

Assessment submitted.  
X



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NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Geometry Of Vision (course)



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Course outline

How does an NPTEL  
online course work? ()

Week 0 ()

Week 1 ()

Week 2 ()

- Chapter Two: A Geometry of Coincidence (unit? unit=25&lesson=69)
- Video 4A: incidence relations (unit? unit=25&lesson=70)
- Video 4B: linear spaces (unit?unit=25&lesson=71)
- Video 4C: extending the euclidean plane (unit? unit=25&lesson=72)
- Video 4D: the shape of this extended plane (unit? unit=25&lesson=73)
- Video 4E: incidence relations in the extended plane (unit? unit=25&lesson=74)
- Video 5A: coincidence #1: the harmonic conjugate theorem (unit? unit=25&lesson=75)
- Video 5B: proof of the harmonic conjugate theorem (unit? unit=25&lesson=76)
- Video 5C: coincidence #2: pappus's theorem (unit? unit=25&lesson=77)
- Video 5D: coincidence #3: desargues's theorem (unit?unit=25&lesson=78)
- Video 6A: the extended euclidean space P3 (unit? unit=25&lesson=79)
- Video 6B: desargues's theorem in three

# Thank you for taking the Week 2: Assignment 2.

## Week 2: Assignment 2

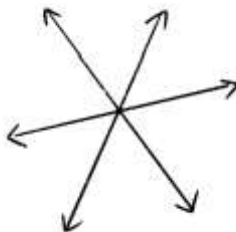
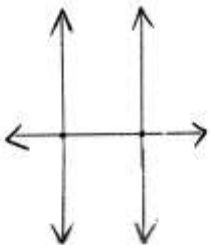
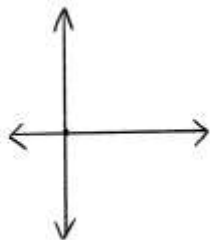
Your last recorded submission was on 2023-09-06, 19:22 IST

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  $l_\infty$ , 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 **1 point** both directions. Let  $l$  be a line in  $\mathbb{P}^2$ . Into how many pieces will  $l$  divide  $\mathbb{P}^2$ ?
- ☐ 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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dimensions (unit? unit=25&lesson=80)

● Video 6C: a shadow drawing challenge (unit? unit=25&lesson=81)

● Video 6D: solution to the shadow drawing challenge (unit? unit=25&lesson=82)

● Video 6E: proving desargues's in three dimensions (unit? unit=25&lesson=83)

● Video 6F: lifting desargues's theorem from the plane (unit? unit=25&lesson=84)

● Video 6G: how to prove the converse (unit? unit=25&lesson=85)

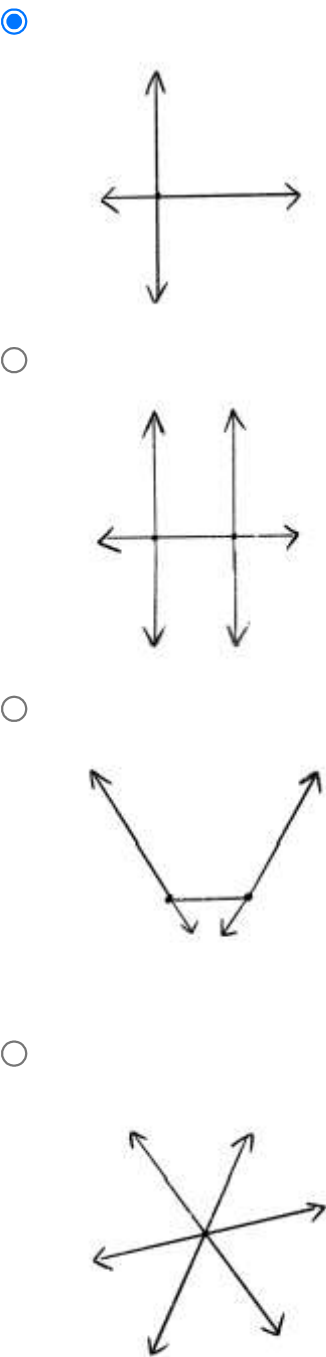
● Lecture Notes (unit? unit=25&lesson=30)

○ Practice: Week 2: Assignment 2 (Non Graded) (assessment? name=135)

● Quiz: Week 2: Assignment 2 (assessment? name=134)

○ Week 2 Feedback Form: Geometry of Vision (unit? unit=25&lesson=29)

Week 3 ()



- 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  $A$ ,  $B$ , 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,  $1/2$  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

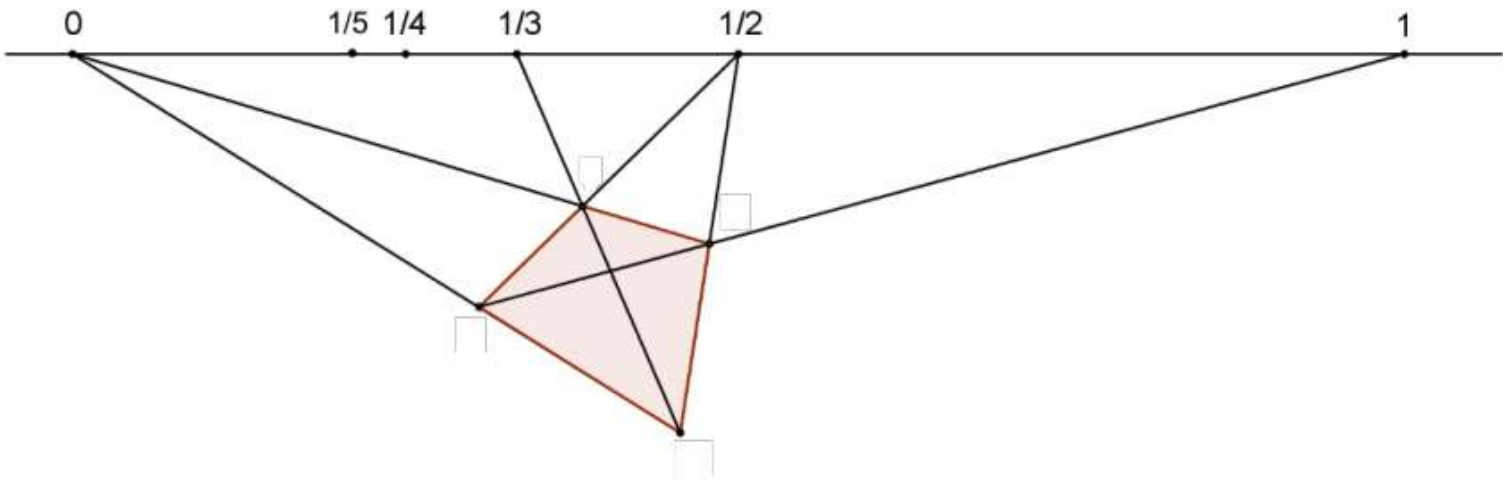
☐ 2

☒  $\infty$
- 9)

1 point

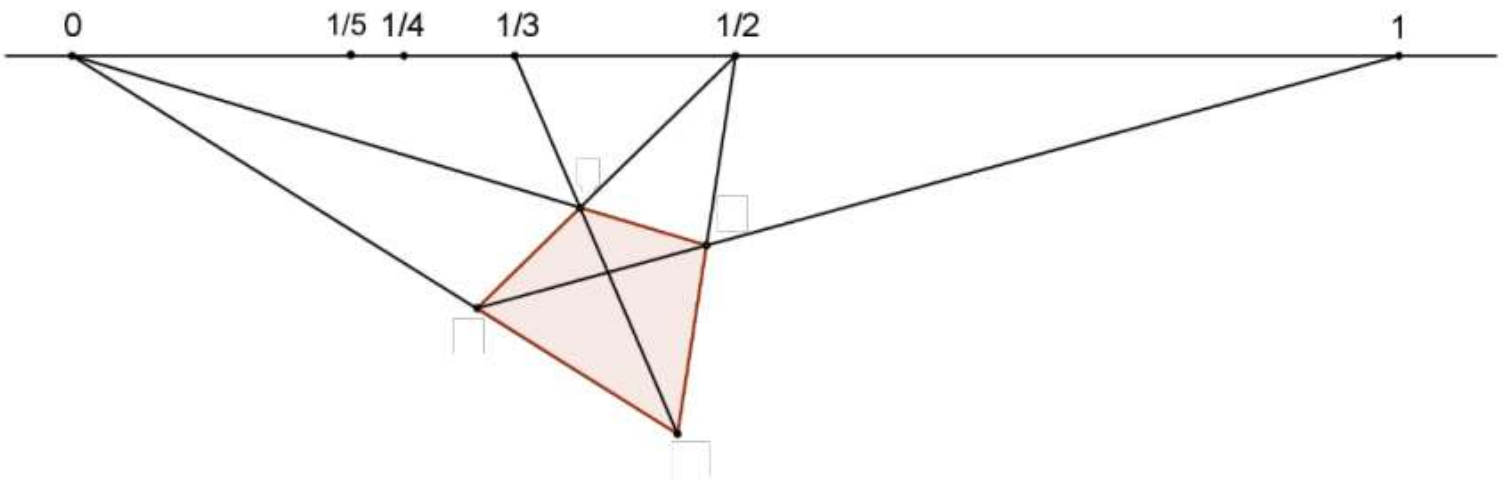
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Using the following diagram, determine  $H_{0,1/2}(1)$ , the harmonic conjugate of 1 with respect to 0 and  $1/2$ .



- ☐ 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  $\lim_{X \rightarrow A} H_{A,C}(X)$ , for any points  $A$  and  $C$ . Determine  $H_{A,C}(A)$ . **1 point**

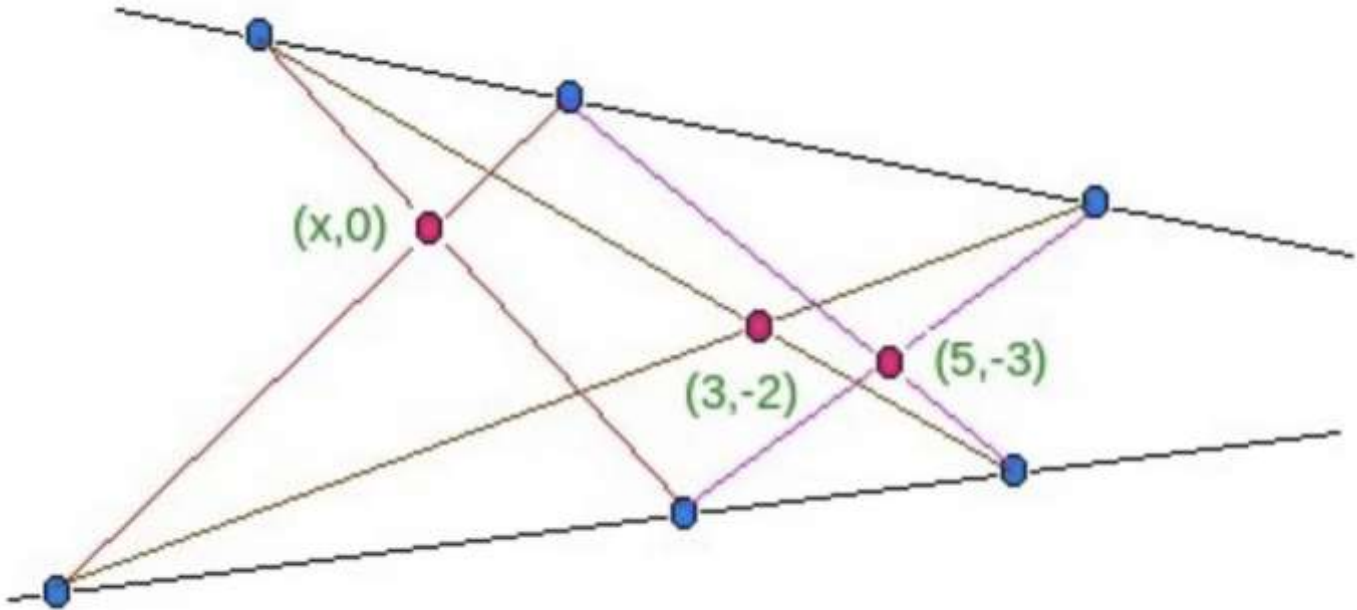
- ☐  $A$
- ☐  $C$

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- ☐
- $\infty$
- ☐ Not enough information to say

13) Find the value of  $x$  in the following picture:

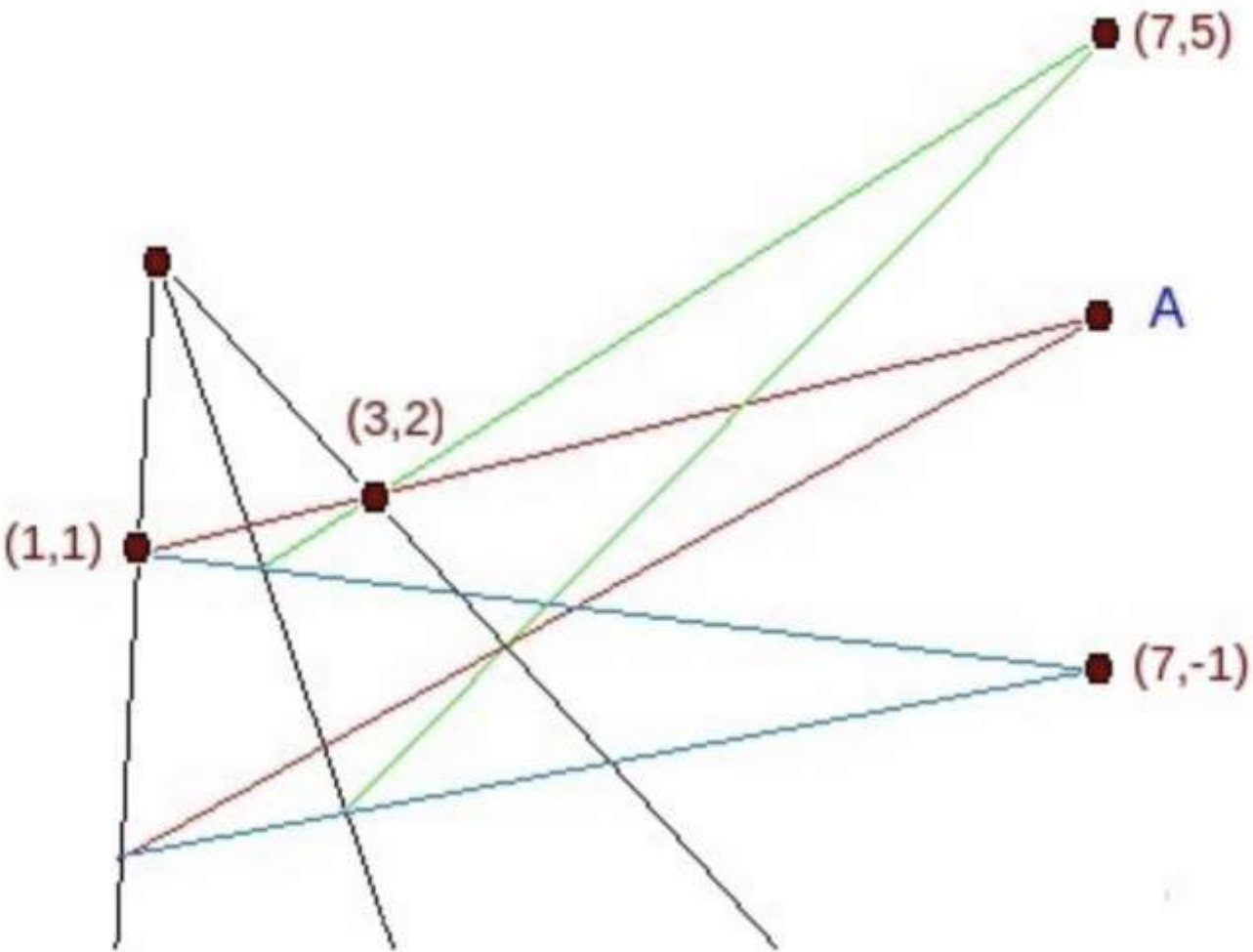
1 point



- ☒ -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  $\pi$  and  $\pi'$  be two planes in  $\mathbb{R}^3$ . If  $l_{[\pi]} = l_{[\pi']}$ , then we can say with certainty that

1 point

- ☐  $\pi = \pi'$
- ☒  $\pi$  is parallel to  $\pi'$

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

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

☒ True

☐ False

1 point

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

☐ True

☒ False

1 point

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

☒ True

☐ False

1 point

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

☒ True

☐ False

1 point

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

☒ True

☐ False

1 point

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

Submit Answers