**Christina School District Assignment Board**

**Grade Level: 12th**

**Week of May 4th, 2020**

| | | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|---|---|---|---|---|---|---|
| **ELA** | | This week we will explore paradox, irony and how they convey satire. Read and complete the **Understanding Paradox** sheet. | Read and complete the **Cartoon Analysis Sheet** and **Design an Editorial Cartoon** sheet | Read the article ***Weighed Down By Too Much Cash?*** As you read, remember that when reading satire you are looking for the target, the techniques, and the reform. Underline the satirical elements and any paradoxes you find. | Complete the target chart below the text. | The writer of the ***Weighed Down By Too Much Cash?*** forgot to include a graphic for his editorial. A visual would really help to convey his message. Create a satirical cartoon that clearly conveys his target, and criticisms. |
| **Math** | **IM4** | *Geometric Series*<br><br>Answer "Which One Doesn't Belong?" and justify your choice. (attached) Read pages 119-120. Use the examples as a guide. Complete page 121 #1-8. (attached) | Review Concept Summary: Geometric Sequences and Series (attached), and complete Geometric Sequences and Series Worksheet 1 #1-3. (attached) | Complete Geometric Sequences and Series Worksheet 2 #1-9. (attached) Reference Concept Summary if needed. | Complete Geometric Sequences and Series Worksheet 2 #10-15. (attached) Reference Concept Summary if needed. | Complete Geometric Sequences and Series Worksheet 3. (attached) Reference Concept Summary if needed. |
| | **PreCalc** | *Using Fundamental Identities and Verifying Trigonometric Identities*<br><br>Review 5.1 and 5.2 | Use 5.1 and 5.2 PP notes and examples to complete Trig Identities Worksheet #11-22. (attached) | Use 5.1 and 5.2 PP notes and examples to complete Trig Identities Worksheet #23-31. (attached) | Use 5.1 and 5.2 PP notes and examples to complete Trig Identities Worksheet 3.4 #1-8. (attached) | Use 5.1 and 5.2 PP notes and examples to complete Trig Identities Worksheet 3.4 #9-16. (attached) |

**Christina School District Assignment Board**

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|---|---|---|---|---|---|---|
| | | PPs and examples to complete<br>Trig Identities<br>Worksheet #1-10.<br>(attached) | | | | |
| | **Calc** | *Estimating with Finite Sums* | | | | |
| **Science** | | **Ticker Tape Diagrams:**<br>Read section. Highlight, underline and/or annotate important information for understanding. | **Dot Diagrams:**<br>Read section. Highlight, underline and/or annotate important information for understanding. | **Check Your Understanding:**<br>Review information from previous 2 days as needed. Complete "Check Your Understanding". | **Vector Diagrams:**<br>Read section. Highlight, underline and/or annotate important information for understanding. | **The Meaning of Shape for a [-t graph:**<br>Read section. Highlight, underline and/or annotate important information for understanding. |
| **Social Studies** | | Complete Activity 3, the Conclusion, from the document titled, "US Soldiers in the Philippines"<br>NOTE: You should have this document from last week (Week 4 - of April 27) | Complete Activity 4, the Debrief, from the document titled, "US Soldiers in the Philippines"<br>NOTE: You should have this document from last week (Week 4 - of April 27) | Complete Activity 1, Analyze Questions 1-8 from the document titled, "Drafting America" | Complete Activity 1, Additional Questions, from the document titled, "Drafting America" | Complete Activity 2, Analyze Questions 1-8 from the document titled, "Drafting America"<br>NOTE: The rest of the activities will be on next week's CSD Assignment Board (Week 6 of May 11) |

# Understanding Paradox

**Paradox Definition**

The term paradox is from the Greek word *paradoxon,* which means "contrary to expectations, existing belief, or perceived opinion." It is a statement that appears to be self-contradictory or silly, but which may include a hint of truth. It is also used to illustrate an opinion or statement contrary to accepted traditional ideas. A paradox is often used to make a reader think over an idea in innovative way.

**Examples of Paradox**

- Your enemy's friend is your enemy.
- I am nobody.
- "What a pity that youth must be wasted on the young." – George Bernard Shaw
- Wise fool
- Truth is honey, which is bitter.
- "I can resist anything but temptation." – Oscar Wilde
- From the above examples of paradox, we can say that paradox creates a humorous effect on the readers because of its ridiculousness.

**STOP** Can you explain why each of these statements are a paradox?

**Examples of Paradox in Literature**

In literature, paradox is not just a clever or comical statement or use of words. Paradox has serious implications because it makes statements that often summarize the major themes of the work they are used in. Let us analyze some paradox examples from some famous literary works:

- Example #1: Animal Farm (By George Orwell)

  In George Orwell's Animal Farm, one part of the cardinal rule is this statement:

  "All animals are equal, but some are more equal than others."

This statement seems to not make any sense. However, on closer examination, it becomes clear that Orwell points out a political truth. The government in the novel claims that everyone is equal, but it has never treated everyone equally. It is the concept of equality stated in this paradox that is opposite to the common belief of equality.

- Example #2: Hamlet (By William Shakespeare)

  In William Shakespeare's famous play Hamlet, the protagonist Hamlet says:

  "I must be cruel to be kind."

This announcement does not seem to make sense. How can an individual treat others kindly even when he is cruel? However, Hamlet is talking about his mother, and how he intends to kill Claudius to avenge his father's death.

This act of Hamlet will be a tragedy for his mother, who is married to Claudius. Hamlet does not want his mother to be the beloved of his father's murderer any longer, and so he thinks that the murder will be good for his mother.

- Example #3: Romeo and Juliet (By William Shakespeare)

  From William Shakespeare's The Tragedy of Romeo and Juliet:

  "The earth that's nature's mother is her tomb;

  What is her burying grave, that is Rainbow in her womb…"

The contradictory ideas of the earth being the birthplace and a graveyard make these lines paradoxical.

- Example #4: My Heart Leaps Up When I Behold (By William Wordsworth)

  In his short lyric My Heart Leaps Up When I Behold, William Wordsworth remembers the joys of his past and says:

  "The child is father of the man…"

This statement has a seemingly incorrect supposition, but when we look deep into its meaning, we see the truth. The poet is saying that the childhood experiences become the basis for all adult occurrences. The childhood of a person shapes his life, and consequently "fathers" or creates the grown-up adult. So, "The child is father of the man."

**Function of Paradox**

The above reading may bring out the question, "Why is paradox used when a message can be conveyed in a straightforward and simple manner?" The answer lies in the nature and purpose of literature. One function of literature is to make the readers enjoy reading. Readers enjoy more when they extract the hidden meanings out of the writing rather than something presented to them in an uncomplicated manner. Thus, the chief purpose of a paradox is to give pleasure.

In poetry, the use of paradox is not confined to mere wit and pleasure; rather, it becomes an integral part of poetic diction. Poets usually make use of paradox to create a remarkable thought or image out of words.

Some types of paradox in poetry are meant to communicate a tone of irony to its readers as well as lead their thoughts to the immediate subject. Paradox in most poems normally strives to create feelings of intrigue and interest in readers' minds, to make them think deeper and harder to enjoy the real message of the poem.

**Recall**

**Irony** is saying something and meaning the opposite, or an outcome that is the opposite of what I expected.

**Paradox** is _____

Explain how the two are similar but different.

_____
_____
_____
_____
_____
_____
_____
_____

## Practice. Identify the Paradox

Write the letter of the paradox in the blank for each group of sentences below.

_____1.

A) The clouds drifted lazily in the sky.
B) The person who wrote that book can’t write.
C) The clown fish swam comically in the aquarium.
D) I was confused by the lesson.

_____2.

A) She is an awfully good singer.
B) The blank page stared back at me.
C) It was the best of times; it was the worst of times.
D) They danced in the moonlight.

_____3.

A) Whose turn is it?
B) Robert carefully built a model of the ship.
C) Remember to take out the trash.
D) If you want peace, you must prepare for war.

_____4.

A) The best advice I have for you is: don’t listen to advice.
B) The rains came.
C) Parting is such sweet sorrow.
D) She cared for him all his life.

_____5.

A) The dress cost a million dollars.
B) I’d rather be lucky than smart.
C) It’s twelve minutes until midnight.
D) She stood in the empty room.

**Cartoon Analysis**

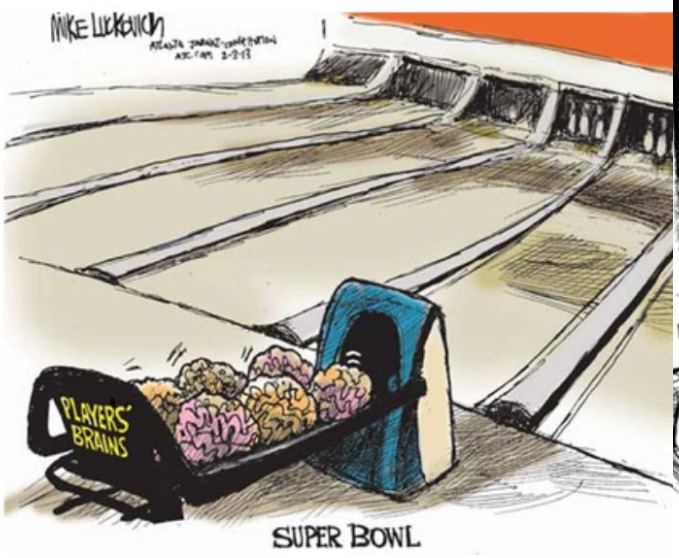
Use the following questions to analyze the cartoons. Write your answers in the margins or on a separate sheet.

- Who/what does the cartoon target?
- What technique does the cartoonist use to satirize the target?
- What reform does the cartoonist want?



"I got in trouble at school today.
I got an A on my test and they said it was unfair to the kids who didn't study as hard."

What message about head trauma does this cartoon suggest?




# Designing an Editorial Cartoon

**Step 1: Brainstorm**

1. What do you think the cartoon is criticizing?
2. Who might be its target? What evidence do you have to support your response?
3. What satirical techniques do you see being used to create this criticism? That is, how does the cartoonist create criticism? Explain.

## Designing an Editorial Cartoon

Creation of a satire requires three steps:

1. Identify a target.
2. Identify aspects of that target worthy of ridicule.
3. Use the satirical techniques (exaggeration, understatement, incongruity, absurdity, irony and parody) to call attention to those aspects.

You will use these steps to create a rough draft of an editorial cartoon.

Come up with 9 possible targets for a satirical cartoon. Your targets do not need to be national, political targets. Think local and small. What annoys you on a daily basis? Or you could think of pop culture. However, avoid personal attacks on private citizens. It is acceptable to target a group or an organization.

| | | |
|---|---|---|
| Example<br>**Girls on Instagram** | | |
| | | |
| | | |

**Step 2:** Select three of your potential targets and brainstorm three aspects/characteristics of the target worthy of ridicule.

| **Target 1** | **Target 2** | **Target 3** |
|---|---|---|
| | | |
| | | |
| | | |

**Step 3:** Choose your target and create a satirical cartoon

# WEIGHED DOWN BY TOO MUCH CASH? DON'T WORRY, I'M HERE TO HELP.

Jul 10, 2012

**Rick Reilly Columnist, ESPN.com**

CONGRATS, NEWLY MINTED NBA ROOKIE!

Now you've been drafted. Next comes the delicious multimillion-dollar contract. And that's when you must do what most NBA players do: start going through cash like Jack Black through the Keebler factory.

Filing for bankruptcy is a long-standing tradition for NBA players, 60% of whom, according to the Toronto Star, are broke five years after they retire. The other 40% deliver the Toronto Star.

It's not just NBA players who have the fiscal sense of the Taco Bell Chihuahua. All kinds of athletes wind up with nothing but lint in their pockets. And if everyone from Johnny Unitas to Sheryl Swoopes to Lawrence Taylor can do it, so can you! With my How to Go Bankrupt* DVD series, it's a layup to go belly-up!

**Ten essentials, just to get you started:**

**1. Screw up, deny it, then fight by using every lawyer and dime you have.** Roger Clemens just sold his Bentley, reportedly to pay legal bills. Marion Jones lawyered herself broke before she finally copped and went to prison. Paging Mr. Bonds, Mr. Barry Bonds.

**2. Buy a house the size of Delaware.** Evander Holyfield was in danger of losing his 54,000-square-foot pad outside Atlanta, and it's a shame. He had almost visited all 109 rooms!

**3. Buy many, many cars.** Baseball slugger Jack Clark had 18 cars and owed money on 17 when he went broke. And don't get just boring Porsches and Mercedes. Go for Maybachs. They sell for as much as $375,000-even though they look like Chrysler 300s-and nobody will ever know how to pronounce them, much less fix them.

**4. Buy a jet.** They burn money like the Pentagon. Do you realize it costs $50,000 just to fix the windshield on one? Scottie Pippen borrowed $4,375 million to buy some wings and spent God knows how much more for insurance, pilots and fuel. Finally, his wallet cried uncle. The courts say he still owes $5 million, including interest. See you in coach, Scottie!

(For that matter, why not a yacht? Latrell Sprewell kept his 70-foot Italian-made yacht tied up in storage until the bank repossessed it, in August 2007. He probably sat at home and cried about that-until the bank foreclosed on his house, this past May.)

**5. Spend stupid money on other really stupid stuff.** In going from $300 million up to $27 million down, Mike Tyson once spent $9,180 in two months to care for his white tiger. That's why Iron Mike's picture is on our logo!

**6. Hire an agent who sniffs a lot and/or is constantly checking the scores on his BlackBerry.** Those are the kinds of guys who will suck up your dough like a street-sweeper. Ex-Knick Mark Jackson once had a business manager he thought he could trust. Turned out the guy was forging Jackson's signature on checks-an estimated $2.6 million worth- to feed a gambling jones. "And it wasn't like I was a rookie-I was a veteran," Jackson says. The only reason he says he's getting some money back is because he didn't ...

**7. Sign over power of attorney. What's it mean?** Who cares? Just sign! The guy you're signing it over to knows. And while you play Xbox, he'll be buying large portions of Switzerland for himself. Kareem Abdul-Jabbar let an agent named Tom Collins have power of attorney once, and it cost Kareem $9 million before he figured it out.

**8. Spend like the checks will never stop.** Also known as the Darren McCarty method. Despite earning $2.1 million a year, Red Wing McCarty, who started a rock band called Grinder, went splat by investing in everything but fur socks ($490,000 in unlikely-to-be-repaid loans) and gambling large ($185,000 in casino markers). In other words, a Tuesday for John Daly.

**9. Just ball.** Don't write your own checks. Don't drive your own car. Don't raise your own kids. Just be a tall slab of skilled meat for others to feast on. Not to worry. It'll be over before you know it.

**10. Most of all, set up a huge support system around you.** It'll be years before you'll realize they call it a support system because you're the only one supporting it. They're all on full-ride scholarships at the University of You. "Guys go broke because they surround themselves with people who help them go broke," says ex-NBA center Danny Schayes, who now runs No Limits Investing in Phoenix. "I know all-time NBA, top-50 guys who sold their trophies to recover."

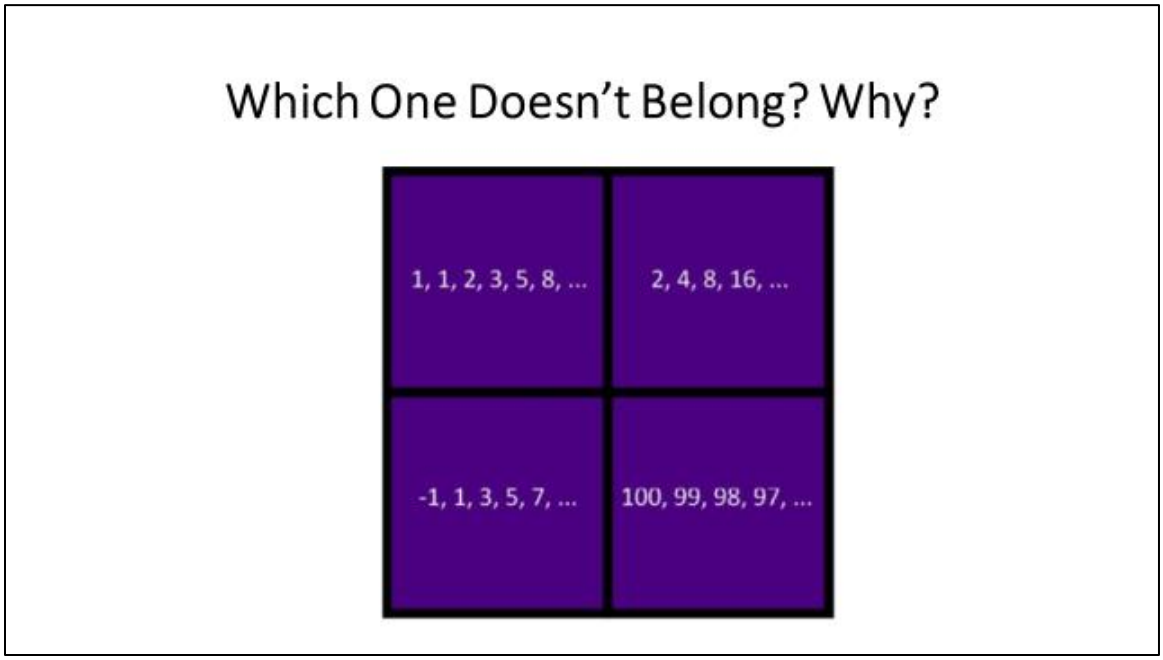
See, kid? You can be a top-50 guy! So order my How to Go Bankrupt series now, and get this empty refrigerator box to sleep in, absolutely free!

**Review your annotations. In the chart identify the target and the criticism. If you need more space use a separate sheet.**

| Target | Line ( direct quote and line number) | Analysis (what is the criticism?) |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**IM4 – Week of May 4th**

**Geometric Series**



Just as arithmetic sequences lead us to arithmetic series (the sum of the terms of the arithmetic sequence), geometric sequences lead us to geometric series as well. In these sections students develop a formula to find the sum of geometric series, write geometric series with summation notation, and explore infinite geometric series. See the Math Notes box in Lesson 10.2.2 for more information.

## Example 1

Write the series $32+16+8+\ldots+\frac{1}{16}$ in summation notation and find the sum.

Since each term of this series is one-half the preceding term, this is a geometric series. The formula for the $n^{\text{th}}$ term of this series is $32\left(\frac{1}{2}\right)^{n-1}$.

To write it in summation notation, we just need to determine how many terms are in this series. We could write out all the terms and count them, but instead we will use the formula for the $n^{\text{th}}$ term, and solve for $n$.

$$\frac{1}{16}=32\left(\frac{1}{2}\right)^{n-1}$$
$$\frac{1}{512}=\left(\frac{1}{2}\right)^{n-1}$$
$$512=2^{n-1}$$
$$2^9=2^{n-1}$$
$$9=n-1$$
$$n=10$$

Therefore, we can write: $\sum_{k=1}^{10} 32\left(\frac{1}{2}\right)^{k-1}$

To find the sum, we will use the formula(s) that students developed in class for the sum of the first $n$ terms of a geometric series. Note: The two given formulas are equivalent.

$$S(n)=\frac{r\cdot t(n)-t(1)}{r-1} \quad \text{or} \quad S(n)=\frac{a(1-r^n)}{1-r}$$

Here we can write:

$$S(10)=\frac{\left(\frac{1}{2}\right)\left(\frac{1}{16}\right)-32}{\frac{1}{2}-1}$$
$$=\frac{\frac{1}{32}-32}{-\frac{1}{2}}$$
$$=\frac{-\frac{1023}{32}}{-\frac{1}{2}}$$
$$=\frac{1023}{16}=63.9375$$

or

$$S(10)=\frac{32\left(1-\left(\frac{1}{2}\right)^{10}\right)}{1-\frac{1}{2}}$$
$$=\frac{32\left(1-\frac{1}{1024}\right)}{\frac{1}{2}}$$
$$=\frac{32\left(\frac{1023}{1024}\right)}{\frac{1}{2}}$$
$$=\frac{\frac{1023}{32}}{\frac{1}{2}}$$
$$=\frac{1023}{16}=63.9375$$

## Example 2

Expand and find the sum of the geometric series: $\sum_{k-1}^{12} 3(4)^{k-1}$

Letting the index $k$ run through its values gives the series:

$$3 + 12 + 48 + 192 + 768 + \ldots + 12{,}582{,}912.$$

We will use the formula from the previous example to find the sum.

$$S(12) = \frac{4(12582912)-3}{4-1}$$
$$= \frac{50331645}{3}$$
$$= 16,777,215$$

## Example 3

Find the sum of each infinite geometric series.

a. $81 + 27 + 9 + 3 + \ldots$ b. $\sum_{k=1}^{\infty} 25\left(\frac{1}{5}\right)^{k-1}$

If the common ratio in an infinite geometric series is between –1 and 1, the series does in fact equal a number, even though the series goes on forever. The sum is given by the formula:

$$S = \frac{t(1)}{1-r} = \frac{a}{1-r}.$$

In part (a) the common ratio is $\frac{1}{3}$, therefore:

$$S = \frac{81}{1-\frac{1}{3}}$$
$$= \frac{81}{\frac{2}{3}}$$
$$= \frac{243}{2}$$
$$= 121.5$$

For part (b), the first term, $t(1) = 25$, and the common ratio, $r$, is $\frac{1}{5}$. Therefore:

$$S = \frac{25}{1-\frac{1}{5}}$$
$$= \frac{25}{\frac{4}{5}}$$
$$= \frac{125}{4}$$
$$= 31.25$$

## Problems

Expand and find the sum of each geometric series.

1. $\sum_{k=1}^{6} 2 \cdot 3^{k-1}$

2. $\sum_{k=1}^{8} 1.07^{k}$

3. $\sum_{k=1}^{4} 5 \cdot 3^{k}$

4. $\sum_{k=1}^{\infty} \left(\frac{2}{5}\right)^{k}$

Write each series using summation notation and find the sum.

5. $2 + 10 + 50 + 250 + \ldots + 19{,}531{,}250$

6. $1 + 3 + 9 + 27 + \ldots + 59{,}049$

7. $500 + 100 + 20 + \ldots + 0.0000512$

8. $88 + 44 + 22 + \ldots$



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In a geometric sequence, the ratio defined by a term divided by the previous term is a constant, $r$. Alternately, any term in a geometric sequence multiplied by $r$ gives the next term.

The sequence 1, 5, 25, 125, 625, … is a geometric sequence, since $r = 5$.

| WORDS | ALGEBRA | EXAMPLE |
|---|---|---|
| Each term in the sequence is $r$ times the previous term. | The recursive definition for a geometric sequence is $a_n = \begin{cases} a_1, & n = 1 \\ a_{n-1} \cdot r, & n > 1 \end{cases}$ | $a_n = \begin{cases} 1 & n = 1 \\ 5a_{n-1}, & n > 1 \end{cases}$ |
| The fourth term in a sequence is the first term multiplied by three common ratios. | The explicit definition is $a_n = a_1 r^{n-1}$ | $a_n = 1(5)^{n-1}$ |
| You can find the sum of a certain number of terms in a geometric series. | For a finite geometric series with $r \neq 1$ $\sum_{m=1}^{n} a_1 r^{m-1} = \frac{a_1(1 - r^n)}{(1 - r)}$. | The sum of the first five terms is $\frac{1(1 - 5^5)}{1 - 5} = \frac{-3{,}124}{-4} = 781$ |

# Geometric Sequences and Series Worksheet 1

**1.** Complete the table to find the common ratio of the geometric sequence. Then, use the table to answer the questions.

| Term Number | Term | Common Ratio ($r$) $\left(\frac{\text{term in row}}{\text{term in previous row}}\right)$ |
|---|---|---|
| 1 | $a_1 = 3$ | No previous term. |
| 2 | $a_2 = 6$ | $\frac{6}{3} = 2$ |
| 3 | $a_3 = 12$ | $\frac{12}{6} =$ |
| 4 | $a_4 = 24$ | $\frac{24}{12} =$ |

**a.** If the common ratio is equal for each term, then the sequence is geometric. Is this a geometric sequence? Circle the correct answer. Yes No

**b.** The first term number is $n$. Circle $n$ in the table. The term is $a_1$. What is the value of $a_1$? _____

**c.** What is the recursive definition if $a_n = \begin{cases} a_1, \text{ if } n = n \\ a_{n-1}(r), \text{ if } n > n \end{cases}$?

$$a_n = \begin{cases} \_\_\_\_\_, \text{ if } n = \_\_\_\_\_ \\ a_{n-1}(\_\_\_\_\_), \text{ if } n > \_\_\_\_\_ \end{cases}$$

**2.** Leo says that the missing number in the geometric sequence 30, _____, 120 is 90. Is he correct? What should the number be?

**3.** The sum of a geometric series is 1,456. The first term of the series is 4, and its common ratio is 3. How many terms are in the series?

# Geometric Sequences and Series Worksheet 2

**Is the sequence geometric? If so, write a recursive definition for the sequence.**

**1.** 3, 9, 27, 81, …

**2.** 4, 8, 12, 16, ...

**3.** 1, 0.5, 0.25, 0.125, ...

**Translate between the recursive and explicit definitions for each sequence.**

**4.** $a_n = \begin{cases} 5, \text{ if } n = 1 \\ a_{n-1}(4), \text{ if } n > 1 \end{cases}$

**5.** $a_n = \frac{2}{3}(7)^{n-1}$

**6.** $a_n = \begin{cases} 2, \text{ if } n = 1 \\ a_{n-1}\left(\frac{3}{4}\right), \text{ if } n > 1 \end{cases}$

**Write the expansion of each series. What is the sum?**

**7.** $\sum_{n=1}^{5} 3(2)^{n-1}$

**8.** $\sum_{n=1}^{6} 5(3)^{n-1}$

**9.** $\sum_{n=1}^{4} 4\left(\frac{1}{2}\right)^{n-1}$

**How many terms are in the geometric series?**

**10.** $75 + 300 + 1200 + \ldots + 4{,}915{,}200$

**11.** $20 + 60 + 180 + \ldots + 1{,}180{,}980$

**12.** $400 + 100 + \ldots + 0.391$

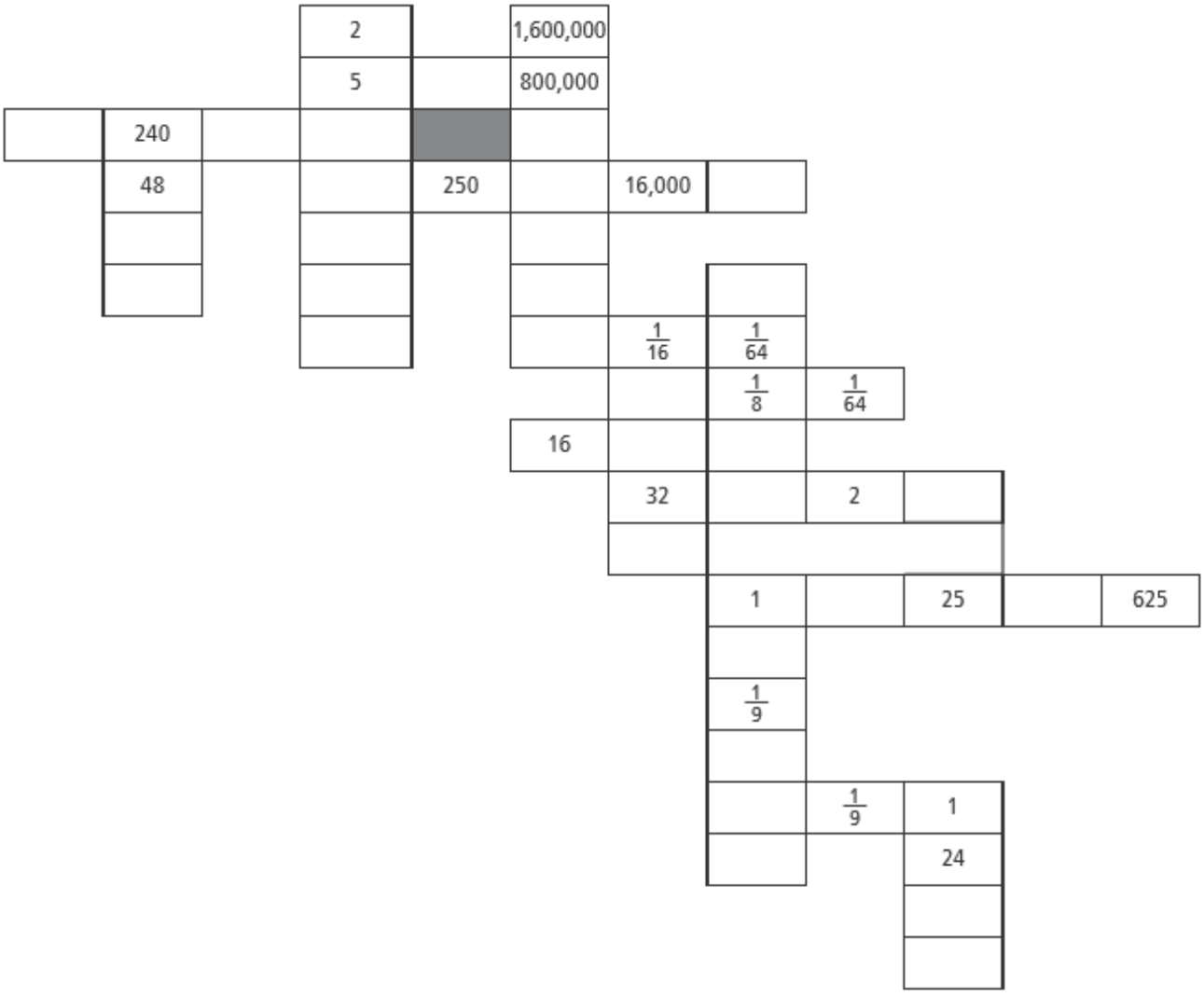
**13.** The sum of a geometric series is 2,351,461. The first term of the series is 7 and its common ratio is 6. How many terms are in the series?

**14.** What is the monthly payment for a $32,000 loan for 5 years with an annual interest rate of 5.4%?

**15.** A geometric sequence can be used to describe the population of rabbits on a farm. The first spring, the farmer purchased 8 rabbits. Five years later, there are 648 rabbits at the farm. Assuming that none of the rabbits leave the farm, how many rabbits were on the farm in year 3?

# Geometric Sequences and Series Worksheet 3

Find the common ratio between the terms going horizontally and vertically on the table. Then complete the table for the missing terms.



# 5.1 Introduction

**Fundamental Trigonometric Identities**

*Reciprocal Identities*

$$\sin u = \frac{1}{\csc u} \qquad \cos u = \frac{1}{\sec u} \qquad \tan u = \frac{1}{\cot u}$$

$$\csc u = \frac{1}{\sin u} \qquad \sec u = \frac{1}{\cos u} \qquad \cot u = \frac{1}{\tan u}$$

*Quotient Identities*

$$\tan u = \frac{\sin u}{\cos u} \qquad \cot u = \frac{\cos u}{\sin u}$$

*Pythagorean Identities*

$$\sin^2 u + \cos^2 u = 1$$

$$1 + \tan^2 u = \sec^2 u$$

$$1 + \cot^2 u = \csc^2 u$$



# 5.1 Introduction

**Fundamental Trigonometric Identities**

*Cofunction Identities*

$$\sin\left(\frac{\pi}{2} - u\right) = \cos u \qquad \cos\left(\frac{\pi}{2} - u\right) = \sin u$$

$$\tan\left(\frac{\pi}{2} - u\right) = \cot u \qquad \cot\left(\frac{\pi}{2} - u\right) = \tan u$$

$$\sec\left(\frac{\pi}{2} - u\right) = \csc u \qquad \csc\left(\frac{\pi}{2} - u\right) = \sec u$$

*Even/Odd Identities*

$$\sin(-u) = -\sin u \qquad \csc(-u) = -\csc u$$

$$\cos(-u) = \cos u \qquad \sec(-u) = \sec u$$

$$\tan(-u) = -\tan u \qquad \cot(-u) = -\cot u$$



# 5.1 Sum and Difference Formulas

**Sum and Difference Formulas**

$$\sin(u + v) = \sin u \cos v + \cos u \sin v \qquad \tan(u + v) = \frac{\tan u + \tan v}{1 - \tan u \tan v}$$

$$\sin(u - v) = \sin u \cos v - \cos u \sin v$$

$$\cos(u + v) = \cos u \cos v - \sin u \sin v \qquad \tan(u - v) = \frac{\tan u - \tan v}{1 + \tan u \tan v}$$

$$\cos(u - v) = \cos u \cos v + \sin u \sin v$$



# 5.1 Using the Fundamental Identities

One common use of trigonometric identities is to use given values of trigonometric functions to evaluate other trigonometric functions.

## 5.1 Example 1 – *Using Identities to Evaluate a Function*

Use the values $\sec u = -\frac{3}{2}$ and $\tan u > 0$ to find the values of all six trigonometric functions.

Solution:

Using a reciprocal identity, you have

$$\cos u = \frac{1}{\sec u}$$

$$= \frac{1}{-3/2}$$

$$= -\frac{2}{3}.$$



## 5.1 Example 1 – *Solution* cont'd

Using a Pythagorean identity, you have

$\sin^2 u = 1 - \cos^2 u$ Pythagorean identity

$= 1 - \left(-\frac{2}{3}\right)^2$ Substitute $-\frac{2}{3}$ for $\cos u$.

$= 1 - \frac{4}{9}$ Evaluate power.

$= \frac{5}{9}.$ Simplify.

Because sec u < 0 and tan u > 0, it follows that u lies in Quadrant III.



## 5.1 Example 1 – *Solution* cont'd

Moreover, because sin $u$ is negative when $u$ is in Quadrant III, you can choose the negative root and obtain $\sin u = -\sqrt{5}/3$.

Now, knowing the values of the sine and cosine, you can find the values of all six trigonometric functions.

$$\sin u = -\frac{\sqrt{5}}{3} \qquad \csc u = \frac{1}{\sin u} = -\frac{3}{\sqrt{5}} = -\frac{3\sqrt{5}}{5}$$

$$\cos u = -\frac{2}{3} \qquad \sec u = \frac{1}{\cos u} = -\frac{3}{2}$$

$$\tan u = \frac{\sin u}{\cos u} = \frac{-\sqrt{5}/3}{-2/3} = \frac{\sqrt{5}}{2} \qquad \cot u = \frac{1}{\tan u} = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$



## 5.2 Verifying Trigonometric Identities

In this section, you will study techniques for verifying trigonometric identities. In the next section, you will study techniques for solving trigonometric equations.

The key to both verifying identities *and* solving equations is your ability to use the fundamental identities and the rules of algebra to rewrite trigonometric expressions.

Remember that a *conditional equation* is an equation that is true for only some of the values in its domain.

# 5.2 Verifying Trigonometric Identities

For example, the conditional equation

$\sin x = 0$ Conditional equation

is true only for

$x = n\pi$

where $n$ is an integer. When you find these values, you are *solving* the equation.



# 5.2 Verifying Trigonometric Identities

On the other hand, an equation that is true for all real values in the domain of the variable is an *identity*.

For example, the familiar equation

$\sin^2 x = 1 - \cos^2 x$ Identity

is true for all real numbers $x$. So, it is an identity.



# 5.2 Verifying Trigonometric Identities

**Guidelines for Verifying Trigonometric Identities**

1. Work with one side of the equation at a time. It is often better to work with the more complicated side first.
2. Look for opportunities to factor an expression, add fractions, square a binomial, or create a monomial denominator.
3. Look for opportunities to use the fundamental identities. Note which functions are in the final expression you want. Sines and cosines pair up well, as do secants and tangents, and cosecants and cotangents.
4. When the preceding guidelines do not help, try converting all terms to sines and cosines.
5. Always try *something*. Even making an attempt that leads to a dead end provides insight.



# 5.2 Example 1 – *Verifying a Trigonometric Identity*

Verify the identity.

$$\frac{\sec^2\theta - 1}{\sec^2\theta} = \sin^2\theta$$

## Solution:

Because the left side is more complicated, start with it.

$$\frac{\sec^2\theta - 1}{\sec^2\theta} = \frac{(\tan^2\theta + 1) - 1}{\sec^2\theta}$$ Pythagorean identity

# 5.2 Example 1 – *Solution* cont'd

$= \dfrac{\tan^2\theta}{\sec^2\theta}$ Simplify.

$= \tan^2\theta\,(\cos^2\theta)$ Reciprocal identity

$= \dfrac{\sin^2\theta}{\cos^2\theta}(\cos^2\theta)$ Quotient identity

$= \sin^2\theta$ Simplify.



# Trig Identities Notes

***Pythagorean Identities***

$\sin^2 x + \cos^2 x = 1$

$1 + \tan^2 x = \sec^2 x$

$1 + \cot^2 x = \csc^2 x$

***Quotient Identities***

$\tan x = \dfrac{\sin x}{\cos x}$ $\quad \cot x = \dfrac{\cos x}{\sin x}$

***Even-Odd Identities***

$\sin(-x) = -\sin(x)$ $\quad \csc(-x) = -\csc(x)$

$\cos(-x) = \cos(x)$ $\quad \sec(-x) = \sec(x)$

$\tan(-x) = -\tan x$ $\quad \cot(-x) = -\cot x$



# Trig Identities Notes

***Sum-Difference Formulas***

$\sin(x+y) = \sin x\cos y + \sin y\cos x$

$\sin(x-y) = \sin x\cos y - \sin y\cos x$

$\cos(x+y) = \cos x\cos y - \sin x\sin y$

$\cos(x-y) = \cos x\cos y + \sin x\sin y$

$\tan(x+y) = \dfrac{\tan x + \tan y}{1 - \tan x\tan y}$

$\tan(x-y) = \dfrac{\tan x - \tan y}{1 + \tan x\tan y}$

***Double Angle Formulas***

$\sin(2x) = 2\sin x\cos x$

$\cos(2x) = \cos^2 x - \sin^2 x$

$\cos(2x) = 1 - 2\sin^2 x$

$\cos(2x) = 2\cos^2 x - 1$

$\tan(2x) = \dfrac{2\tan(x)}{1 - \tan^2 x}$



Pre-Calculus

WS Trig Identities

I. For the following problems, match the trigonometric expression with one of the following.

a) $-1$ b) $\cos x$ c) $\cot x$

d) $1$ e) $-\tan x$ f) $\sin x$

5. $\csc x \sin x$ 6. $\tan x \cos x$ 7. $\tan^2 x - \sec^2 x$

8. $(1-\sin^2 x)(\sec x)$ 9. $\dfrac{\sin(-x)}{\cos(-x)}$ 10. $\dfrac{\sin\left[(\pi/2)-x\right]}{\cos\left[(\pi/2)-x\right]}$

II. For the following problems, match the trigonometric expression with one of the following.

a) $\csc x$ b) $\cot x$ c) $\cos^2 x$

d) $\sin x \tan x$ e) $\sec^2 x$ f) $\sec^2 x + \tan^2 x$

11. $\cos x \csc x$ 12. $\sin^2 x(\csc^2 x - 1)$ 13. $\sec^4 x - \tan^4 x$

14. $\cot x \sec x$ 15. $\dfrac{\sec^2 x - 1}{\sin^2 x}$ 16. $\dfrac{\cos^2\left[(\pi/2)-x\right]}{\cos x}$

III. For the following problems, factor the expression and use the fundamental identities to simplify.

17. $\cot^2 x - \cot^2 x \cos^2 x$ 18. $\sin^2 x \sec^2 x - \sin^2 x$

19. $\tan^4 x + 2\tan^2 x + 1$ 20. $\sin^4 x - \cos^4 x$

IV. For the following problems, perform the multiplication and use the fundamental identities to simplify.

21. $(\sin x + \cos x)^2$ 22. $(\sec x + 1)(\sec x - 1)$

# WS Trig Identities cont.

V. For the following problems, perform the addition or subtraction and use the fundamental identities to simplify.

23. $\frac{1}{1+\cos x}+\frac{1}{1-\cos x}$

24. $\frac{\cos x}{1+\sin x}+\frac{1+\sin x}{\cos x}$

VI. For the following problems, simplify the expression so that it is *not* a fraction.

25. $\frac{\sin^2 y}{1-\cos y}$

VII. For the following problems, verify the identity algebraically. Then use a graphing utility to check your result graphically.

26. $\frac{\csc\theta}{\sec\theta}+\frac{\cos\theta}{\sin\theta}=2\cot\theta$

27. $1-\frac{\sin^2\theta}{1-\cos\theta}=-\cos\theta$

28. $\frac{\cot(-\theta)}{\csc\theta}=-\cos\theta$

29. $\sin\theta+\cos\theta\cot\theta=\csc\theta$

30. $\frac{\cos\theta}{1-\sin\theta}=\sec\theta+\tan\theta$

31. $\frac{\sin\theta}{\csc\theta}+\frac{\cos\theta}{\sec\theta}=1$

32. $\frac{1+\cos\theta}{\sin\theta}+\frac{\sin\theta}{1+\cos\theta}=2\csc\theta$



**Trig Identities worksheet 3.4 name:**

**Prove each identity:**

1. $\sec x-\tan x\sin x=\frac{1}{\sec x}$

2. $\frac{1+\cos x}{\sin x}=\csc x+\cot x$

3. $\frac{\sec\theta\sin\theta}{\tan\theta+\cot\theta}=\sin^2\theta$

4. $\frac{\sec\theta}{\cos\theta}-\frac{\tan\theta}{\cot\theta}=1$

5. $\cos^2 y-\sin^2 y=1-2\sin^2 y$

6. $\csc^2\theta\tan^2\theta-1=\tan^2\theta$

7. $\frac{\sec^2\theta}{\sec^2\theta-1}=\csc^2\theta$

8. $\tan^2 x\sin^2 x=\tan^2 x-\sin^2 x$

9. $(\sin\theta+\cos\theta)^2+(\sin\theta-\cos\theta)^2=2$

10. $(\sin\theta+\cos\theta)(\tan\theta+\cot\theta)=\sec\theta+\csc\theta$

11. $\frac{\tan\theta-1}{\tan\theta+1}=\frac{1-\cot\theta}{1+\cot\theta}$

12. $\frac{1-\tan^2 x}{1+\tan^2 x}=1-2\sin^2 x$

13. $\frac{\cos x+1}{\sin^3 x}=\frac{\csc x}{1-\cos x}$

14. $\csc^4 x-\cot^4 x=\csc^2 x+\cot^2 x$

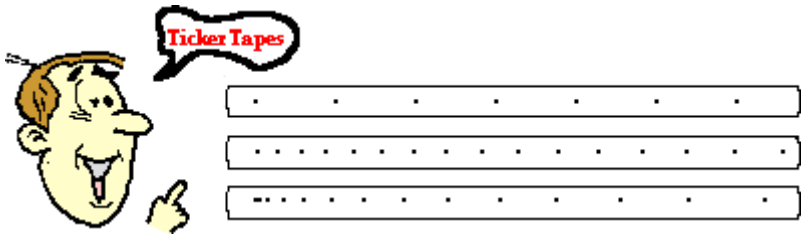
15. $\frac{\tan\theta}{\sec\theta}+\frac{\cot\theta}{\csc\theta}=\sin\theta+\cos\theta$

16. $\frac{\sin y+\tan y}{1+\sec y}=\sin y$

# Ticker Tape Diagrams

Imagine a device that could identify the position of a moving object at constant intervals of time - for instance, every second or every 1/10-th second or even every 1/60-th second. Perhaps such a device could track the location of a object moving in 1-dimension by placing a dot on a strip of paper. The trail of dots would represent the motion of the object as it changes its position over the course of time.

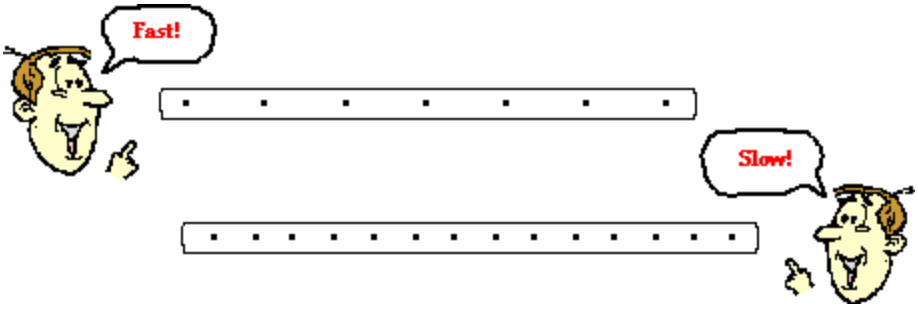
Believe it or not, there is such a device - it's called a **ticker tape timer**. Before the advent of computers in Physics labs, a common way of analyzing the motion of objects in physics labs was to perform a **ticker tape analysis**. A long *tape* was attached to a moving object and threaded through a device that placed a tick upon the tape at regular intervals of time - say every 0.10 second. As the object moved, it dragged the tape through the "ticker," thus leaving a trail of dots. The trail of dots provided a history of the object's motion and therefore a representation of the object's motion.




**Dot Diagrams**

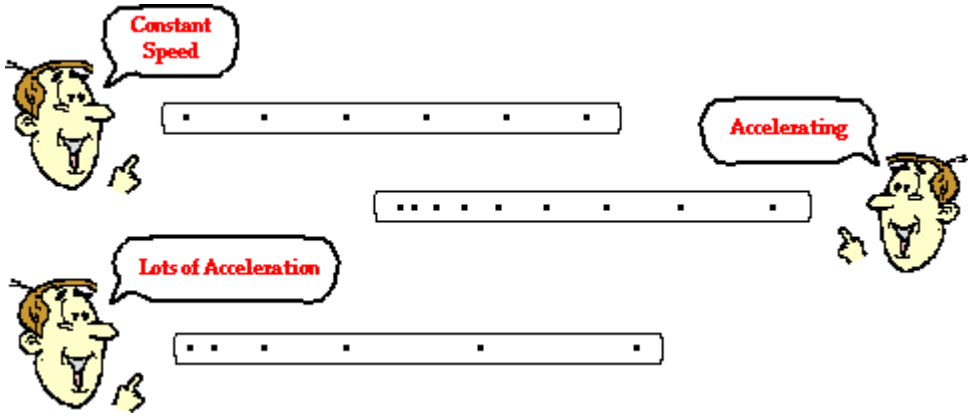
While the use of ticker tape analyses in Physics labs has mostly been replaced by the use of computer-interfaced motion detectors, the use of ticker tapes or *motion diagrams* still persists in our Physics curriculum due to the visual nature of representing an object's motion. Such diagrams are referred to as dot diagrams, motion diagrams, oil drop diagrams, and (still) ticker tape diagrams.

The distance between dots on a dot diagram represents the object's position change during that time interval. A large distance between dots indicates that the object was moving fast during that time interval. A small distance between dots means the object was moving slow during that time interval. Dot diagrams for a fast- and slow-moving object are depicted below.




The analysis of a dot diagram will also reveal if the object is moving with a constant velocity or accelerating. A changing distance between dots indicates a changing velocity and thus an acceleration. A constant distance between dots represents a constant velocity and therefore no

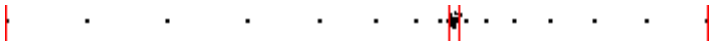
acceleration. Dot diagrams for objects moving with a constant velocity and with an accelerated motion are shown below.



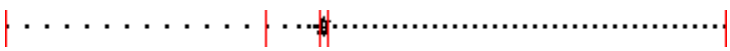

And so dot diagrams provide one more means of representing various features of the motion of objects.

## Check Your Understanding

Ticker tape diagrams are sometimes referred to as oil drop diagrams. Imagine a car with a leaky engine that drips oil at a regular rate. As the car travels through town, it would leave a trace of oil on the street. That trace would reveal information about the motion of the car. Renatta Oyle owns such a car and it leaves a signature of Renatta's motion wherever she goes. Analyze the three traces of Renatta's ventures as shown below. Assume Renatta is traveling from left to right. Describe Renatta's motion characteristics during each section of the diagram.

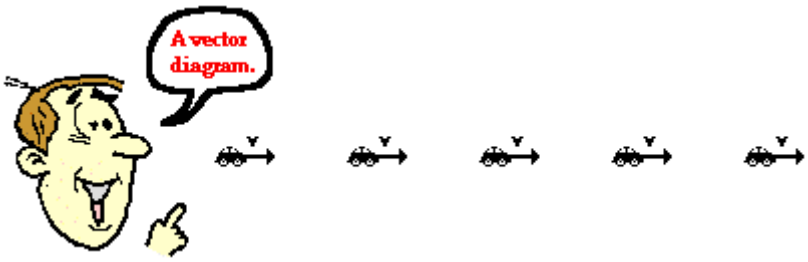
1. 

2. 

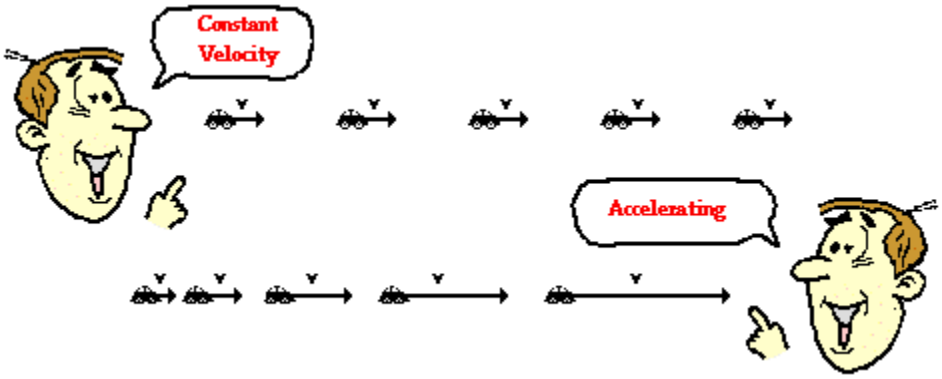
3. 

# Vector Diagrams

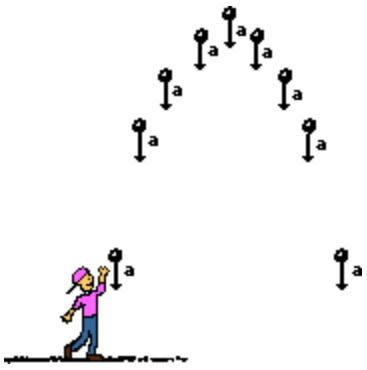
**Vector diagrams** are diagrams that depict the direction and relative magnitude of a vector quantity by a vector arrow. Vector diagrams can be used to describe the velocity of a moving object during its motion. For example, a vector diagram could be used to represent the motion of a car moving down the road.




In a vector diagram, the magnitude of a vector quantity is represented by the size of the vector arrow. If the size of the arrow in each consecutive frame of the vector diagram is the same, then the magnitude of that vector is constant. The diagrams below depict the velocity of a car during its motion. In the top diagram, the size of the velocity vector is constant, so the diagram is depicting a motion of constant velocity. In the bottom diagram, the size of the velocity vector is increasing, so the diagram is depicting a motion with increasing velocity - i.e., an acceleration.




Vector diagrams can be used to represent any vector quantity. In future studies, vector diagrams will be used to represent a variety of physical quantities such as acceleration, force, and momentum. Be familiar with the concept of using a vector arrow to represent the direction and relative size of a quantity. It will become a very important representation of an object's motion as we proceed further in our studies of the physics of motion.

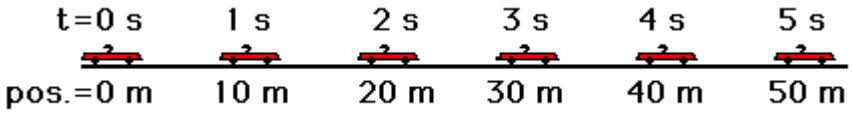


# The Meaning of Shape for a p-t Graph

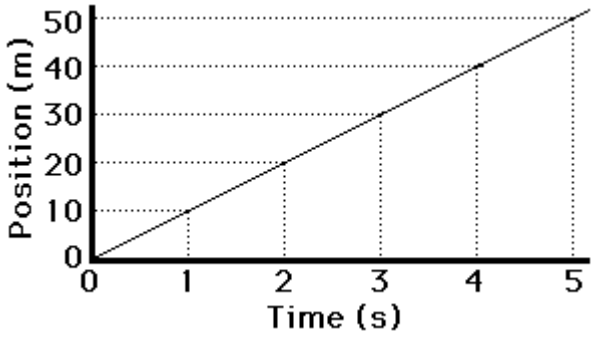
Our study of 1-dimensional kinematics has been concerned with the multiple means by which the motion of objects can be represented. Such means include the use of words, the use of diagrams, the use of numbers, the use of equations, and the use of graphs. Lesson 3 focuses on the use of **position vs. time graphs** to describe motion. As we will learn, the specific features of the motion of objects are demonstrated by the shape and the slope of the lines on a position vs. time graph. The first part of this lesson involves a study of the relationship between the shape of a p-t graph and the motion of the object.

## Contrasting a Constant and a Changing Velocity

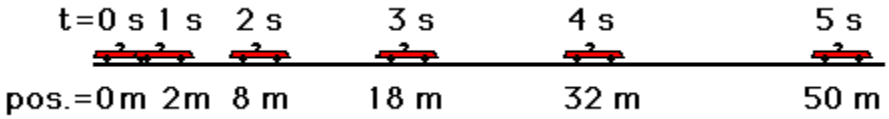
To begin, consider a car moving with a **constant, rightward (+) velocity** - say of +10 m/s.



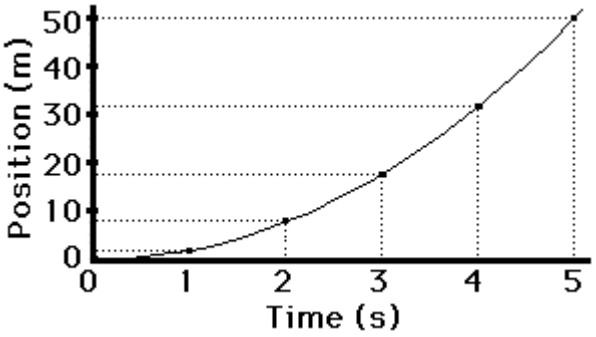

If the position-time data for such a car were graphed, then the resulting graph would look like the graph at the right. Note that a motion described as a constant, positive velocity results in a line of constant and positive slope when plotted as a position-time graph.




Now consider a car moving with a **rightward (+), changing velocity** - that is, a car that is moving rightward but speeding up or *accelerating*.

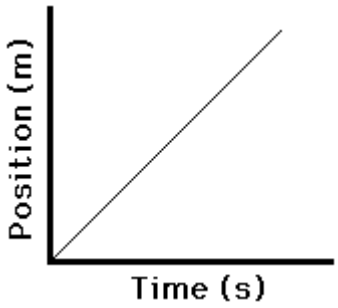



If the position-time data for such a car were graphed, then the resulting graph would look like the graph at the right. Note that a motion described as a changing, positive velocity results in a line of changing and positive slope when plotted as a position-time graph.

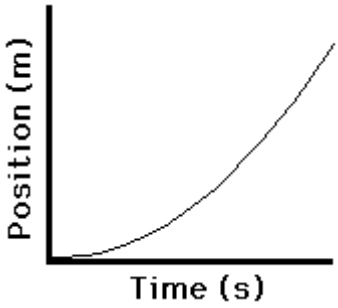



The position vs. time graphs for the two types of motion - constant velocity and changing velocity (acceleration) - are depicted as follows.

**Constant Velocity**
**Positive Velocity**




**Positive Velocity**
**Changing Velocity (acceleration)**




## The Importance of Slope


The shapes of the position versus time graphs for these two basic types of motion - constant velocity motion and accelerated motion (i.e., changing velocity) - reveal an important principle. The principle is that the slope of the line on a position-time graph reveals useful information about the velocity of the object. It is often said, "As the slope goes, so goes the velocity." Whatever characteristics the velocity has, the slope will exhibit the same (and vice versa). If the velocity is constant, then the slope is constant (i.e., a straight line). If the velocity is changing, then the slope is changing (i.e., a curved line). If the velocity is positive, then the slope is positive (i.e., moving upwards and to the right). This very principle can be extended to any motion conceivable.

# Drafting America

| | |
|---|---|
| Benchmark Standard | **History 1a**: Students will analyze historical materials to trace the development of an idea or trend across space or over a prolonged period of time in order to explain patterns of historical continuity and change. |
| Grade | 11-12 |
| Vocabulary / Key Concept | Militia- a group of citizens with some military training who are called into service only in emergencies<br>Standing army-a permanent army of paid soldiers<br>Conscription- mandatory enrollment of persons for military service<br>Draft- a system for selecting individuals from a group (as for mandatory military service)<br>Conscientious objector- a person who refuses to serve in the armed forces or bear arms on moral or religious grounds |

**~This is a DRC / Delaware Archives Lesson modified by CSD for use at home~**

**ACTIVITY 1:**

## REGISTRATION REGULATIONS.

[Prescribed by the President under the act of Congress approved May 18, 1917.]

1. *Prescribed by the President.*—These regulations are prescribed by the President under the authority vested in him by the act of Congress authorizing the President to increase temporarily the military establishment of the United States, approved May 18, 1917, and may by him be modified at any time.

2. *Scope of the regulations.*—These regulations pertain only to the registration of all male persons in the United States, the Territories, and the District of Columbia between the ages of 21 and 30, both inclusive, and are published for the direction and guidance of all concerned. These regulations do not cover the process of the selective draft, which is entirely separate from the registration and will be governed by regulations to be promulgated hereafter. However, the registration boards under designation by the President will be made to constitute the local boards for the execution of the selective draft. While changes in the general plan may be necessary in some States and Territories in order to accommodate peculiarities of local organization, the idea of national supervision and State execution will be followed throughout the raising of our new armies by selective draft. It is believed that this method best expresses the American genius for self-government and affords a just and effective execution of the law.

3. *Persons required by the act to present themselves for registration.*—Section 5 of the act of Congress approved May 18, 1917, provides—

That all male persons between the ages of twenty-one and thirty, both inclusive, shall be subject to registration in accordance with regulations to be prescribed by the President; and upon proclamation by the President or other public notice given by him or by his direction stating the time and place of such registration it shall be the duty of all persons of the designated ages, except officers and enlisted men of the Regular Army, the Navy, and the National Guard and Naval Militia while in the service of the United States, to present themselves for and submit to registration under the provisions of this Act; and every such person shall be deemed to have notice of the requirements of this Act upon the publication of said proclamation or other notice as aforesaid given by the President or by his direction; and any person who shall willfully fail or refuse to present himself for registration or to submit thereto as herein provided, shall be guilty of a misdemeanor and shall, upon conviction in the district court of the United States having jurisdiction thereof, be punished by imprisonment for not more than one year, and shall thereupon be duly registered: *Provided*, That in the call of the docket precedence shall be given, in courts trying the same, to the trial of criminal proceedings under this Act: *Provided further*, That persons shall be subject to registration as herein provided who shall have attained their twenty-first birthday and who shall not have attained their thirty-first birthday on or before the day set for the registration, and all persons so registered shall be and remain subject to draft into the forces hereby authorized, unless exempted or excused therefrom as in this Act provided: *Provided further*, That in the case of temporary absence from actual place of legal residence of any person liable to registration as provided herein such registration may be made by mail under regulations to be prescribed by the President.

(3)

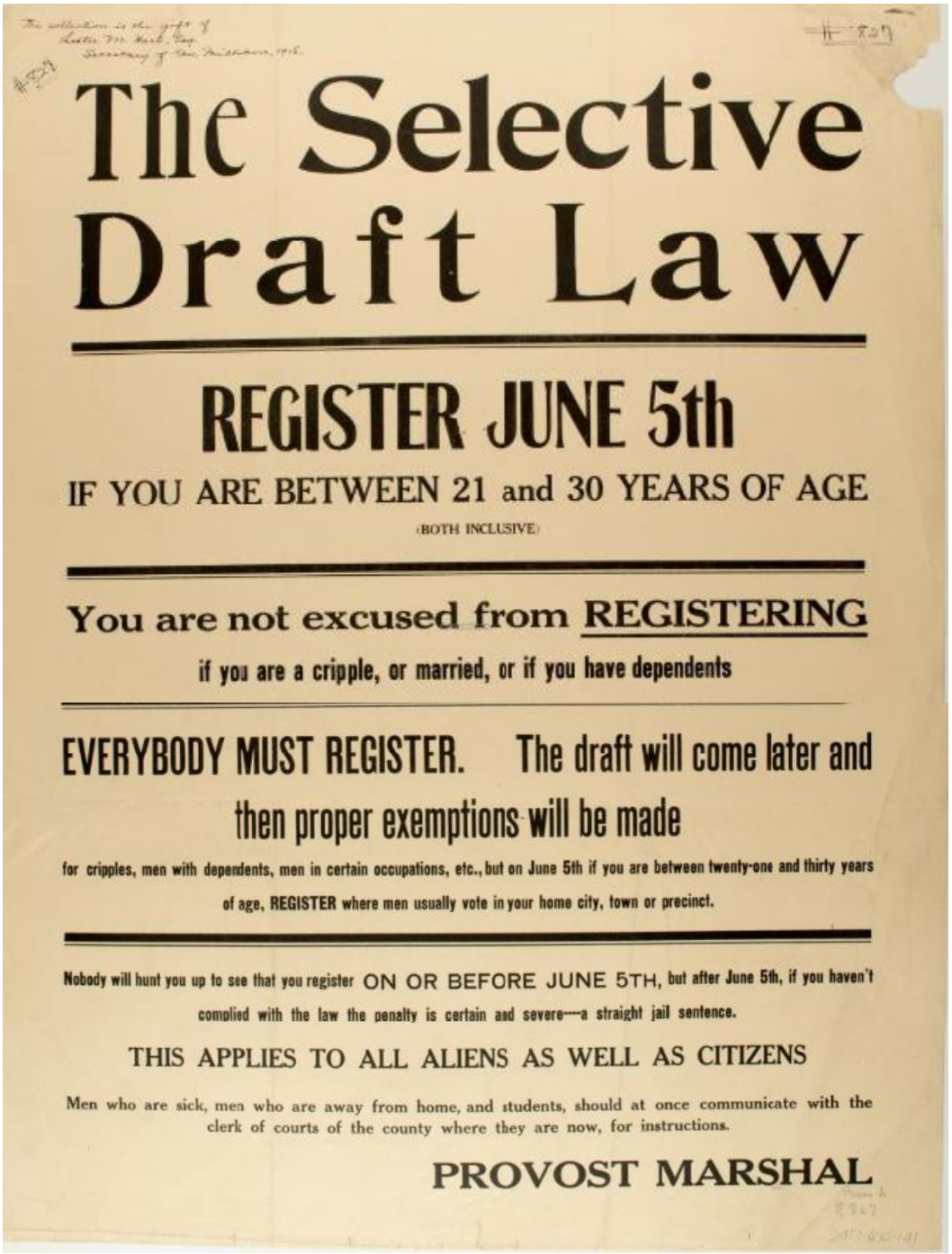
**ANALYZE** the Primary Source Document by answering the following questions on a separate sheet of paper:

1. What is the title and who is the author?
2. Date of the Document?
3. Who is the intended audience?
4. What is the purpose of the document?
5. Facts included in the document?
6. Interpretations in the document?
7. Summary of the Document?
8. Important quote from the document?

**ADDITIONAL QUESTIONS**:

1. What was the purpose of this registration? Explain.
2. Which groups of people are excluded from the registration?
3. Why did the U.S. Government deem the draft necessary? Explain.

**ACTIVITY 2:**



# The Selective Draft Law

## REGISTER JUNE 5th

IF YOU ARE BETWEEN 21 and 30 YEARS OF AGE

(BOTH INCLUSIVE)

**You are not excused from REGISTERING**

if you are a cripple, or married, or if you have dependents

**EVERYBODY MUST REGISTER. The draft will come later and then proper exemptions will be made**

for cripples, men with dependents, men in certain occupations, etc., but on June 5th if you are between twenty-one and thirty years of age, REGISTER where men usually vote in your home city, town or precinct.

Nobody will hunt you up to see that you register ON OR BEFORE JUNE 5TH, but after June 5th, if you haven't complied with the law the penalty is certain and severe---a straight jail sentence.

THIS APPLIES TO ALL ALIENS AS WELL AS CITIZENS

Men who are sick, men who are away from home, and students, should at once communicate with the clerk of courts of the county where they are now, for instructions.

**PROVOST MARSHAL**

**ANALYZE** the Primary Source Document by answering the following questions on a separate sheet of paper:

1. What is the title and who is the author?
2. Date of the Document?
3. Who is the intended audience?
4. What is the purpose of the document?
5. Facts included in the document?
6. Interpretations in the document?
7. Summary of the Document?
8. Important quote from the document?

**ADDITIONAL QUESTIONS**:

1. What is the punishment for not completing the registration?
2. Is anyone exempt from completing a registration?
3. Do you think this is a fair method of conscription? Why or why not?
4. Based on the two primary source documents, how important do you think a Conscription Act / draft law is? Explain and support your opinion with evidence from the documents.

**ACTIVITY 3:**

As you read the Background Information, complete the Graphic Organizer "Conscription Acts / Draft Laws Over the Years"

**Background Information**

The tradition of citizen responsibility for defending home and country in this country is rooted in English tradition. The 1181 English Assize of Arms of Henry II "required all free men to possess arms, according to their class." i English citizens were required to be ready for summoning, when necessary, to defend their homeland and their King. Almost five hundred years later, with the establishment of the New World, Massachusetts' first settlers followed this tradition and obliged its citizenry to possess arms and use them in defense of self, home, and homeland.

The militia, historic forerunner of the National Guard, stands in contrast to today's volunteer army of men and women who choose to devote their lives to the defense of the country. Members of the colonial militia were known as citizen-soldiers; their task was to respond to the defensive needs of their communities. These groups of citizen soldiers were required to bring their own weapons, to stand for "muster," or regularly scheduled training sessions of community militias. Militiamen served without pay; service was seen as a

responsibility of citizenship. As the threat of attacks by Native Americans decreased and the desire for political autonomy began, the need for a standing army, the Continental Army, was recognized. Individual colonies held the power to “draft” members of the militia into service for short periods of time. During these times of forced service, small stipends were paid. The need for a well trained, more permanent military force began the two forms of military service that still exist in the United States today: a professional military composed of career men and women versus the National Guard, composed of civilians who have other careers but see it as their civic duty to spend time in the defense of their country.

The guarantees of the citizens’ rights and responsibilities to bear arms in defense of their country were codified in George Mason’s draft of the Virginia Declaration of Rights in 1776. Section 13 dealt with the right of the state to call into service a standing army. “That a well-regulated militia, composed of the body of the people, trained to arms, is the proper, natural, and safe defense of a free state; that standing armies, in time of peace, should be avoided as dangerous to liberty; and that in all cases the military should be under strict subordination to, and governed by, the civil power.” This particular section was later adapted by Thomas Jefferson and served as the basis for Amendment II of the Bill of Rights: “A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.” During “the American Revolution, the new state governments assumed the colonies' authority to draft men, through county militia officers, for their short-term militias. They extended it to the long-term state units of the Continental Army, but they denied Gen. George Washington's request that the central government be empowered to conscript. As the initial volunteering subsided, most states boosted enlistment bounties and held an occasional draft, producing more hired substitutes than actual draftees.”ii During this initial conscription, men could be exempt from service for religious reasons or because they were conscientious objectors.

After the Revolution and during the drafting of the Constitution, the need to guarantee a military force to be brought into service was recognized. In 1788, Alexander Hamilton wrote in Federalist Paper 29 that “It is, therefore, with the most evident propriety, that the plan of the convention proposes to empower the Union ‘to provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, RESERVING TO THE STATES RESPECTIVELY THE APPOINTMENT OF THE OFFICERS, AND THE AUTHORITY OF TRAINING THE MILITIA ACCORDING TO THE DISCIPLINE PRESCRIBED BY CONGRESS.’” The infant standing military would serve the nation but actually be under the control of the state.

In 1792 the first national conscription act, the Uniform Militia Act, was passed. This law mandated that all “able bodied men” between the ages of 18 and 45 had to enroll in the militia. Again, the states maintained control of the forces; there were no penalties for those who chose not to follow the mandate. Thus, this first law can be seen to be merely a recommendation to the states for enrollment of their male citizens. With the War of 1812, the necessity for a mandatory conscription act became obvious. The militia troops had abandoned the capital in the face of the British onslaught. “After the conflict, Secretary of War James Monroe made the first proposal for a federal draft in which military service would be compulsory for all young men.”iii Congress rejected the proposal but did approve payment for men choosing to serve in the military, thus the militia concept was on the wane as the standing volunteer army grew slowly in popularity.

The onset of the Civil War brought about the first major enforceable draft act. In 1862, as the need for soldiers continued to climb and the militia pool was vanishing, the Militia Act of 1862 was signed into law and mandated that states upgrade their militia by assigning bounties, or payments for service, to those pledging service in the Union forces. Since an all volunteer force was not sustainable due to the length of the conflict, the first mandatory draft act, the Enrollment Act of 1863, was enacted and signed into law. While this act did require military service of all white males, it also provided a series of exemptions from service. “Men who were mentally or physically impaired, the only son of a widow, the son of infirm parents, or a widower with dependent children were exempt.”iv An additional provision endowed the more affluent with the option to pay a “commutation fee” and send a substitute in the place of the draftee. This provision led to the perception that the law was discriminatory against the poor, and primarily against the Irish immigrants in Northeastern cities. As a consequence of the Act and the associated exemptions, the New York Draft riots occurred in 1863, causing 1.5 million dollars in damages. The draft raised about 150,000 troops; yet fully 75% of the draftees were substitutes.v

World War I initiated a second mobilization program because, much like the time of the Civil War, a sustainable and sizeable military force was only guaranteed through national conscription. Consequently, Congress enacted legislation in May 1917, the Selective Draft Act of 1917, which mandated three designated registration days in 1917 and 1918. Congress specifically tailored this legislation to avoid the Civil War conscription scandals of paid substitutes, paid exemptions, and bounties. Inductees were required to serve for the duration of the “emergency.” The draft process resided in the hands of local draft boards during this recruitment. There were over 4,550 local draft boards operating under 155 supervisory districts. “Exemptions from induction were allowed for: (a) Persons already in the armed forces or national guard [sic][Only these men were also exempt from registration] (b) Officers of the federal and state legislatures, judiciary and executive branch(c) Clergy and theological students (d) Those who were physically or "morally" deficient (e) Those with dependents (f) Persons whose occupations were necessary for maintaining military or national interests.” The local boards had discretionary powers to grant or deny deferment requests. While there was inherent difficulty with this approach, a positive

outcome was the large measure of hometown support granted board members, and consequently the draft. The President of the United States had discretionary powers to defer elected officials, mail carriers, and local customs house officials. During the Great War, as World War I came to be known, there were no exemptions granted to conscientious objectors. Special Boards convened to hear the cases and arguments of those who declared themselves to be conscientious objectors. The draft did exempt from combat duty, however, members of religious groups, such as the Quakers and Mennonites, which historically had been opposed to war.

Some brief facts from the WWI draft:
1. Desertion totaled almost 350,000 men by war's end.
2. Draft boards were criticized for drafting too many agricultural and war industry workers.
3. Most draftees were unmarried.
4. 75% of married men who requested deferments received them.
5. Native Americans claimed the fewest deductions of any group.

At the conclusion of World War I, the military was demobilized and the forces reduced from 6 million to approximately 147,000. With the increase in tensions in Europe as Adolph Hitler and the Nazi forces began overrunning countries, President Franklin D. Roosevelt addressed the United States Congress on May 31, 1940 and requested that "The expansion of our defense program makes it necessary that we undertake immediately the training and retraining of our people, and especially our young people, for employment in industry and in service in the Army and Navy."vi Roosevelt proposed to the Congress that they enact legislation authorizing him to set in motion the call-up of sufficient National Guard troops to "maintain our position of neutrality and to safeguard the national defense…."vii On September 16, 1940, President Roosevelt signed into law the first legislation enabling a peacetime draft: the Selective Training and Service Act of 1940. This legislation limited the number of men who could be in training to 900,000 and also authorized the creation of the Selective Service System, an independent agency within the Federal government. Increasingly aware of the world's precarious situation, on July 21, 1941, President Roosevelt requested that Congress authorize the extension of the Act beyond the mandated 12-month expiration of the bill. Roosevelt wrote that

> *…. we would be taking a grave national risk unless the Congress were to make it possible for us to maintain our present full effective strength and during the coming year give training to as many additional Americans as we can, when immediate readiness for service becomes more and more a vital precautionary measure, the elimination of approximately two thirds of our trained soldiers, and about three-fourths of the total officer personnel, would be a tragic error.* Viii

With these words Roosevelt convinced the US Congress to extend the active duty status of 900,000 men for another 18 months. Shortly after the bombing of Pearl Harbor on December 7, 1941, the United States officially entered World War II and 10,110,114 men served in the military as a result of the draft.ix Men between 18 and 45 were liable for military service; all men between 18 and 65 were required to register. Term of service was extended to six months after the end of the war. As in World War I and the Civil War, exemptions from service existed. Among the primary criteria for exemption were: physical or mental disability, religious beliefs, employment in war or agricultural industries, or the presence of dependents. Conscientious objectors often served in noncombatant roles, much as they had done in World War I.

Following World War II another mass demobilization of military personnel drafted for service occurred. "The Truman White House could not contain the overpowering public and bipartisan Congressional outcry--accompanied by riots at overseas military bases in January 1946--for the early return home of American soldiers.x Following the war, the United States reverted to its prewar penchant towards isolationism. Even though the "enemy" appeared to be Stalin and the Soviet Union, Truman decided against maintaining a large peacetime force; the Selective Service Act expired in 1947 and brought an end to the draft. Truman's philosophy followed that of George Kennan: containment of the enemy through economic means was to be far more damaging to the countries than the cost of lives drafted into service for a potential conflict.

Tensions erupted when Truman was forced to reinitiate the draft for the Korean Conflict. On June 24, 1948 Truman signed into law the Selective Service Act of 1948 enabling the Department of Defense to draft young men for a period not to exceed 21 months. This was later extended to 24 months. In 1951, President Truman signed into law the Universal Military Training and Selective Service Act and "extended selective service until 1955, lowered the draft age from 19 to 18 ½ and increased the period of service to 24 months. It also provided a method for reconstituting the depleted reserve by imposing an obligation on men completing their term to continue in the reserve for six more years. At the same time, it made necessary the release of many Inactive and Volunteer reservists previously called to active duty by stipulating that any who had served in World War II should be released on the completion of 17 months service.xi" The following year Congress passed, and the President signed into law, the Reserve Forces Act, which mandated that every man between the ages of 18 and 26 register for the draft, serve some active duty time, and be eligible for recall to active duty for a total of six years. With these pieces of legislation, the United States ended its historic embargo against maintaining a standing army.

During the sixties and seventies, the draft continued as the United States became embroiled in conflicts in Southeast Asia. While the 1950s saw little overt anger at the perpetuation of the draft, the sixties, characterized by vicious and often-violent street protests, ignited an enduring explosion of anger against the military and its involvement in a far-off, small area of the world.

> *In the United States, military conscription, or the draft, had been in place virtually without interruption since the end of World War II, but volunteers generally predominated in combat units. When the first U.S. combat troops arrived in Vietnam in 1965 they were composed mainly of volunteers. The Air Force, Navy, and Marines were volunteer units. The escalating war, however, required more draftees. In 1965 about 20,000 men per month were inducted into the military, most into the Army; by 1968 about 40,000 young men were drafted each month to meet increased troop levels ordered for Vietnam. The conscript army was largely composed of teenagers; the average age of a U.S. soldier in Vietnam was 19*.xii

As with earlier drafts, the Selective Service System fulfilled its mission of drafting young men for military service through local draft boards. Again, the local draft boards determined the suitability for service of young men between the ages of 18 ½ and 26. The draftees, or selectees, had the option to apply for deferments based on the initial classification of their eligibility as determined by the Board. Some of the classifications in place during the Vietnam era were:

**1-A** Available immediately for military service.
**1-O** Conscientious Objector- conscientiously opposed to both types (combatant and non-combatant) of military training and service - fulfills his service obligation as a civilian alternative service worker.
**1-A-O** Conscientious Objector - conscientiously opposed to training and military service requiring the use of arms - fulfills his service obligation in a noncombatant position within the military.
**2-D** Ministerial Students - deferred from military service.
**3-A** Hardship Deferment - deferred from military service because service would cause hardship upon his family.
**4-C** Alien or Dual National - sometimes exempt from military service.
**4-D** Ministers of Religion - exempted from military service. **Student Postponements** - a college student may have his induction postponed until he finishes the current semester or, if a senior, the end of the academic year. A high school student may have his induction postponed until he graduates or until he reaches age 20. **Appealing a Classification** - A man may appeal his classification to a Selective Service Appeal Board.xiii

An additional classification, 4F, was applied to those men who did not meet the physical qualifications necessary to serve in the military. Since the draft boards were appointed by the director of the Selective Services agency upon recommendations of the state governors, many during the Vietnam era believed that an unacceptably high number of poor and/or African American young men were drafted. As the war dragged on and the number of men needed in service continued to grow, Congress passed legislation that preempted the potential of favoritism applied by the local boards. A lottery, the first since 1942, was held and the order in which young men would be called to service was determined by the random drawing of 366 birth dates. During the Vietnam era as the casualty lists grew, the opposition to the war became widespread. Many men chose to avoid service in the military during this time. Interestingly, as the country was

> *…faced with well over 100,000 apparent draft offenders, the federal government indicted 22,500 persons, of whom 8,800 were convicted and 4,000 imprisoned. As the Supreme Court expanded the criteria from religious to moral or ethical objections, Conscientious Objector exemptions grew in relation to actual inductions from 8 percent in 1967 to 43 percent in 1971 and 131 percent in 1972. Between 1965 and 1970, 170,000 registrants were classified as Conscientious Objectors.*
>
> *The most common form of draft "protest" was evasion. Of the 26.8 million young men who reached draft age between 1964 and 1973, 16 million (60 percent) did not serve in the military. Of those who avoided service, 15.4 million received legal exemptions or deferments, and perhaps 570,000 evaded the draft illegally. Among illegal draft evaders 360,000 were never caught, another 198,000 had their cases dismissed, 9,000 were convicted, and 4,000 sent to prison. In addition, an estimated 30,000 to 50,000 fled into exile, mainly to Canada, Britain, and Sweden*.xiv

The continuing unpopularity of the war and the fracturing of the country due to the US's involvement and the draft led to a legislative proposal in the 1970s supporting the formation of an All Volunteer Force and an end to the draft. In 1975 President Gerald Ford suspended compulsory draft registration. President Jimmy Carter reinstated the registration during the Soviet invasion of Afghanistan.

Today, almost all US men between the ages of 18 and 25 and resident aliens between those ages are required to register with the Selective Service. This does not imply a call to active duty. If the draft to active service were reinstituted, a lottery system would be in place from the onset. Student deferments would be issued only until the end of the current semester in which a student is enrolled.

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NOTES:

i on. 12March 1994. Available online: http://www.saf.org/pub/rkba/wais/data_files/shell/militia/milintro
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vii Ibid.
viii Roosevelt, Franklin D. "President Franklin D. Roosevelt Message to Congress On Extension Of Selective Service Terms Of Service." 21 July 1941. [Online] http://www.ibiblio.org/pha/policy/1941/410721a.html November 2, 2001.
ix Bound, John and Sarah Turner. "Going to War and Going to College: Did World War II and the G.I. Bill Increase Educational Attainment for Returning Veterans?" Report 00-453. Population Studies Center, University of Michigan. [Online] webgopher.nara.gov/1/inform/guide/index/nagidxf.txt (Nov. 2, 2001).
x Pollard, Robert A. "US Demobilization after World War II." Economic Security and the Origins of the Cold War, 1945-1950 (New York: Columbia University Press, 1985). [Online] http://www.mtholyoke.edu/acad/intrel/pollard.htm November 1, 2001.
xi Coakley, Dr. Robert W. Highlights of Mobilization, Korean War. [Online] http://www.army.mil/cmh-pg/documents/Korea/kwmob.htm November 3, 2001.
xii Excerpt from "Vietnam War," Microsoft® Encarta® Online Encyclopedia 2000. [Online] http://www.stillserving.org/vietnam_war.htm November 3, 2001.
xiii Selective Service: Classification. Selective Service System Agency website. [Online] http://www.sss.gov/classif.htm November 3, 2001.
xiv Chambers II, John Whiteclay. My History is America's History. [Online] http://www.myhistory.org/historytopics/articles/conscription.html November 3, 2001.

**ACTIVITY 4**: After completing the Graphic Organizer, answer the following questions:

1. In general, how did the government find people to serve in conflicts? Explain.
2. Who was most likely to be called into military service during the Civil War era? Who would have been exempted?
3. Who was most likely to be called into military service during the Vietnam War? Who would have been exempted?
4. During which war was conscription most fairly implemented? Explain your answer.

**ACTIVITY 5**:

- Has the history of conscription changed or stayed the same over time?
- How has conscription in the United States changed or stayed the same over time? Explain and support your answer with evidence from at least four of the different conflicts described in the article / graphic organizer.

# Conscription Acts / Draft Laws Over the Years (page 1)

| Year / Era | Name of Conscription Act / draft law | What were the mandates / stipulations for the law? | Did the law provide exemptions? | Was it mandatory and/or did it provide penalties for those who didn't obey? | What were the age limits & Length of time for draft service? | What were the problems with the law? |
|---|---|---|---|---|---|---|
| 1792 | | | | | | |
| 1812 | | | | | | |
| Civil War 1861-1865 | | | | | | |
| WW 1 1914-1918 | | | | | | |

# Conscription Acts / Draft Laws Over the Years (page 2)

| Year / Era | Name of Conscription Act / draft law | What were the mandates / stipulations for the law? | Did the law provide exemptions? | Was it mandatory and/or did it provide penalties for those who didn't obey? | What were the age limits & Length of time for draft service? | What were the problems with the law? |
|---|---|---|---|---|---|---|
| WW 2 1939-1945 | | | | | | |
| Korean War 1950-1953 | | | | | | |
| Vietnam War 1965-1975 | | | | | | |