

Unit 5 Day 4

Quiz Review

Quiz Review Warm Up

A scenario to practice...

- Sophomores get 5 votes.
- Juniors get 7 votes.
- Seniors get 8 votes.
- A winning coalition must have 8 votes.

a) What are all the possible coalitions?

b) Of these coalitions which ones are winners?

c) What is the Power Index for each grade level?

Sophomores _____

Juniors _____

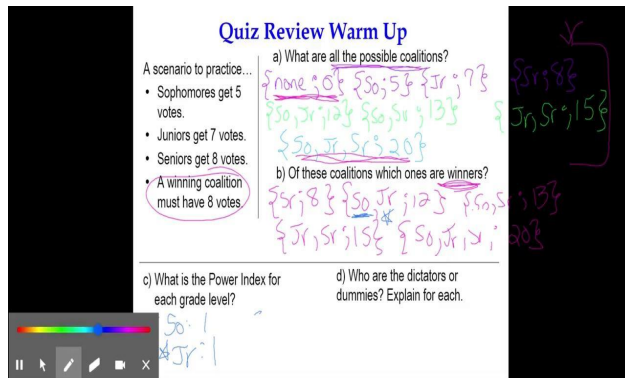
Seniors _____

d) Who are the dictators or dummies? Explain for each.

Warm Up ANSWERS

A scenario to practice...

- Sophomores get 5 votes.
- Juniors get 7 votes.
- Seniors get 8 votes.
- A winning coalition must have 8 votes.



a) What are all the possible coalitions?

{none; 0}, {So; 5}, {Jr; 7}, {Sr; 8},
{So, Jr; 12}, {So, Sr; 13},
{Jr, Sr; 15}, {So, Jr, Sr; 20}

b) Of these coalitions which ones are winners?

{Sr; 8}, {So, Jr; 12}, {So, Sr; 13},
{Jr, Sr; 15}, {So, Jr, Sr; 20}

c) What is the Power Index for each grade level?

Sophomores 1

Juniors 1

Seniors 3

d) Who are the dictators or dummies? Explain for each.

None! No one is essential in **all** or **none** of the winning coalitions!

**Tonight's HW =
Packet p. 7-8 = Quiz Review
Check answers online and
come to class meeting with
questions**



More Quiz Review
Up Next 😊

Arrow's 5 Conditions Necessary for a Fair Group Ranking Method

1. Non-Dictatorship
2. Individual Sovereignty
3. Unanimity
4. Freedom from Irrelevant Alternatives
5. Uniqueness of the Group Ranking



Kenneth Arrow won a Nobel Prize and proved one of these conditions is always violated.

Which of Arrow's Criteria are Violated in these Scenarios?

1. Non-Dictatorship
2. Individual Sovereignty
3. Unanimity
4. Freedom from Irrelevant Alternatives
5. Uniqueness of the Group Ranking

1. There are four candidates competing in an election for math club president: Sydney, David, Courtney, and Julia. The voters turn in their preference ballots and Sydney is the winner. However, David decided he didn't want to be math club president and leaves the election for science club president. They decide to recount the votes with David eliminated and discover that Julia is now the winner. The election shows a violation of which voting criterion?

Which of Arrow's Criteria are Violated in these Scenarios?

ANSWERS

1. Non-Dictatorship
2. Individual Sovereignty
3. Unanimity
4. Freedom from Irrelevant Alternatives
5. Uniqueness of the Group Ranking

1. There are four candidates competing in an election for math club president: Sydney, David, Courtney, and Julia. The voters turn in their preference ballots and Sydney is the winner. However, David decided he didn't want to be math club president and leaves the election for science club president. They decide to recount the votes with David eliminated and discover that Julia is now the winner. The election shows a violation of which voting criterion?

Freedom from Irrelevant Alternatives

Which of Arrow's Criteria are Violated in these Scenarios?

1. Non-Dictatorship
2. Individual Sovereignty
3. Unanimity
4. Freedom from Irrelevant Alternatives
5. Uniqueness of the Group Ranking

2. The club voted for their choice of next year's math club president from: Sydney, David, Courtney, and Julia. The club's votes with secret ballots selected Julia as president. However, the current club president believes Courtney is better to lead the club, and so chooses Courtney.

The election shows a violation of which voting criterion?

Which of Arrow's Criteria are Violated in these Scenarios?

ANSWERS

1. Non-Dictatorship
2. Individual Sovereignty
3. Unanimity
4. Freedom from Irrelevant Alternatives
5. Uniqueness of the Group Ranking

2. The club voted for their choice of next year's math club president from: Sydney, David, Courtney, and Julia. The club's votes with secret ballots selected Julia as president. However, the current club president believes Courtney is better to lead the club, and so chooses Courtney.

The election shows a violation of which voting criterion?

Non-Dictatorship

Which of Arrow's Criteria are Violated in these Scenarios?

1. Non-Dictatorship
2. Individual Sovereignty
3. Unanimity
4. Freedom from Irrelevant Alternatives
5. Uniqueness of the Group Ranking

3. A survey was given to a class of 32 students. The survey asked the students to choose a favorite university mascot from a list of 5 university mascots.

The election shows a violation of which voting criterion?

Which of Arrow's Criteria are Violated in these Scenarios?

ANSWERS

1. Non-Dictatorship
2. Individual Sovereignty
3. Unanimity
4. Freedom from Irrelevant Alternatives
5. Uniqueness of the Group Ranking

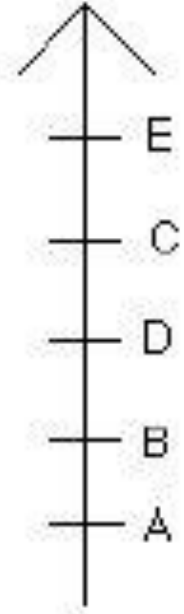
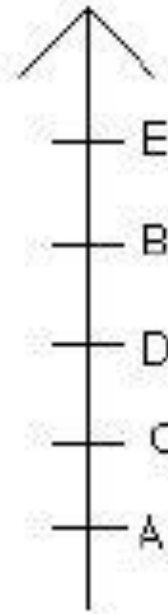
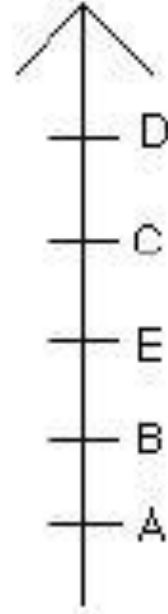
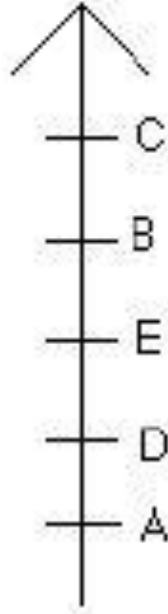
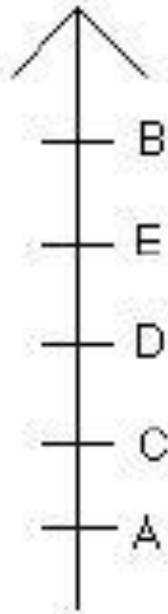
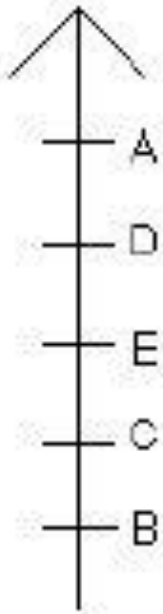
3. A survey was given to a class of 32 students. The survey asked the students to choose a favorite university mascot from a list of 5 university mascots.

The election shows a violation of which voting criterion?

Individual Sovereignty

Review

1) Find the Plurality, Majority, Runoff, and Sequential Runoff winners



Votes: 18

12

10

9

4

2

Plurality:

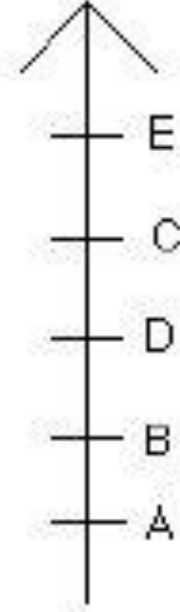
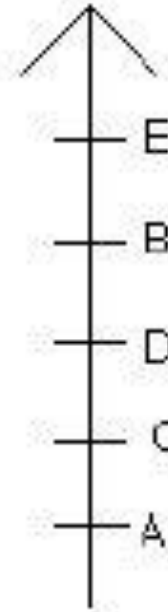
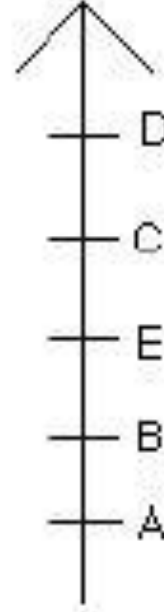
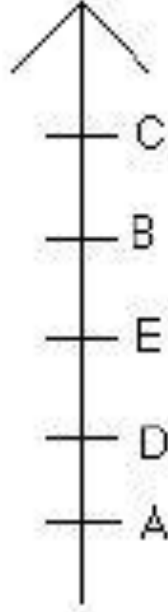
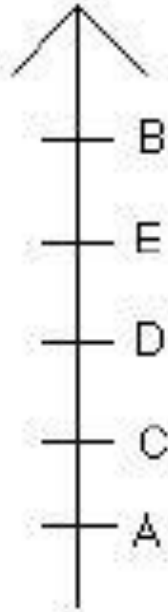
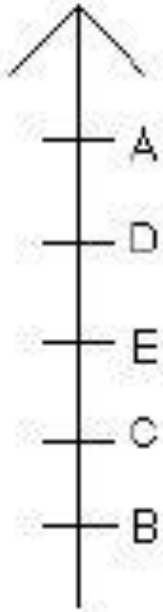
Majority:

Runoff:

Seq. Runoff:

Review ANSWERS

1) Find the Plurality, Majority, Runoff, and Sequential Runoff winners



Votes: 18

12

10

9

4

2

Plurality: **A**

Majority: **None**

Runoff: **B**

Seq. Runoff: **C**

Review

1) Find the Plurality, Majority, Runoff, and Sequential Runoff winners

Votes: 18 12 10 9 4 2 =

Plurality: **A** (with 18) Majority: **None** > 50%

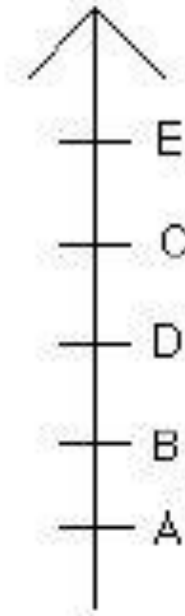
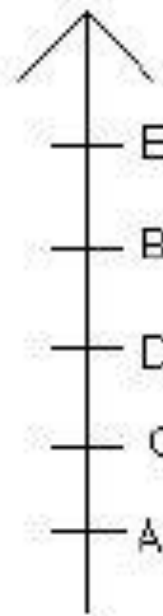
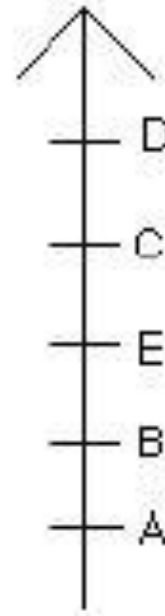
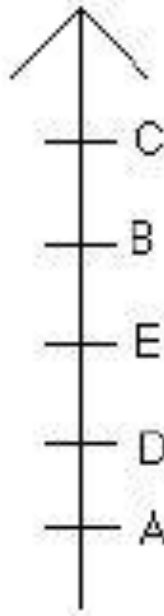
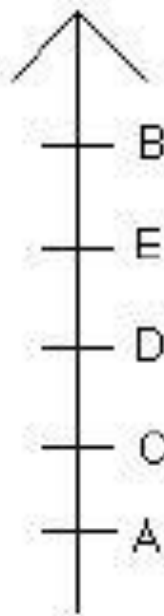
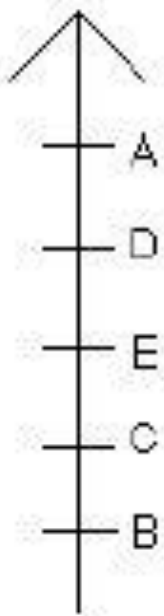
Runoff: **B** (with 37) Seq. Runoff: **C**

SS
A: 18/55 < 50%

More Review

2) Find the Borda, Condorcet, and Approval winners.

For approval, the top 3 votes were approved.



Votes: 18

12

10

9

4

2

Borda:

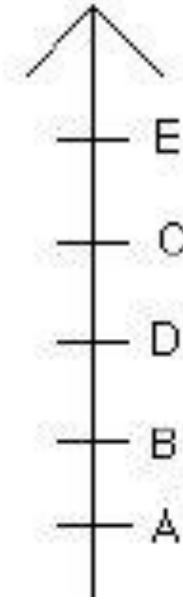
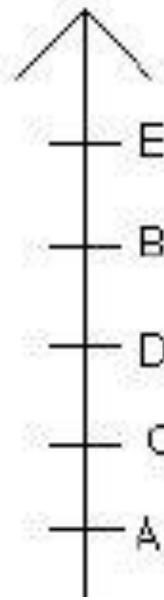
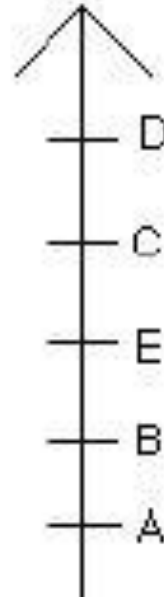
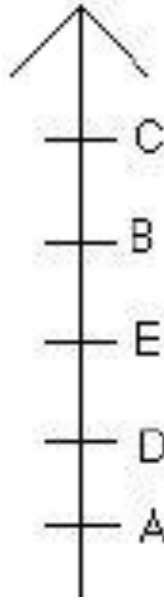
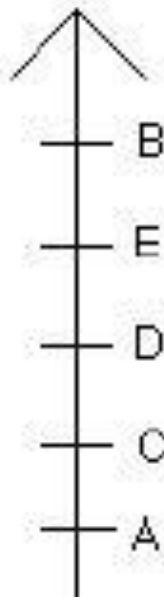
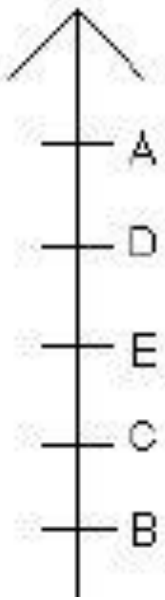
Condorcet:

Approval:

More Review **ANSWERS**

2) Find the Borda, Condorcet, and Approval winners.

For approval, the top 3 votes were approved.



Votes: 18

12

10

9

4

2

Borda: D

Condorcet: E

Approval: E

More Review

2) Find the Borda winners.

	A	B	C	D	E
5	A	B	C	D	E
4	D	E	C	A	B
3	E	D	B	E	C
2	C	C	D	C	B
1	B	A	A	A	A

Votes: 18 12 10 9 4 2

Borda: $18(4) + 12(3) + 10(2) + 9(1) + 4(0) + 2(0) = 127$
 $18(3) + 12(4) + 10(3) + 9(4) + 4(2) + 2(1) = 156$
 $18(2) + 12(2) + 10(4) + 9(3) + 4(1) + 2(0) = 137$
 $18(1) + 12(1) + 10(1) + 9(2) + 4(3) + 2(4) = 127$
 $18(0) + 12(0) + 10(0) + 9(0) + 4(4) + 2(5) = 36$

Unit 5 Day 4 Quiz Review SC S20

More Review

2) Find the Borda, Condorcet, and Approval winners.
For approval, the top 3 votes were approved.

	A	B	C	D	E
5	X				
4	X	X			
3	X	X	X		
2	X	X	X	X	
1	X	X	X	X	X

Votes: 18 12 10 9 4 2

More Review

2) Find the Borda, Condorcet, and Approval winners.
For approval, the top 3 votes were approved.

	A	B	C	D	E
5	X				
4	X	X			
3	X	X	X		
2	X	X	X	X	
1	X	X	X	X	X

Votes: 18 12 10 9 4 2

Approval: A: 18, B: 12+10, C: 10, D: 18+12

**Tonight's HW =
Packet p. 7-8 = Quiz Review
Check answers online and
come to class meeting with
questions**

