exactly one common point in $\mathbb{P}^3$. ***1 point***

- (●) True
- ( ) False

19) Suppose π is a plane in $\mathbb{P}^3$ and l is a line in $\mathbb{P}^3$. Then π and l are incident. ***1 point***

- (●) True
- ( ) False

20) Any two distinct lines in $\mathbb{P}^3$ are contained in a common plane in $\mathbb{P}^3$. ***1 point***

- (●) True
- ( ) False

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers