



Digital Research

HOW TO NARROW YOUR SEARCH

FROM RESEARCHING IN A DIGITAL WORLD BY ERIK PALMER

Digital Research Terms

URL

- Tells the browser what you are looking for

Browser

- Connects your device to the Internet
- Searches the Web for your request

Internet

- **NOT A PLACE** or all-knowing source of knowledge
- **IS** an enormous network of interconnected computers
- www. Is the Worldwide Web—a collection of documents and other resources formatted to be accessed on the internet *i.e.* *http: (HyperText Transfer Protocol)*

Search Engines

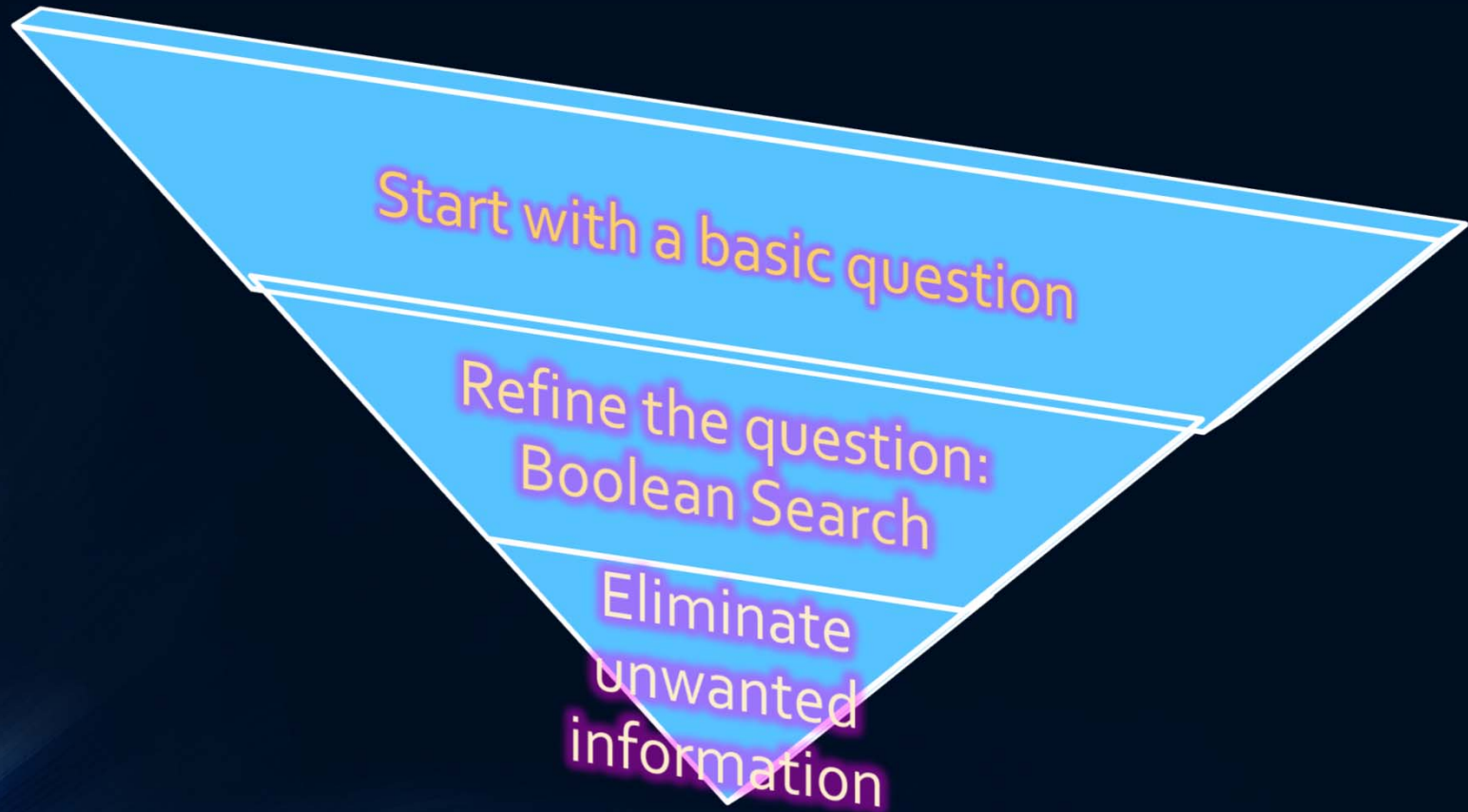
- Program designed to help us find related information according to our search terms
- Examples: Google, Bing, WebMD, MapQuest, Dogpile, Northern Lights, etc.
- Kid friendly: Kidsclick!, KidzSearch, KidRex, Google Scholar; GoGooligans, etc.

Strategic Action

- By yourself generate a list of questions you want to know about your topic.
- Time: 10 minutes. GO!
- Now narrow down to your top 5 Questions
- Time 5 min. GO!
- Share your questions with a partner.
- Time 3 minutes. GO!



What is the question?



Formatting Search Questions: Boolean Searches

- Cuts down the number of results
- Refines your search by using three terms:

✓ AND

✓ OR

✓ NOT

and
&

Typing AND (&) between key words will show results where both terms are present

Ex. Athens & Education; Sparta & Military

or
/

Typing OR (/) between key words will return results that include either or both terms

*Ex. Athens or military;
Sparta or Education*

not
(-)

With some search engines, typing NOT (-) between key terms may limit results

Ex. Sparta & girls - boys

Formatting Search Questions

Search Shortcuts

- Research cheat sheets available on various search engines
 - Type “[search engine name] shortcuts” into the search bar
- Google short cuts:
 - <https://support.google.com/websearch/answer/136861>

Formatting Search Questions: Search Shortcuts

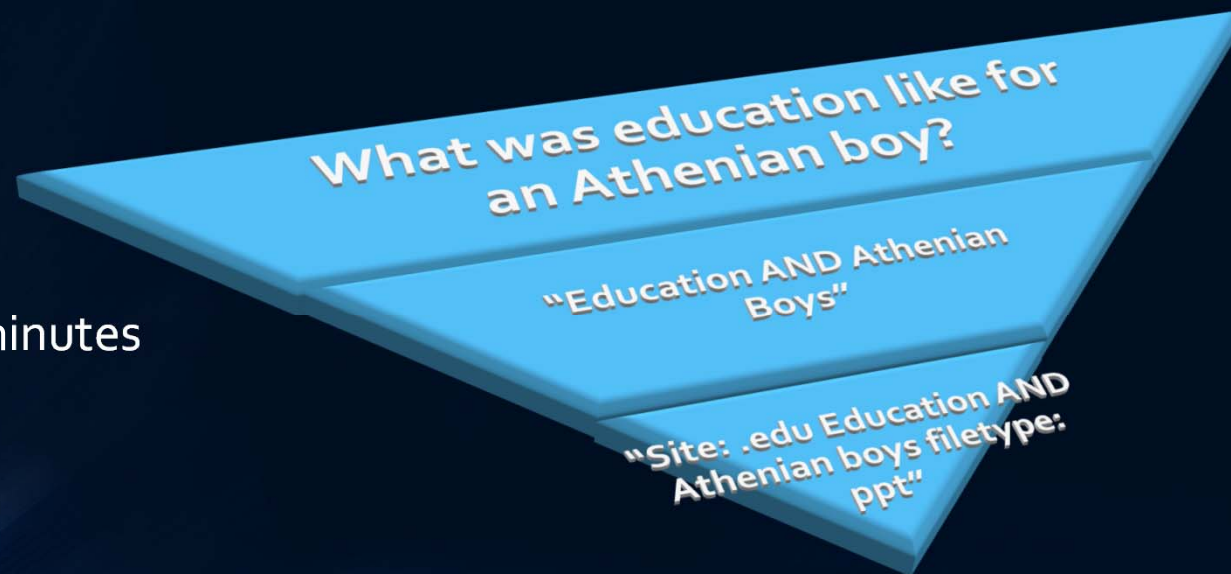
- Simple Short Cuts

- Add prefix **SITE:** to focus on domain types-- .org, .edu...
(*site:.edu Athenian government*)
- Add the prefixes **RELATED** or **LINK:** to find sites with similar information (*related:www.nasakids.org*)
- Add the prefix **FILETYPE:** find information in specific file types -- .pdf, .ppt, .docx... (*Athens government filetype:ppt*)

Strategic Questioning

- With your table team, translate your questions into the most strategic format.

- 20 minutes
- GO!



Kid Friendly Search Engines

Programs designed to help find web pages related to our search criteria

Search Engine	Description
Kidsclick! www.kidsclick.org	Created by librarians—students may search by key words, categories, media, Dewey decimal numbers
KidzSearch www.kidzsearch.com	Good source. One of the most popular WARNING! Cluttered with ads
KidRex www.kidrex.org	No ads. High quality sources dominate
SweetSearch www.sweetsearch.com http://4mesweetsearch.com (younger students version)	Results are displayed with a synopsis of what the main article is about <ul style="list-style-type: none">• This day in history• Daily assortment of sites for quick reference

Kid Friendly Search Engines continued

Programs designed to help find web pages related to our search criteria

Search Engine	Description
GoGooligans www.gogooligans.com	Designed for younger students Results grouped into categories (Facts, Economy, History, Research) WARNING! Includes Google Ads
Google Scholar http://scholar.google.com	Results come from research articles and works from professional organizations, colleges and universities etc.
ipl2 www.ipl.org	Collected and maintained by a group of volunteer information science professionals and librarians Provides search options like: <ul style="list-style-type: none">• Search All ipl2• For Teens• For Kids

Strategic Searching

- Search with out using Google
- Exploring search engines
 - www.dogpile.com
 - www.gogooligans.com
 - www.kidsclick.org
 - www.ipl.org

Strategic Searching: Advanced Searches



- Advance Searches allows you to refine and limit your searches
 - Recent information (last 5 years)
 - Reading levels
- Look for the tabs on the search page that say: "Advanced Search" or "Search Tools"



Strategic Challenges

WEBSITES

- Results of our search questions
- Not equally reliable
- Root of reliability
 - Go back to the root
<http://www.historyforkids.org/learn/greeks/government/athens.htm#!>

LIBRARY DATABASES

- A storehouse of published works
 - Organized by categories
 - Key word: ***published***
 - Authors probably experts in their fields
 - Facts are checked for accuracy

Websites vs. Library Databases

WEBSITES

- Ads
- Materials can be written by anyone
- Information may not be verified
- May not have been updated
- Can feature any type of writing

LIBRARY DATABASES

- No Ads
- Materials more likely written by experts
- Information has been checked
- Sources constantly updated
- Features only writing that has been published elsewhere

Websites vs. Library Databases

WEBSITES

- Multiple intended purposes (entertain, persuade, self)
- Access is free
- Articles may cost money
- Author may be unclear

LIBRARY DATABASES

- Purpose to provide information
- Access limited to library members and those who pay significant subscription fees
- Article is free after access
- Author is clear

WIKIPEDIA WARNING!

Welcome to Wikipedia, the free encyclopedia that *anyone can edit*.
4,579,763 articles in English.
(Wikipedia, 2014c, emphasis added)

- Collaborative resource
- Generated by users
- Good place to start research to build basic knowledge
- Not reliable on its own

WIKI History Action Item:

- Discuss why it might have been changed. (Is there new information available?)

Evaluating Online Resources

1. Resources not listed by relevance—

- Ads 1st (sites that pay for that spot)
- Next sites are organized by key word factors:
 - ❖ presence,
 - ❖ frequency,
 - ❖ links and
 - ❖ past search history
- Action Item Activity

Evaluating Online Resources: Examine the Domain Type

“Caveat Emptor”
Credibility Rating

4 = Very Suspicious

3 = Be Suspicious

2 = Be Slightly Suspicious

1 = Everything is the
guaranteed
truth

- **.com** commonly used; stands for commercial—signals something is for sale...information may be reliable but watch for the pitch. *Rating 4*
- **.net** stands for network; originally for businesses that provided web services. Now anyone can buy a .net domain name. *Rating 4*
- **.org** stands for organization; although still used by groups, associations, & organizations it may be purchased by any one. They may have more expertise behind them. *Rating: 3*
- **.gov** stands for government—restricted to federal, state and local government agencies. *Rating 2*
- **.edu** stands for education—higher probability of reliability. *Rating 2*

Evaluating Online Resources: Examine Site Appearance—At First Glance...

1. Get a quick sense of the amount of information shown
 - Is there a lot of information—What is the ratio of Ads : Information?
 - Valuable images & graphics noticeable or are pop-ups interfering ?
2. Explore a few links
 - Do they dead end? (404 Page Not Found)
 - Do they lead to useful sites?
 - Do they lead to commercial/non-related sites
3. Look for dates
 - Has it been updated recently?

Evaluating Online Resources: Consider Site Purpose

- No matter how carefully the search was crafted there is no guarantee that the results will be limited to informational sites.
- Take a few minutes to question the purpose of the site:
 1. Is it to sell a product?
 2. Is it to persuade them to do or believe something?
 3. Is it to divert or entertain them?
 4. Is it to inform them?

Evaluating Online Resources: Examine Site Ownership

- Can be found via links labeled:
 - Home
 - About Us
 - About
 - FAQ
- Placed on a tab at the top of the page
- Might need to hunt for the information on links:
 - Contact Us
 - Advertise
 - Terms of Service
- Truncate or cut off the URL after the domain suffix—1st step to your detective work.
 - example:
www.kidshealth.org/parent/general/body/overweight_obesity.html
would be truncated to:
www.kidshealth.org
- Take 3-5 minutes to look into a sites credentials it will save you time when writing information that is credible

Evaluating Online Resources: Consider Authority

WHO WROTE THIS?

*WHY SHOULD I BELIEVE THIS
WRITER?*

- If the site sponsor doesn't have obvious authority, crucial to find the author's name.
 - Is it a recognizable name
 - How do you find out more about this author?
 - Are the author's credentials listed?
 - What kinds of credentials would make the more trustworthy? More questionable?

EXPLORE THE LINKS

- All scholarly publications have bibliographies—where the author got his information
- Check the facts/verify claims
- Digital bibliography—provides links to other sites giving the students a tool for evaluating the credibility of the information—helps students expand their research

Evaluating Online Resources: Consider “Understandability”

Do I understand the words I'm reading?

- You need to be sure you understand what you are reading before writing or cut-n-pasting into your notes
- Don't understand?
 - Find another source
 - What if source is authoritative?
 - Look up terms you don't understand & translate them in to words you do know

SAMPLE FORM FOR EVALUATING RESOURCES

Criteria	Source 1	Source 2	Source 3
Appearance	A B C D F	A B C D F	A B C D F
Purpose	A B C D F	A B C D F	A B C D F
Ownership	A B C D F	A B C D F	A B C D F
Authority	A B C D F	A B C D F	A B C D F
Understandability	A B C D F	A B C D F	A B C D F
Verdict	  	  	  

Using Online Resources

- Cite information properly using MLA Style
 - <https://owl.english.purdue.edu/owl/resource/747/01>
- Steer clear of cut and paste
 - Make sure you understand all terms you use

- Strategy:

- Say it Two Ways :Create a two column chart:

Quote	Paraphrase
-------	------------

- “Ask the Expert” Panel—3 students conduct an interview of the “Expert” who did the research, asking follow-up questions about anything they didn’t understand.

Plagiarism

Using someone else's work and trying to pass it off as your work.

- Plagiarism can have major consequences—
 - suspension and expulsion at the university level
 - Suspension at the high school & junior high levels
- Plagiarism Detectors—Your teacher will use them to check your work
 - Plagiarism Detector: <http://plagiarismdetector.net>
 - Plagiarism Checker: www.plagiarismchecker.com
- Give Credit Where Credit is Due
 - *Does everyone know this?*
 - *Did I think of this, or did someone else think of it?*
- Keep a source page
 - Use MLA format
- Practice paraphrasing, summarizing and citing sources

Copyright and Fair Use

"If it's on the Internet, it is OK to use, right? What if I give the author credit and site it?"

- Public Domain—material available to all for all purposes
 - Older works where the copyright has expired
- Copyright—text, images, audio & video protected by law issued by the Library of Congress
 - You must ask permission to use these works
- Fair Use—sliding scale for what constitutes fair use:
 1. What is the purpose of the use? Nonprofit educational or commercial gain?
 2. What is the nature of the work being used? Factual or highly creative?
 3. How much work is being used? Small percent or substantial part of the whole?
 4. Will the use possibly affect the market of the original work?
- Educational uses are likely allowed but highly creative works are protected
- Creative Commons—some creators are willing to share their works (<http://creativecommons.org>)

Name: _____

"We Didn't Start the Fire" by Billy Joel

Harry Truman, Doris Day, Red China, Johnnie Ray
South Pacific, Walter Winchell, Joe DiMaggio

Joe McCarthy, Richard Nixon, Studebaker,
television
North Korea, South Korea, Marilyn Monroe

Rosenbergs, H-bomb, Sugar Ray, Panmunjom
Brando, "The King and I" and "The Catcher in the
Rye"

Eisenhower, vaccine, England's got a new queen
Marciano, Liberace, Santayana goodbye

CHORUS

We didn't start the fire
It was always burning
Since the world's been turning
We didn't start the fire
No we didn't light it
But we tried to fight it

Joseph Stalin, Malenkov, Nasser and Prokofiev
Rockefeller, Campanella, Communist Bloc

Roy Khan, Juan Peron, Toscanini, Dacron
Dien Bien Phu falls, "Rock Around the Clock"

Einstein, James Dean, Brooklyn's got a winning
team
Davy Crockett, Peter Pan, Elvis Presley,
Disneyland

Bardot, Budapest, Alabama, Krushchev
Princess Grace, "Peyton Place", trouble in the
Suez

CHORUS

Little Rock, Pasternak, Mickey Mantle, Kerouac
Sputnik, Chou En-Lai, "Bridge on the River Kwai"

Lebanon, Charlse de Gaulle, California baseball
Starkweather, homicide, children of thalidomide

Buddy Holly, "Ben Hur", space monkey, Mafia
Hula hoops, Castro, Edsel is a no-go

U2, Syngman Rhee, payola and Kennedy
Chubby Checker, "Psycho", Belgians in the Congo

CHORUS

Hemingway, Eichmann, "Stranger in a Strange
Land"

Dylan, Berlin, Bay of Pigs invasion

"Lawrence of Arabia", British Beatlemania
Ole Miss, John Glenn, Liston beats Patterson

Pope Paul, Malcolm X, British politician sex
JFK, blown away, what else do I have to say

CHORUS

Birth control, Ho Chi Minh, Richard Nixon back
again

Moonshot, Woodstock, Watergate, punk rock
Begin, Reagan, Palestine, terror on the airline
Ayatollah's in Iran, Russians in Afghanistan

"Wheel of Fortune", Sally Ride, heavy metal,
suicide

Foreign debts, homeless vets, AIDS, crack,
Bernie Goetz

Hypodermics on the shores, China's under martial
law

Rock and roller cola wars, I can't take it anymore

We didn't start the fire

It was always burning

Since the world's been turning

We didn't start the fire

But when we are gone

Will it still burn on, and on, and on, and on

Read more: [Billy Joel - We Didn't Start The Fire
Lyrics | MetroLyrics](#)

“We Didn’t Start the Fire”

Research Paper

These are the steps in creating your research paper. All of them will be graded, so don’t throw anything away!

___1. Questions or topics—this is a basic list of topics or paragraphs your report might cover. It is very changeable. You can always add to it or cross things out. (Use Task 2 Graphic Organizer)

___2. Working bibliography—This is a document on the computer or in your notebook where you keep track of the sources you are using for the report. **Everyone must use at least 5 sources!** When you find a source that you will use to take notes from, copy and paste the web address into your working bibliography document (or write the website address down in your notebook). **Number the sources.** (Use Task 2 Graphic Organizer)

___3. Notecards— A notecard should have notes for only one topic from one source:

Topic #	Source #
<p>Notes about that outline number only, paraphrased in your own words. If you like how they say something, then you must put quotation marks around it. You can use the front and the back of the notecard. REMEMBER ONLY PUT NOTES ON THE CARD THAT FIT WITH THAT TOPIC!!!!</p>	

Before you start your rough draft, look at all your notes. Do you have enough information for each topic? If not, can you find more? Does that topic need to be combined with another shorter topic? Should that topic be thrown out? Do some topics have too much information? Can you split it into 2 topics or subtopics, each with its own paragraph? (Task 2)

___4. Rough draft—once you have all the notes taken, you will then begin writing your rough draft. You will have to compose an exciting introduction to get your audience to want to read your paper. You will organize your notecards by topic and use them to build your body paragraphs. Then you will write a good conclusion summing up your paper and adding in your own opinion if you choose to. (Task 3)

One new thing we will be learning is how to give credit (cite) the quotations that you may use. This will be a lesson in the classroom when we get to the writing stage.

___5. Revising/Editing—This paper is not one that you can just sit down and write and call it perfect! You can have a friend read it and make comments. At any time you can send me the paper, or even just a paragraph from the paper, and I will read it and make comments on it. Have your parents read it too.

___6. Final Works Cited Page—This is a very formal and prescriptive way to cite your sources. This will be the last page of your paper. You will have a lesson and a handout on the proper way to write this later.

___7. Final Draft—We will be using MLA formatting. You can find this at <https://owl.english.purdue.edu/owl/resource/747/01/>

All of these items I will check either by having you show me them, send them to me electronically, or by handing them in. Throw nothing away!!!

Topic and Source Graphic Organizer

What are your topic or focus questions?

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

What are your sources?

Source Number	Type <i>Book, Web, Video, Music, etc.</i>	Source (title, author, web address with date accessed, etc.)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

**Practice
10-1****Ratios**

- There are 8 boys and 3 girls from the sixth grade in the marching band. Check the two ratios that compare the number of boys and the number of girls.
 A. 11 : 8
 B. 8 : 3
 C. 11 : 3
 D. 3 : 8
 E. 3 : 11
 F. 8 : 11
- There are 8 boys and 7 girls in the school robotics club. Write the ratio of the number of boys to the number of girls.
- Last month, Carmen paid a gas and electricity utility bill of \$65. The gas part of the bill was \$20. Write the ratio of the payment for gas to the payment for electricity.
- Last month, Carmen paid a gas and electric utility bill of \$50. The gas part of the bill was \$30. Write the ratio of the payment for electricity to the payment for gas.
- There are 18 boys and 7 girls in the school jazz band. Find the ratio of the number of girls in the band to the total number of students in the band.

- Students in a sixth grade class will be participating in a school Field Day. They need to decide on a shirt color. The table shows the results of their vote.

Votes for Field Day Shirt Color	
Shirt Color	Number of Votes
Yellow	7
Green	17
Blue	5

Determine whether the following statement is true or false. The ratio of total votes to votes for green shirts is 29 : 17.

- A recreational sports team had a season of 27 wins and 13 losses.
 - State the ratio of wins to losses.
 - State the ratio of losses to wins.
- Clothing** Dan has 7 pairs of white socks, 3 pairs of black socks, and several pairs of blue socks. He has 15 pairs of socks altogether.
 - How many pairs of blue socks does he have?
 - Write the ratio of the number of pairs of black socks to the number of pairs of blue socks.

9. **Error Analysis** The table shows the results of the vote for a name for the science club's new pet, a turtle. One student claims the ratio of the number of votes for the name Speedy to all the votes is 5 : 25.

Votes for Turtle Name	
Name	Number of Votes
Ted	15
Tina	10
Speedy	5

- a) Why is the statement incorrect?
- A. The second term of the ratio is not the correct number of votes for the name Speedy.
 - B. The terms of the ratio are not in the correct order.
 - C. The second term of the ratio is not the correct total number of votes.
 - D. The first term of the ratio is not the correct total number of votes.
 - E. The first term of the ratio is not the correct number of votes for the name Speedy.
- b) What is the correct ratio of the number of votes for the name Speedy to all the votes?
- A. 5 : 30
 - B. 25 : 30
 - C. 25 : 5
 - D. 30 : 5

10. a) **Open-Ended** Draw several circles, squares, and triangles. Make some of each large and some of each small. Then describe different ratios you could use to compare the number of figures. Write two different ratios that compare the number of triangles and the number of circles.

- b) Which statement about your ratios is true?
- A. Only one of the ratios uses the number of circles in the drawing.
 - B. Only one of the ratios uses the number of triangles in the drawing.
 - C. Neither ratio uses the number of squares in the drawing.
 - D. Both ratios use the number of squares in the drawing.

11. **Writing** The table shows the favorite subjects in a class of sixth graders.

Favorite Subject	Number of Students
Language Arts	3
Math	7
Science	6
Social Studies	2

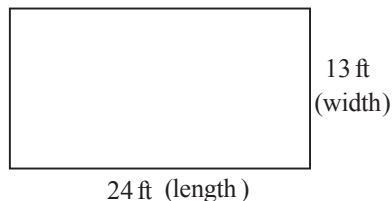
- a) Explain how a whole-to-part ratio can help compare the total number of students surveyed to the number of votes for a favorite subject.
- b) What is the ratio of the total number of students surveyed to the number of students who said math is their favorite subject?
- A. 18 : 7
 - B. 7 : 11
 - C. 11 : 7
 - D. 7 : 18

12. Marco has a bag of 50 colored marbles. There are 12 blue marbles, 18 black marbles, and 20 red marbles. What is the ratio of the number of black marbles to the number of blue marbles?

- A. 18 : 50
- B. 12 : 18
- C. 18 : 12
- D. 12 : 50

13. What is the ratio of the width of the playing surface to its perimeter?

- A. 74 : 13
- B. 13 : 74
- C. 13 : 24
- D. 24 : 74



14. **Challenge** In a recent survey of 100 teens, the number wanting a new phone was 54. The number wanting a new television was 25. The number wanting both was 15. What is the ratio of the number of teens wanting neither a new phone nor a new television to the number of teens wanting a new phone or a new television?

15. **Challenge** The table shows the favorite subjects in a class of sixth graders. What is the ratio of the total number of students surveyed to the total number of students who said science or language arts is their favorite subject?

Favorite Subject	Boys	Girls
Language Arts	2	8
Math	5	3
Science	6	2
Social Studies	3	3
Total	16	16

- A. 18 : 6
- B. 18 : 32
- C. 32 : 18
- D. 6 : 2

1. B, D
2. 8 : 7
3. 20 : 45
4. 20 : 30
5. 7 : 25
6. True
7. a) 27 : 13
b) 13 : 27
8. a) 5
b) 3 : 5
9. a) C
b) A
10. a) Answers will vary
b) C
11. a) Answers will vary
b) A
12. C
13. B
14. 36 : 64
15. C

**Practice
10-2**

Exploring Equivalent Ratios

Use the multiplication table to answer some of the following questions.

x	1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7	8
2	2	4	6	8	10	12	14	16
3	3	6	9	12	15	18	21	24
4	4	8	12	16	20	24	28	32
5	5	10	15	20	25	30	35	40
6	6	12	18	24	30	36	42	48
7	7	14	21	28	35	42	49	56
8	8	16	24	32	40	48	56	64

- Which ratio is not equivalent to 36 : 42? Use the multiplication table above.
 - A. 18 : 21
 - B. 12 : 14
 - C. 18 : 24
 - D. 30 : 35
- Which ratio is not equivalent to 24 : 28? Use the multiplication table above.
 - A. 48 : 64
 - B. 42 : 49
 - C. 36 : 42
 - D. 30 : 35
- Find the equivalent ratio with lower terms.

x	1	2	3	4	5
3					
4				16	
5					
6	6		18	24	
7			21		
8					

- a) $18 : 21 = 6 : \underline{\hspace{2cm}}$
- b) $16 : 24 = \underline{\hspace{2cm}} : 6$

4. Find the equivalent ratio with greater terms.

x	1	2	3	4	5
2					
3		6			15
4			12		20
5		10		20	
6					
7					35

a) $6 : 15 = 10 : \underline{\hspace{2cm}}$

b) $12 : 20 = \underline{\hspace{2cm}} : 35$

5. In Ms. Harrington's sixth grade class, 25 out of 30 students bought their lunch. How many students out of every 6 bought their lunch? Use the table at the top of page 1.
6. In Mr. Harrington's sixth grade classes, 6 out of every 7 students turned in their field trip slips. If there is a total of 35 students in his classes, how many turned in their field trip slips? Use the table at the top of page 1.
7. Use the multiplication table to find ratios that are equivalent to $70 : 80$.

x	5	6	7	8	9	10	11	12
5	25	30	35	40	45	50	55	60
6	30	36	42	48	54	60	66	72
7	35	42	49	56	63	70	77	84
8	40	48	56	64	72	80	88	96
9	45	54	63	72	81	90	99	108
10	50	60	70	80	90	100	110	120
11	55	66	77	88	99	110	121	132
12	60	72	84	96	108	120	132	144

Which of the following ratios is not equivalent to $70 : 80$?

- A. $63 : 72$
 C. $42 : 48$
 B. $49 : 56$
 D. $49 : 63$

8. a) **Open-Ended** Write a ratio word problem using the values in the partial multiplication table. Make your problem such that the solver must find the missing term of the ratio $21 : 35 = 12 : \underline{\hspace{2cm}}$.

x	3	4	5	6	7
2					
3		12			21
4			20		
5					35
6					
7					

- b) What statement about your ratio problem is true?
- A. The problem compares terms in the same ratio.
 - B. The problem compares two terms to a third term.
 - C. The problem compares two terms that increase by the same amount.
 - D. The problem compares two terms that decrease by the same amount.
9. **Temperature** The temperature fell 10 degrees Fahrenheit from 45°F to 35°F in 8 hours. How much would the temperature fall over 12 hours if the pattern continued? Use the multiplication table found at the top of page 1.
10. **Error Analysis** Galvin and Stefani were told to complete the pair of equivalent ratios $6 : 9$ and $12 : \underline{\hspace{2cm}}$. Use the multiplication table found at the top of page 1.
- | | |
|---------|-----------------------|
| Galvin | $6 : 9$ and $12 : 18$ |
| Stefani | $6 : 9$ and $12 : 21$ |
- a) Which student wrote the equivalent ratios correctly?
- A. Galvin
 - B. Stefani
- b) What mistake did the student with the incorrect equivalent ratios likely make?
- A. The student looked in the wrong column or row to find both terms.
 - B. The student looked in the wrong column or row to find the second term.
 - C. The student looked in the wrong column or row to find the first term.
 - D. The student looked in the wrong column and the wrong row to find the second term.
11. **Mental Math** Micah and Mia are on the yearbook staff at their middle school. Over the weekend, they sold 12 yearbooks for a total of \$21. Use mental math to find a ratio equivalent to $12 : 21$. Which ratio is equivalent to $12 : 21$?
- A. $4 : 7$
 - B. $7 : 4$
 - C. $5 : 7$
 - D. $4 : 8$

12. Complete the statement $160 : 200 = \underline{\hspace{2cm}} : 400$.

x	20	30	40	50
5				250
6			240	
7		210		
8	160			
9				
10	200		400	

13. Corey can do 200 push-ups at a steady pace. The table shows how long it takes Corey to do the number of push-ups shown. How many push-ups can Corey do in 45 seconds?

Push-ups	Seconds
42	63
48	72

x	3	4	5	6	7	8	9	10	11
3	9	12	15	18	21	24	27	30	33
4	12	16	20	24	28	32	36	40	44
5	15	20	25	30	35	40	45	50	55
6	18	24	30	36	42	48	54	60	66
7	21	28	35	42	49	56	63	70	77
8	24	32	40	48	56	64	72	80	88
9	27	36	45	54	63	72	81	90	99
10	30	40	50	60	70	80	90	100	110
11	33	44	55	66	77	88	99	110	121

14. **Challenge** For the ratio $28 : 36$, find an equivalent ratio with both terms greater than 6 and less than 10.

x	1	2	3	4
6				
7		14		28
8				
9	9		27	36
10	10		30	40

- 15. Challenge** In gym class, students must run back and forth between two cones. One trip back and forth is called a circuit. A student completes 3 circuits in 21 seconds. Assume the student runs at a steady pace. How many circuits would the student complete in 46 seconds? (Hint: If a number is not on the multiplication table, find the greatest number of complete circuits that could be made in this time.)

x	2	3	4	5	6	7	8	9
1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18
3	6	9	12	15	18	21	24	27
4	8	12	16	20	24	28	32	36
5	10	15	20	25	30	35	40	45
6	12	18	24	30	36	42	48	54
7	14	21	28	35	42	49	56	63
8	16	24	32	40	48	56	64	72

1. C
2. A
3. a) 7
b) 4
4. a) 25
b) 21
5. 5
6. 30
7. D
8. a) Answers will vary
b) A
9. 15 degrees
10. a) A
b) B
11. A
12. 320
13. 30
14. 7 : 9
15. 6

**Practice
10-3**

Equivalent Ratios

1. A teacher kept track of what students consumed at a school picnic. For three grades, the ratios of the amount of water consumed to the amount of fruit juice consumed were equivalent. Complete the table.

Grade	Water (gallons)	Juice (gallons)
5th	6	7
6th	24	_____
7th	18	_____

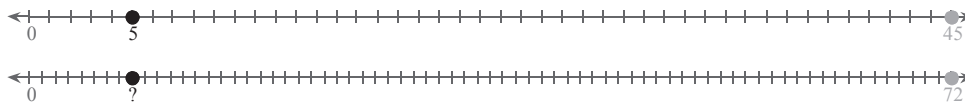
2. The attendant at a parking lot compared the number of hybrid vehicles to the total number of vehicles in the lot over a weekend. The ratios for the three days were equivalent. Complete the table.

Day	Hybrids	Total
Fri.	4	9
Sat.	_____	63
Sun.	32	_____

3. A baker uses 45 cups of flour and 72 cups of water for a recipe. The flour-to-water ratio is 45 : 72. How much water does the baker need if he uses only 5 cups of flour? Complete the table.

Flour	Water
45 cups	72 cups
5 cups	_____ cups

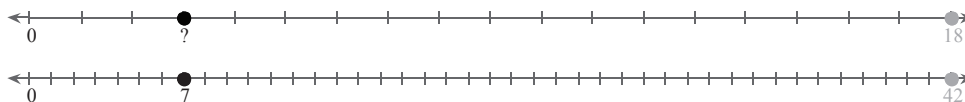
Double Number Lines



4. The ratio of the weight of zinc to the weight of all raw materials used by a factory is 18 : 42. How many tons of zinc would the factory use if it were to use 7 tons of raw materials? Complete the table.

Zinc	Raw Materials
18 tons	42 tons
_____ tons	7 tons

Double Number Lines



12. A school group orders 8 large pizzas for the members to eat after a meeting. The ratio of the number of cheese-pizza slices to the total number of pizza slices is 18 : 48.
- How many slices does each pizza have?
 - How many of the pizzas are cheese?
13. A small business makes ceramic figures. Some figures come out of the mold ready for painting. Other figures first need to have rough edges smoothed. Yesterday, the ratio of figures that were ready for painting to figures that needed smoothing was 3 : 7. Which numbers are possible for yesterday's production at the factory?
- 28 ready, 24 needed smoothing
 - 24 ready, 28 needed smoothing
 - 42 ready, 18 need smoothing
 - 18 ready, 42 need smoothing
14. **Challenge** A ten-speed bicycle has five sprockets on the rear wheel. It has two front sprockets by the pedals. The five rear sprockets have 21, 18, 15, 12, and 9 teeth. The two front sprockets have 36 and 27 teeth. For one gear setting, the ratio of the number of teeth on the front sprocket to the number of teeth on the rear sprocket is 12 : 7. How many teeth are on each sprocket for this setting?
15. **Challenge** In basketball, some baskets are worth two points. Others are worth three points. In one game, the ratio of three-point baskets to three-point tries for one team was 3 : 8. If the team scored 36 points from three-point baskets, how many three-point tries did the team have?

1. 28
21
2. 28
72
3. 8
4. 3
5. A, B, D
6. 6
7. 42
8. It is possible. Kyle must have 3 hits so far this season.
9. 24
10. a) A
b) D
11. a) Answers will vary
b) 24
12. a) 6
b) 3
13. D
14. 36 teeth on the front sprocket
21 teeth on the rear sprocket
15. 32

**Practice
10-4****Ratios as Fractions**

- In a bouquet of flowers, there are 4 daisies and 19 roses. Write the ratio of daisies to roses in three different ways.
- A jug of juice has 9 cups of pineapple juice and 8 cups of orange juice. Write the ratio of number of cups of pineapple juice to total number of cups of juice in three different ways.
- Write a ratio equivalent to $\frac{5}{6}$ that has greater terms.
- Write a ratio equivalent to $\frac{30}{75}$ that has lower terms.
- Which ratios are equivalent to $\frac{20}{90}$? Check all that apply.
 - A. $\frac{25}{95}$
 - B. $\frac{80}{360}$
 - C. $\frac{16}{72}$
 - D. $\frac{9}{2}$
 - E. $\frac{8}{36}$
 - F. No ratios here are equivalent to $\frac{20}{90}$
- Are the ratios $\frac{14}{35}$ and $\frac{20}{30}$ equivalent?
- Error Analysis** In a wildlife preserve, there are 4 zebras and 13 lions. Fred says you can write the ratios of lions to zebras as 13 to 4, 13 : 4, or $\frac{13}{4}$. Jane says you can write the ratio of lions to zebras as 13 to 4, 13 : 4, or $\frac{4}{13}$. Who is incorrect? What is the error?
- a) Reasoning** For any ratio, what process can you use to write an equivalent ratio with greater terms?
 - Write the ratio as a fraction. Divide the numerator by a whole number greater than 1. Then multiply the denominator by the same number.
 - Write the ratio as a fraction. Multiply the numerator by a whole number greater than 1. Then divide the denominator by the same number.
 - Write the ratio as a fraction. Multiply the numerator by a whole number greater than 1. Then multiply the denominator by the same number.
 - Write the ratio as a fraction. Divide the numerator by a whole number greater than 1. Then divide the denominator by the same number.**b) Explain your reasoning.**

9. In a serving of mixed vegetables, there are 30 peas and 18 pieces of corn. Check all ratios that are equivalent to the ratio of peas to corn in the given serving.
- A. $\frac{45}{27}$
- B. $\frac{3}{5}$
- C. $\frac{20}{12}$
- D. $\frac{50}{30}$
- E. $\frac{49}{14}$
- F. No ratios here are equivalent to the ratio of peas to corn.
10. **Cooking** In a cooking class, students are measuring ingredients for making a cake. The original recipe calls for 3 teaspoons of vanilla and 6 cups of flour. The students need to make the cake larger. They use 18 teaspoons of vanilla and 24 cups of flour. Is the ratio of teaspoons to cups for the new recipe the same as the original recipe?
11. **Multiple Representations** One day, the local hardware store sold 24 buckets of basic house paint and 11 buckets of ultimate house paint. A bucket of basic house paint uses 5 cans of white paint and 6 cans of color paint. For a bucket of basic house paint, which ratio of cans of color paint to cans of white paint, written in 3 different ways, is correct?
- A. 6 to 11, 6 : 11, and $\frac{6}{11}$.
- B. 5 to 24, 5 : 24, and $\frac{5}{24}$
- C. 5 to 6, 5 : 6, and $\frac{5}{6}$
- D. 24 to 5, 24 : 5, and $\frac{24}{5}$
- E. 6 to 5, 6 : 5, and $\frac{6}{5}$
- F. 11 to 6, 11 : 6, and $\frac{11}{6}$
12. **Personal Communication Fees** An Internet, telephone, and cable TV package plan costs \$85 each month. The Internet part of the bill is \$26. The telephone part of the bill is \$16. Which ratio of the Internet bill to the cable TV bill, written in 3 different ways, is correct?
- A. 26 to 43, 26 : 43, or $\frac{26}{43}$
- B. 26 to 59, 26 : 59, or $\frac{26}{59}$
- C. 43 to 16, 43 : 16, or $\frac{43}{16}$
- D. 59 to 26, 59 : 26, or $\frac{59}{26}$
- E. 16 to 43, 16 : 43, or $\frac{16}{43}$
- F. 43 to 26, 43 : 26, or $\frac{43}{26}$

13. The food stand at the fair sells small, medium, and large fruit drinks. The medium drink is made with 9 parts juice, 5 parts fruit, and 7 parts crushed ice.

- a) For a medium drink, what is the ratio of juice to fruit and crushed ice combined in simplified form?
- b) Which ratios are equivalent to the ratio of juice to fruit and crushed ice combined? Check all that apply.

A. $\frac{30}{48}$

E. $\frac{50}{80}$

B. $\frac{27}{36}$

- F. No ratios here are equivalent to the ratio of juice to fruit and crushed ice combined.

C. $\frac{24}{32}$

D. $\frac{36}{48}$

14. **Challenge** The area of a rectangle is its length times its width. A rectangular garden has a width of 4 feet and an area of 20 square feet.

- a) What is the ratio of the width of the garden to its length in simplest fraction form?
- b) Which choice shows your answer from the previous step in greater terms?

A. $\frac{60}{12}$

D. $\frac{15}{12}$

B. $\frac{60}{15}$

E. $\frac{15}{60}$

C. $\frac{12}{15}$

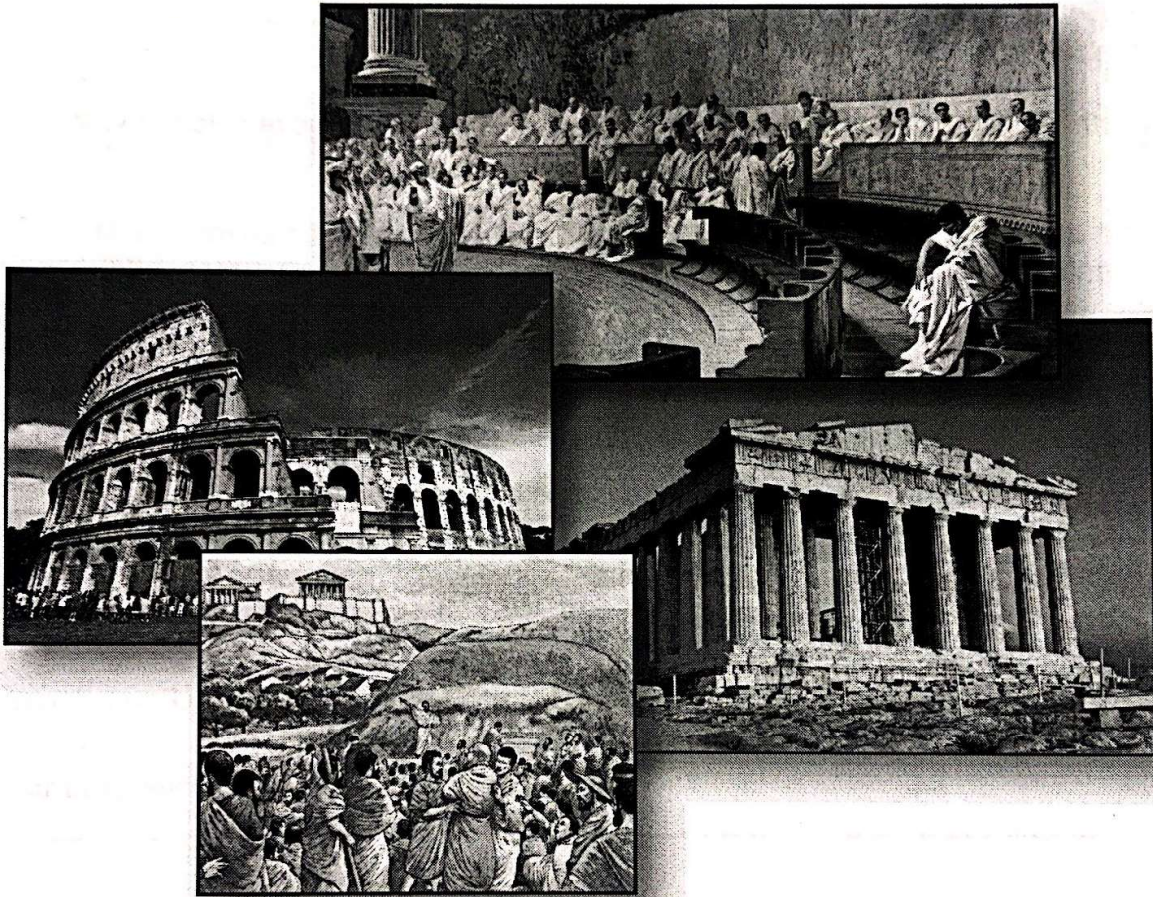
F. $\frac{12}{60}$

15. **Challenge** A company is mixing a new juice blend in two mixing vats. In the smaller vat, workers mix 3 parts Juice A, 6 parts Juice B, and 15 parts Juice C. In the larger vat, workers mix 4 parts Juice A, 12 parts Juice B, and 28 parts Juice C.

- a) Write the ratio of the amount of Juice A to total amount of juice in simplest fraction form for the smaller vat.
- b) Write the ratio of the amount of Juice A to total amount of juice in simplest fraction form for the larger vat.
- c) Are the ratios equivalent?

1. 4 to 19, 4 : 19, and $\frac{4}{19}$
2. 9 to 17, 9 : 17, and $\frac{9}{17}$
3. $\frac{15}{18}$
4. $\frac{10}{25}$
5. B, C, E
6. No
7. Jane
the terms of the ratio written as a fraction are in the wrong order
8. a) C
b) Answers will vary
9. A, C, D
10. No
11. E
12. A
13. a) $\frac{3}{4}$
b) B, C, D
14. a) $\frac{4}{5}$
b) C
15. a) $\frac{1}{8}$
b) $\frac{1}{11}$
c) No

Citizenship in Athens and Rome: Which Was the Better System?



Overview: The right to be a citizen of a country is not a modern idea. In fact, the laws for being a citizen in the United States today trace back thousands of years to ancient Athens and Rome. This Mini-Q looks at how citizenship worked in these two great early societies and asks you to decide which system was best.

The Documents:

Document A: Athens and Rome: Who Could Be a Citizen? (chart)

Document B: Citizenship in Athens

Document C: Citizenship in the Roman Republic

Document D: Controlling Citizenship in Athens and Rome

Document E: Participation in the Government of Athens

Document F: Participation in the Government of Rome

A Mini Document Based Question (Mini-Q)

Citizenship in Athens and Rome: Which Was the Better System?

About 500 BCE, on the Greek and Italian peninsulas of the Mediterranean Sea, a new idea began to take shape. This was the notion that people were **citizens** of a state or empire, and that being a citizen meant not only meeting certain responsibilities, but also enjoying certain rights. Before this time, in places like Egypt, Babylonia, and ancient China, individuals were generally regarded as **subjects**, not as citizens. Power was largely in the hands of a pharaoh, king, or emperor and the thousands of administrators who carried out the ruler's command. But by the sixth century BCE, a new idea was emerging: that ordinary people should play a more significant role in the life of the state, or nation.

Citizenship is a status, or standing, given by a government to some or all of its people. In the modern world, citizenship often involves a balance between individual rights, such as the right to vote, and individual responsibilities, such as the duty to serve one's country. This balance has been called the **social contract theory of citizenship**. The individual does his or her part; the nation or state does its part.

It is probably accurate to say that in the **city-state** of Athens, the emphasis was more on citizen responsibility than citizen rights. The great Athenian leader Pericles (495-429 BCE) said that Athenians who did not fully participate in voting, political debate, and holding office were "useless." The Greek **philosopher** Aristotle did him one better by declaring such Athenians to be beasts. It seems that many Athenians agreed. Participating in government and making

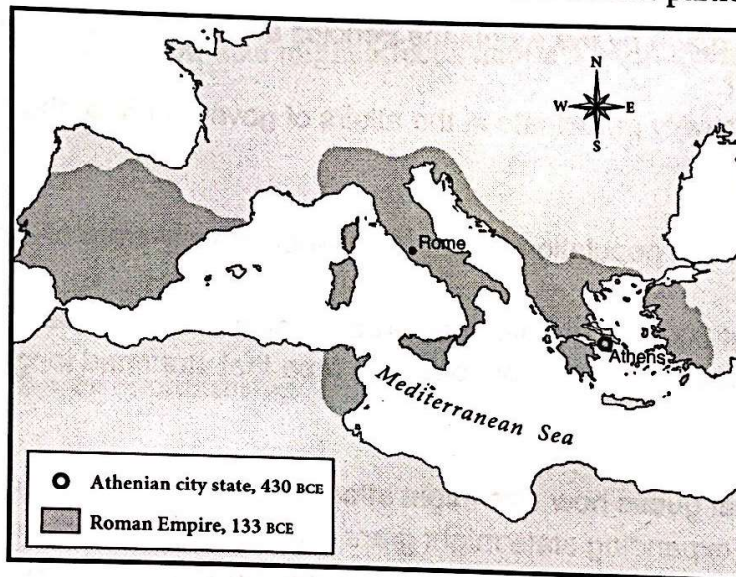
the city-state work was simply what good citizens should do. Citizenship was an action verb.

In Rome, the idea of a good citizen was a bit different. During the years of the Roman Republic, from 509 BCE until roughly 27 BCE, Roman citizenship qualifications and rights fluctuated but hovered around those described in this Mini-Q. Unlike Athenians, a Roman citizen was judged more by how he behaved with his family, his neighbors, and his property. A Roman citizen who did not participate in local government would not likely have been called a beast.

It is important to note that comparing Athens and Rome is in some ways like comparing a flea and an elephant. Athens in 400 BCE had a population of about 300,000, including slaves. The Roman

Empire had an estimated population in 1 CE of about 45,000,000, perhaps 15 percent of the world's population. Athens, a land-locked city-state, was about the size of Rhode Island. The **Roman Republic** (see map) was huge.

In both Athens and Rome, citizenship was something to be honored and protected. Not everyone could have it, and those who did had a special relationship to the state. The documents that follow should help deepen your understanding of how Athenians and Romans viewed the matter. Imagine life as a citizen of Athens and as a citizen of Rome. Then address the question: *Citizenship in Athens and Rome: Which was the better system?*



Background Essay Questions

1. What two Mediterranean societies are being compared? During what approximate time period?
2. The essay says that citizenship often strikes a balance between rights and responsibilities. Give an example of a citizen's rights and an example of his or her responsibilities.
3. What point was being made by the Athenians Pericles and Aristotle when they used the words "useless" and "beast"?
4. What was the difference in population and area between the city-state of Athens and the Roman Republic?
5. Can you make a logical guess how size might affect a nation's willingness to grant citizenship?
6. Define these terms:

citizen

subject

social contract theory of citizenship

city-state

philosopher

Roman Republic

