

Title 7: Education K-12

Part 12

Mississippi Testing Accommodations Manual

Revised January 2013



Mississippi Department of Education

Office of Student Assessment

Table of Contents

Overview	3
Testing Accommodations Chart (Main)	4
Important Notes	7
Appendix A	
Accommodation 48 Language Arts Allowable	12
Appendix B	
Accommodation 48 Language Arts Non-Allowable	17
Appendix C	
Accommodation 48 Mathematics Arts Allowable	29
Appendix D	
Accommodation 48 Mathematics Non-Allowable	41
Appendix E	
Testing Accommodations Chart (CUM COPY)	94

Overview

The list of accommodations shows the numeric codes to be entered in the designated areas on student answer documents or test booklets. **The accommodations that are allowable on each of the statewide tests vary.** A list of allowable and non-allowable accommodations for each test is located in this document.

The **General Accommodations** are allowable and may be used by all students on each of the statewide tests. These accommodations do not have to be entered on the student's answer document. Any accommodation utilized for the assessment of students must be used during the student's routine classroom instruction, including classroom assessment.

All eligible students may utilize appropriate assessment accommodations when participating in the statewide assessments. Any accommodation utilized for the assessment of students must be

- based upon the learning needs of the individual student through decisions made and officially documented on the **IEP/504 Plan** prior to the test administration, or
- based on the student's **temporary physical disability**, and
- used during the student's **routine** classroom instruction, to include classroom assessment.

All **English Language Learner** students may utilize appropriate assessment accommodations when participating in the statewide assessments. Any accommodation utilized for the assessment of individual students must be:

- based upon the individual student's learning needs,
- based upon decisions made prior to the test administration, and
- used during the student's routine classroom instruction, to include classroom assessment.

	25	Administer the test over several days, specifying the duration of each day's session (MDE prior approval required) REFER TO NOTES 4 & 16	N	Y	Note 16	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Presentation	40	Large print	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	41	Braille REFER TO NOTE 5	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	42	Hearing aids	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	43	Auditory trainers	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	44	Transparent color overlays	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	45	Magnifying glasses/magnifying equipment	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	46	Templates to reduce visible print	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	47	Provide cues (e.g., arrows and stop signs) on answer form in pencil REFER TO NOTE 6	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	48	Use of memory aids, fact charts, resource sheets, and/or abacus REFER TO NOTE 7	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	49	Clue student to stay on task	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	50	Highlight key words/phrases in directions (e.g., complete sentences, show your work) by the teacher	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
53	Read test directions (but not test items) to individual students or a group -- repeating and/or paraphrasing directions if needed REFER TO NOTE 8 & 9	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
55	Read test directions and test items to individual students or a group -- repeating directions/items, but not paraphrasing REFER TO NOTES 8 & 9	N	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	
58	Read test directions and test items to individual students or a group -- repeating and/or paraphrasing only the directions if needed REFER TO NOTES 8 & 9	N	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	
60	Use of highlighter (yellow only) by student in test booklet	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	

	61	Calculator (MCT2 Mathematics: Allowable only in grades 7 and 8) REFER TO NOTE 15	N	Note 15	N	N	N	N	Note 15	Y	N	N	N	N	N	N
Response	70	Dictation of answers to test administrator/proctor (scribe) REFER TO NOTE 10	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	72	Allow marking of answers in booklet and transferring of answers from test booklet/answer document to answer document by test administrator (i.e., large print) REFER TO NOTE 11	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	73	Tape record responses for later verbatim translation REFER TO NOTE 12	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	74	Provide copying assistance between drafts REFER TO NOTES 10 & 11	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	75	Braille	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	76	Communication board	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	77	Augmentative communicative device	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	78	Computer / word processor (without grammar/syntax checker & without work completion/prediction feature) REFER TO NOTE 13	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	79	Computer / word processor (without grammar/syntax checker, with completion/prediction activated)	N	N	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
	80	Adapted keyboards	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
81	Native language dictionaries for ELL students (i.e. dictionaries that translate English words into the native language - no definitions are given in either language) REFER TO NOTE 14	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	

	82	Spelling dictionaries (dictionaries show correct spelling of English words; do not give definitions).	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	Y
	98	Other <u>allowable</u> accommodation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	99	Other <u>non-allowable</u> accommodation	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Important Notes

In the Testing Accommodations Chart specific accommodations have a tag reading, “REFER TO NOTE ___”. These notes are listed below by number.

NOTE 1: *A test administrator and proctor must be present during the entire test administration for all students tested.*

NOTE 2: *It should be noted that some accommodations used routinely in the classroom may not be allowable for statewide tests. The test results of students who use non-allowable accommodations are invalid and must be excluded from summary statistics. Any student with an invalid score is considered not tested. Allowable accommodations may change the method in which test items are presented and the method of the student’s response to test items but will not interfere with what the test purports to measure. An unallowable accommodation provides an unfair advantage to the student and interferes with what the test purports to measure.*

NOTE 3: *Approval must be granted by the Office of Student Assessment (OSA) four (4) weeks prior to the use of accommodations that are not included in this list. Please complete the Accommodation Request Form and submit it to OSA. It is the responsibility of the OSA to determine whether the use of such accommodation(s) will affect the validity of the assessment.*

NOTE 4: *Accommodations 24 and 25 relate to administering the test over several sessions and/or days and must be approved by the Office of Student Assessment four (4) weeks prior to their use on statewide assessments. However, the entire assessment must be completed within the testing window. Any extension that exceeds or goes beyond the day the test administration is scheduled must be pre-arranged, the procedure must be documented, and on file with the District Test Coordinator. If the student is testing over several days, he/she is not allowed to change responses to questions answered during the previous testing sessions or preview questions that will be administered in a future session.*

NOTE 5: *The Braille test administrator may review Braille test material prior to test administration, but the review must be authorized by the district test coordinator and must take place in a controlled, secure environment.*

NOTE 6: *Accommodation 47 relates to cueing. Cueing is assisting the student in focusing his/her attention. Cueing strategies include, but are not limited to, arrows, lines, space, contrasting colors, position or focal point, underlining, labeling, size, and shading. Cues may be used only in test directions and in test questions. Cues may not be used in the answer choices. Cues provided on answer booklets/documents must be erased before they are returned for scoring. Cues provided on test books do not have to be erased since test books are non-scorable documents.*

NOTE 7: *Accommodation 48 relates to the use of memory aids. A memory aid, fact chart, and/or resource sheet is something that helps a student remember how to find the answer; it*

should not give him/her the answer. This accommodation cannot interfere with what the test purports to measure. For example, if the test measures computation skills, a multiplication fact chart is a non-allowable accommodation since it gives the answer or a portion of the answer to the item assessing multiplication skills.

The compilation of allowable and non-allowable materials is by no means exhaustive. Prior approval is not required for the memory aids, fact charts, and/or resource sheets labeled allowable. All other material requires prior approval from the Office of Student Assessment (OSA). You must complete the Accommodation Request Form. Submissions may be sent any time during the school year but no later than four (4) weeks prior to the test administration for which the use of memory aid is intended. The memory aids, fact charts, and/or resource sheets for state assessments must be limited to 1-3 pages per content area.

Only a student who is visually-impaired may use the abacus to solve mathematics problems. No prior approval is required for use of the abacus by these students.

NOTE 8: Paraphrasing is re-stating the text and does not include providing definitions or detailed explanations. Only directions may be paraphrased. Items, including sample questions, may not be paraphrased as part of a presentation accommodation.

NOTE 9: Accommodations **53**, **55**, and **58** relate to the presentation of test directions and test items (questions and answer choices) to students. In addition to reading, these accommodations may involve writing the material on a blackboard, using sign language, using a text scanner with voice synthesizer, or using other appropriate technology.

Using accommodations **55** and **58** for passages or items in the reading sections of the MCT2 (MCT2 – Reading) or the SATP (English II Multiple Choice – Vocabulary/Reading [and Reading Comprehension for “old framework” re-testers]) is not allowed.

For the WIDA ACCESS for ELLs® test, accommodations **55** and **58** are not allowed, as these accommodations interfere with what the test purports to measure.

When preparing to administer the test(s) to students who are deaf or hard of hearing or to students who are blind or visually impaired, test administrators may review eligible test material (i.e., math, science, or history test books; scripted directions for reading tests; non-reading portions of language arts tests) prior to test administration. The review must be authorized by the district test coordinator and must take place in a controlled, secure environment. A signed Confidentiality Agreement is required and must be on file when test administrators preview test items prior to the test administration. Test administrators should be familiar with specific symbols or abbreviations particular to the content area being assessed.

When working with a student who has limited English proficiency, consideration needs to be given to whether the assessment should be explained to the student in his or her native language or other mode of communication unless it is clearly not feasible to do so.

Students for whom American Sign Language (ASL) is the primary language may have directions and/or items signed to them, except for the reading sections of MCT2 – Reading and English II Multiple Choice – Vocabulary/Reading, where the signing of items is not allowed. Other

allowable signing systems are Signing Exact English (SEE), Signed English (SE), Sign Supported English (SSE or CASE), or Contact Sign (i.e., Pidgin Sign English [PSE]). Sign languages from other countries (i.e., Auslan, BSL, LSF) or non-standard sign systems (i.e., home sign) are not permitted to be used.

NOTE 10: *The scribe must write exactly what the student says as dictated. The scribe may not edit or alter the student’s dictation in any way. The student is responsible for all capitalization, punctuation, and spelling. The student should review the draft composition and make any necessary edits, including edits to capital letters and punctuation. A scribe may not assist the student during the editing process. The scribe transfers verbatim the student’s responses to an answer document.*

NOTE 11: *The dictation process and transfer of answers must occur under secure conditions with at least two persons present.*

NOTE 12: *Accommodation 73 - Tape record responses for later verbatim translation*

- A. Dictating a response at any grade is very tedious for both the student and the scribe.
- B. Students must spell each word and note every punctuation mark as they dictate.
- C. Please consider using a tape recorder for a student’s “draft.”
- D. The tape can be played back to the student, who can stop and start the tape as necessary, spelling and punctuating the response more easily as dictation to the scribe takes place. The student must also note indentation or skipped lines during the dictation.
- E. The taped version, of course, can also be edited by the student.
- F. The taped “draft” must not be written for the student to review until the dictation with spelling and punctuation has occurred. The student must also note indentation or skipped lines during the dictation.
- G. The student may be given the dictated response to review and may make revisions at that point.
- H. The dictation process must occur under secure conditions with at least two persons present.
- I. The response must be transcribed on the pre-ID Final Response Insert Page, if available, with appropriate Prompt Number gridded or in a blank Final Response Insert Page with appropriate Prompt Number gridded and the MSIS number written on the front cover of the Final Response Insert Page.
- J. If this method is used, the tape must be erased after the transcription has been completed.
- K. This process, if used, should be added as an addendum to the school test security plan.
- L. All persons (TA, Proctor, Scribe) involved in this process must sign Confidentiality Agreements.

NOTE 13: *Accommodation 78 - Typewriter or word processor (without grammar/syntax checker and without word completion/prediction feature)*

- A. All tools for spelling, grammar check, and syntax must be turned off. Additionally, the device (e.g., NEO) must have the extra features disabled (e.g., Google Docs, linked files, Write On! Lessons, etc.).
- B. The student may not have access to the Internet.
- C. Typed responses are not to be submitted to the vendor; these typed responses must be transcribed under secure conditions with at least two persons present.
- D. The person transcribing must duplicate exactly what the student wrote, including exact spelling, punctuation, indentation, skipped lines, etc.
- E. The response must be transcribed on the pre-ID Final Response Insert Page, if available, with appropriate Prompt Number gridded or in a blank Final Response Insert Page with appropriate Prompt Number gridded and the MSIS number written on the front cover of the Final Response Insert Page.
- F. The typed response must be erased from the assistive technology.
- G. The typed response must include the student's name and MSIS number. The student's typed response is considered secure material and must be returned with all scorable testing material.
- H. This process, if used, should be added as an addendum to the school test security plan.
- I. All persons (TA, Proctor, Scribe) involved in this process must sign Confidentiality Agreements

NOTE 14: *Electronic word-to-word translating dictionaries may be used with the audio/speaker function turned off. In addition the test administrator must ensure that electronic dictionaries are not connected to the internet or any additional software. Refer to the Suggested List of Bilingual Dictionaries for ELL Students for word-to-word glossaries.*

NOTE 15: *For accommodation 61, calculators are allowable only in grades 7 and 8 for MCT2 Mathematics and for the SATP2 Algebra I. Beginning with the 2011-2012 academic year,*

1. All formulas, applications, and/or programs (including, but not limited to, Zoom Math/Zoom Algebra) **must be disabled or removed** from the calculators to be used by students during the MCT2 Mathematics, Grades 7-8 exams and the SATP2, Algebra I exam.
2. School districts must outline in their District Test Security Plan the processes and/or procedures to be used to ensure the NO calculators used by students during a state assessment administration for the tests listed above have any stored formulas, applications, and/or programs.
3. Students may use personal calculators. However, the District Test Security Plan must address the processes and/or procedures to be used to ensure that NO personal calculators used by the students during a state assessment administration have any stored formulas, applications, and/or programs.
4. School districts will be given the authority to allow **retesters** who participated in the SATP2 Algebra I test administration **prior to** 2011-

2012 to continue to use graphing calculators with formulas, applications, and/or programs.

- Districts **must** test these students in a room separate from any testing room that is used for first-time test takers in 2011-2012 and thereafter.
- Districts **must** address these procedures for retesters in the District and School Test Security Plans.

The complete memorandum from the state Superintendent of Education regarding calculator use on the MCT2 Mathematics (grades 7 and 8) and Algebra I can be read at the following link: <http://www.mde.k12.ms.us/ACAD/osa/pdfs/20110406-Calculator-Guidance-Memo.pdf>

NOTE 16: *For the ELL student, accommodation 25 is non-allowable on the Speaking component of the ACCESS for ELLs® Test.*

Accommodation 48

LANGUAGE ARTS

ALLOWABLE

Allowable Memory Aid

Topic

Introduction

Body

Paragraph 1

Paragraph 2

Paragraph 3

Conclusion

Allowable Memory Aid

A B C D E F G H I J
K L M N O P Q R S T
U V W X Y Z

a b c d e f g h i j k l m n o
p q r s t u v w x y z

1 2 3 4 5 6 7 8 9 10

Allowable Memory Aid

Proofreading Checklist

Read each question below. Then check your paper. Correct any mistakes that you find. After you have corrected them, put a checkmark in the box next to the questions.

- 1. Did I spell all the words correctly?
- 2. Does each sentence state a complete thought?
- 3. Are there any run-on sentences or fragments?
- 4. Did I capitalize all proper nouns?
- 5. Did I end each sentence with the correct end mark?
- 6. Did I use commas, apostrophes, and quotation marks correctly?

Allowable Memory Aid

This is a very low tech example of a cut-out viewer. It helps some students focus on only a certain portion of the text at a time so as not to become overwhelmed by all the text on the page. It might require supervision to be sure that the student is looking at the correct text in the viewer.

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Accommodation 48

LANGUAGE ARTS

NON-ALLOWABLE

A **friendly letter** has five parts. They are the heading (1), greeting (2), body (3), closing (4), and signature (5). Match each number with the letter part below.

(1)
234 Mississippi Street
Anywhere, Mississippi 54545
Date, Year

(2)
Dear Sam,

(3)
I am so glad that you are moving to Mississippi. I think you will really like the fact that it does not get so cold in the winter. It does get cold, just not as cold as it gets in Denver.

Have you started packing yet? Be sure you bring all of your cards so we can trade. It will really be fun to have you living so close to my house. We can play every day!

Let me know what day you are supposed to get here. I can hardly wait!

(4)
Your friend,
(5)
Dimitri

NON-ALLOWABLE

Words	Rules	Examples
bad badly	<i>Bad</i> is an adjective. It can be used after linking verbs like look and feel. <i>Badly</i> is an adverb.	This was a <u>bad</u> day. I feel <u>bad</u> . I play <u>badly</u> .
borrow lend	<i>Borrow</i> means "to take." <i>Lend</i> means "to give."	You may <u>borrow</u> my pen. I will <u>lend</u> it to you for the day.
can may	<i>Can</i> means "to be able to do something." <i>May</i> means "to be allowed or permitted."	Nellie <u>can</u> read quickly. <u>May</u> I borrow your book?
good well	<i>Good</i> is an adjective. <i>Well</i> is usually an adverb. It is an adjective only when it refers to health.	The weather looks <u>good</u> . She sings <u>well</u> . Do you feel <u>well</u> ?
in into	<i>In</i> means "located within." <i>Into</i> means "movement from the outside to the inside."	Your lunch is <u>in</u> that bag. He jumped <u>into</u> the pool.
its it's	<i>Its</i> is a possessive pronoun. <i>It's</i> is a contraction of <i>it is</i> .	The dog wagged <u>its</u> tail. It's <u>cold</u> today.
let leave	<i>Let</i> means "to permit or allow." <i>Leave</i> means "to go away from" or "to let remain in place."	Please <u>let</u> me go swimming. I will <u>leave</u> soon. <u>Leave</u> it on my desk.
lie lay	<i>Lie</i> means "to rest or recline." <i>Lay</i> means "to put or place something."	The dog <u>lies</u> in its bed. Please <u>lay</u> the books there.
sit set	<i>Sit</i> means "to rest in one place." <i>Set</i> means "to place or put."	Please <u>sit</u> in this chair. <u>Set</u> the vase on the table.
teach learn	<i>Teach</i> means "to give instruction." <i>Learn</i> means "to receive instruction."	He <u>teaches</u> us how to dance. I <u>learned</u> about history.
their there they're	<i>Their</i> is a possessive pronoun. <i>There</i> is an adverb. It may also begin a sentence. <i>They're</i> is a contraction of <i>they are</i> .	<u>Their</u> coats are on the bed. Is Carlos <u>there</u> ? <u>There</u> is my book. <u>They're</u> going to the store.
two to too	<i>Two</i> is a number. <i>To</i> means "in the direction of." <i>Too</i> means "more than enough" and "also."	I bought <u>two</u> shirts. A squirrel ran <u>to</u> the tree. May we go <u>too</u> ?

Topic

1. Attention getter:

2. Information:

3. Thesis statement:

Paragraph 1	Paragraph 2	Paragraph 3
Reasons/Facts/Examples	Reasons/Facts/Examples	Reasons/Facts/Examples

Conclusion

Thesis restated.

Opinion/Prediction/Question:

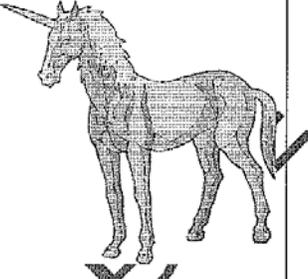
Plot: What is the story about?
Mood: What is the feeling of the story?
Setting: Where does this story take place?
Characters: Who is the story about?

NON-ALLOWABLE

<p><u>Contractions</u> he'll - he will can't - cannot she's - she is</p>	<p><u>Synonyms- same</u> little - small big - huge shut - close hop - jump</p>								
<p><u>Vowel Sounds</u> ee -feel ea - peach oa - boat ai - sail</p>	<p><u>Antonyms – opposite</u> cold – hot in – out up - down</p>								
<p><u>Homophones</u> their they're there doe dough to too two</p>	<p><u>Compare – Contrast</u></p> <table border="1" data-bbox="792 982 1198 1188"> <tr> <td>apples</td> <td>bananas</td> </tr> <tr> <td>red</td> <td>yellow</td> </tr> <tr> <td>round</td> <td>long</td> </tr> <tr> <td>fruit</td> <td>fruit</td> </tr> </table>	apples	bananas	red	yellow	round	long	fruit	fruit
apples	bananas								
red	yellow								
round	long								
fruit	fruit								

NON-ALLOWABLE

Sample Phonetic Aids -- Not Inclusive

 <p>i i_e igh _y</p>	 <p>ow ou</p>	 <p>u_e _ue ew</p>
 <p>j ge gi_ dge</p>	 <p>k c _ck</p>	 <p>s ce ci_</p>

Symbol	Action
^	Insert a missing word, letter or punctuation mark.
/	Use a lower case letter.
=	Capitalize a lower case letter.
√	Check spelling.
¶	Start a new paragraph.

NON-ALLOWABLE

Punctuation Mark:	When to use:	Example:
comma ,	to separate items in a series	In our garden we planted corn, peas, beans, and carrots.
apostrophe '	to show ownership	My teacher's book is red.
question mark ?	to show that a question is being asked	How far is it to Jackson?
exclamation point !	to show a strong emotion	I won the prize!
hyphen -	to separate a word at the end of a line	Miles ran quickly down the trail.
colon :	to separate the hour from the minute	It is 12:45 p.m.
period .	at the end of a sentence	The state bird of Mississippi is the mockingbird.

NON-AVAILABLE

Brainstorming

- Quickly generate a list of ideas to write about.

Prewriting

- Create a method for organizing your ideas such as a semantic web, an outline, or other graphic organizer.

Drafting

- Write your first copy.

Revising

- Rework your writing for ideas, style, voice, organization, and word choice.

Editing

- Fix any errors in punctuation, capitalization, or usage.

Polishing and Publishing

- Write a final draft that is free of errors. Share your writing with others.

1. Interrogative – Asks a question. Use a “?”
Would you share your cookies?

2. Declarative – Makes a Statement. Use a “.”
I will not share my cookies.

3. Imperative – Makes a command. Use a “.”
Share your cookies with me.

4. Exclamatory – Communicates strong emotion or surprise. Use an “!”
I cannot believe you ate 27 cookies!

NON-ALLOWABLE

***Example: Dolch Sight List
List 5**

from	want	put	every
good	don't	too	pretty
any	how	got	jump
about	know	take	green
around	right	where	four

* No sight word vocabulary, word walls, or content vocabulary should be displayed.

NON-ALLOWABLE

Accommodation 48

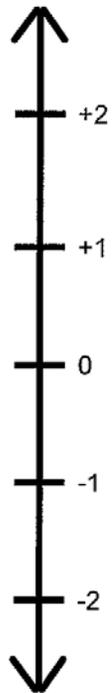
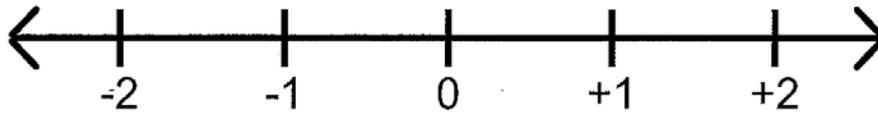
MATHEMATICS

ALLOWABLE

Allowable Memory Aid

Less Than | Greater Than

Allowable Memory Aid

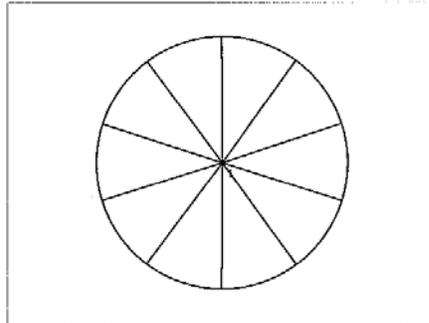
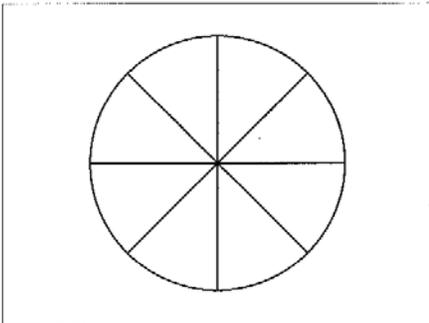
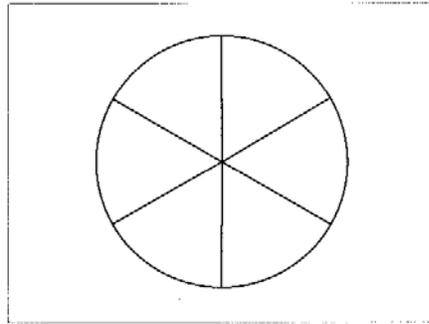
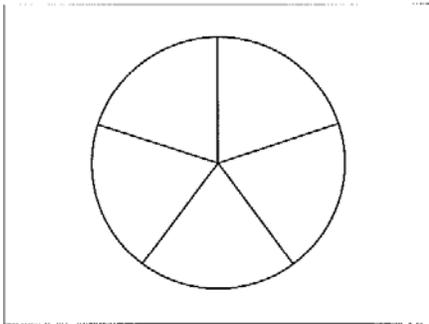
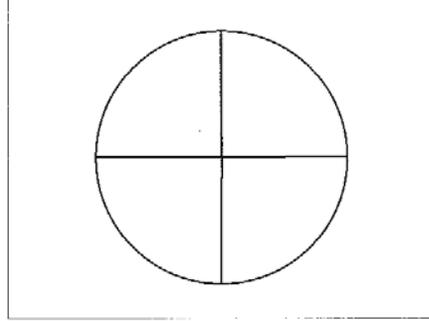
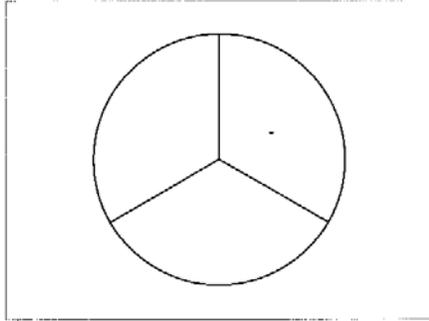


Allowable Memory Aid

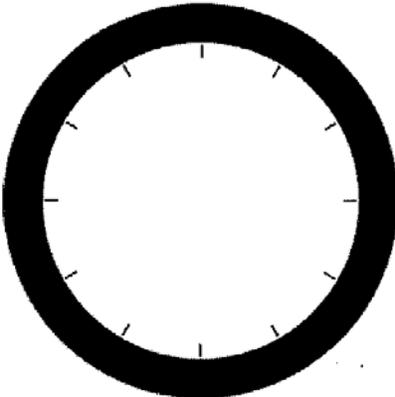
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Allowable Memory Aid

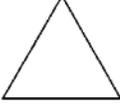
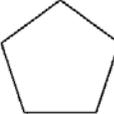
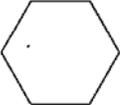
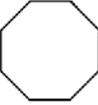
Allowable Memory Aid



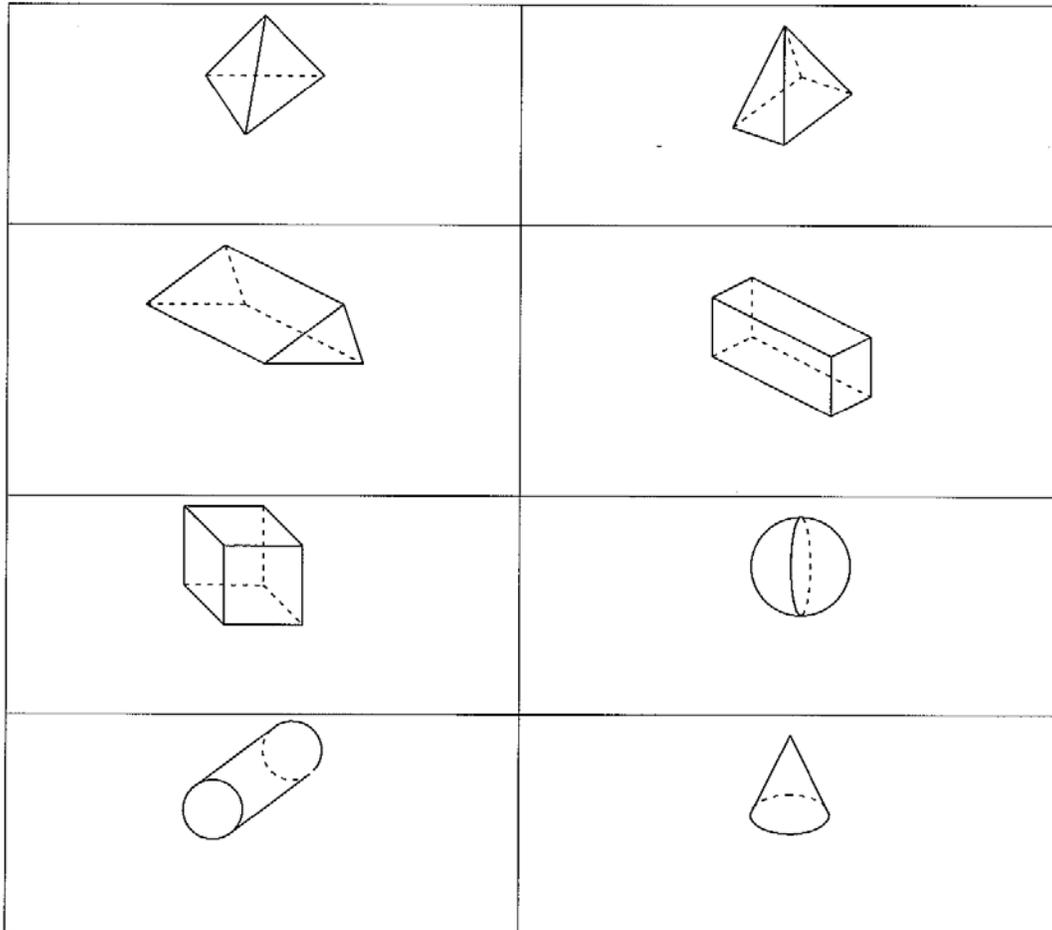
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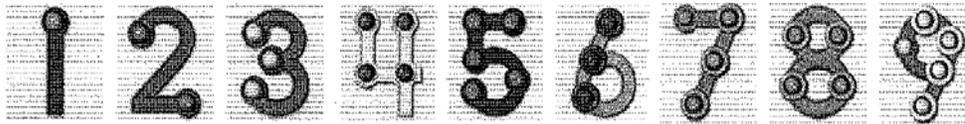
Allowable Memory Aid

Allowable Memory Aid



Allowable Memory Aid



Allowable Memory Aid

WORD BANK

HEXAGON
OCTAGON
PARALLELOGRAM
PENTAGON
QUADRILATERAL
RECTANGLE
RHOMBUS
SQUARE
TRAPEZOID
TRIANGLE

CONE
CUBE
CYLINDER
RECTANGULAR PRISM
RECTANGULAR PYRAMID
SPHERE
TRIANGULAR PRISM
TRIANGULAR PYRAMID

Allowable Memory Aid

DMSCB **Does McDonalds Sell Cheese Burgers?**
PEMDAS **Please Excuse My Dear Aunt Sally**
BEDMAS **Big Elephants Destroy Mice And Snails**
PEDMAS **Pink Elephants Destroy Mice And Snails**
KHDm dcm **King Henry Died Monday Drinking Chocolate Milk**

Accommodation 48

MATHEMATICS

NON-ALLOWABLE

Time

a.m. – between midnight and noon
 p.m. – between noon and midnight

midnight – 12:00 a.m.
 noon – 12:00 p.m.

1 minute = 60 seconds 1 year = 365 days
 1 hour = 60 minutes 1 leap year = 366 days
 1 day = 24 hours 1 decade = 10 years
 1 week = 7 days 1 century = 100 years
 1 year = 12 months
 1 year = 52 weeks + 1 day

Days in Each Month

1 <u>January</u> 31	7 <u>July</u> 31
2 <u>February</u> 28	8 <u>August</u> 31
3 <u>March</u> 31	9 <u>September</u> 30
4 <u>April</u> 30	10 <u>October</u> 31
5 <u>May</u> 31	11 <u>November</u> 30
6 <u>June</u> 30	12 <u>December</u> 31

Season	Begins	Goes through	Ends
Spring	Mar. 20, 21	April – May	June 21, 22
Summer	June 21, 22	July – August	Sept. 21, 22, 23
Fall	Sept. 21, 22, 23	Oct. – Nov.	Dec. 21, 22
Winter	Dec. 21, 22	Jan. – Feb.	Mar. 20, 21

Number Words

1	one	11	eleven	20	twenty
2	two	12	twelve	30	thirty
3	three	13	thirteen	40	forty
4	four	14	fourteen	50	fifty
5	five	15	fifteen	60	sixty
6	six	16	sixteen	70	seventy
7	seven	17	seventeen	80	eighty
8	eight	18	eighteen	90	ninety
9	nine	19	nineteen	100	one hundred
10	ten			1000	one thousand
				1,000,000	one million
		21	twenty-one		
		31	thirty-one		
		46	forty-six		
		58	fifty-eight		
		67	sixty-seven		
		73	seventy-three		
		85	eighty-five		
		94	ninety-four		

Addition Chart

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

Multiplication Chart

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144
13	13	26	39	52	65	78	91	104	117	130	143	156
14	14	28	42	56	70	84	98	112	126	140	154	168

Miscellaneous

Odd/Even

Odd numbers: 1, 3, 5, 7, 9, ...

Even numbers: 0, 2, 4, 6, 8, ...

Counts

1 dozen = 12 items

Less Than/Greater Than

15 < 50 50 > 15

little < big big > little

ORDER OF OPERATION/SYMBOLS

Do operations within parentheses.	()
Do powers (exponents) and roots.	$^2 \sqrt{\quad}$
Do multiplication and division in order from left to right.	$\times \div$
Do addition and subtraction in order from left to right.	$+ -$

OPERATIONS

Parentheses	$()$
Powers (exponents)	2
Roots	$\sqrt{\quad}$
Multiplication	\times
Division	\div
Addition	$+$
Subtraction	$-$

COMPARISONS

$<$ Is smaller than

$>$ Is greater than

$=$ Is equal to

\approx Approximate

\leq Is smaller or equal to

\geq Is greater or equal to

NON-ALL AVAILABLE

FRACTIONS

$\frac{3}{5}$ - numerator

the number above the line in a fraction

5 - denominator

the number below the line in a fraction

OPERATIONS WITH FRACTIONS

To **add** or **subtract** different fractions, first obtain a common denominator.

$$\frac{1}{3} + \frac{2}{5} = \frac{5}{15} + \frac{6}{15} = \frac{11}{15}$$

To **multiply**, multiply the numerators and multiply the denominators:

$$\frac{1}{3} \times \frac{2}{5} = \frac{1 \times 2}{3 \times 5} = \frac{2}{15}$$

To **divide**, multiply the first with the reciprocal of the second fraction:

$$\frac{2}{3} \div \frac{1}{6} = \frac{2}{3} \times \frac{6}{1} = \frac{12}{3} = 4$$

FRACTIONS, DECIMALS, PERCENTS – common equivalents

$$1 = 1.0 = 100\%$$

$$\frac{1}{2} = 0.5 = 50\%$$

$$\frac{1}{3} = 0.\bar{3} = 33.\bar{3}\%$$

$$\frac{1}{4} = 0.25 = 25\%$$

$$\frac{1}{5} = 0.2 = 20\%$$

$$\frac{1}{6} = 0.1\bar{6} = 16.\bar{6}\%$$

$$\frac{1}{8} = 0.125 = 12.5\%$$

$$\frac{1}{9} = 0.\bar{1} = 11.\bar{1}\%$$

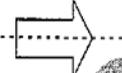
$$\frac{1}{10} = 0.1 = 10\%$$

$$\frac{1}{12} = 0.08\bar{3} = 8.\bar{3}\%$$

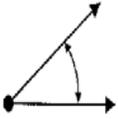
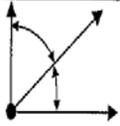
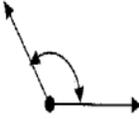
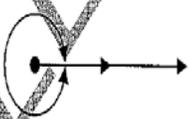
$$\frac{2}{3} = 0.\bar{6} = 66.\bar{6}\%$$

$$\frac{3}{4} = 0.75 = 75\%$$

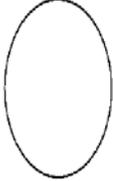
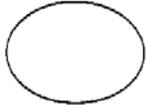
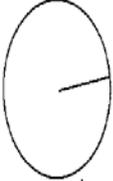
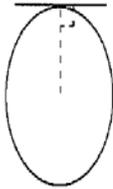
LINES

				
LINE	RAY	LINE OF SYMMETRY	PARALLEL LINES	LINE SEGMENT

ANGLES

 ANGLE / VERTEX	 0 DEGREE	 90° RIGHT ANGLE
 ACUTE less than 90°	 STRAIGHT 180°	 COMPLEMENTARY add up to 90°
 OBTUSE greater than 90° less than 180°	 COMPLETE 360°	 SUPPLEMENTARY add up to 180°

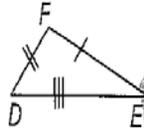
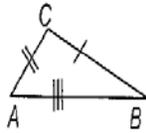
CIRCLES

				
ARC	CIRCLE	ELLIPSE		
				
SEMICIRCLE	RADIUS	DIAMETER	CHORD	TANGENT

TRIANGLES

	
SCALENE TRIANGLE	RIGHT TRIANGLE
	
ISOSCELES TRIANGLE	OBTUSE TRIANGLE
	
EQUILATERAL TRIANGLE	ACUTE TRIANGLE

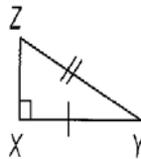
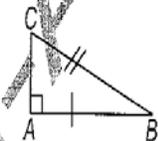
CONGRUENT TRIANGLES



$$\triangle ABC \cong \triangle DEF$$

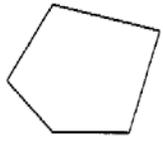
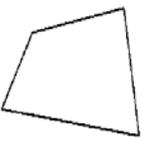
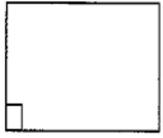
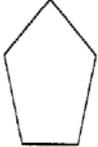
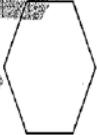
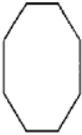
4 CONGRUENCY CASES

1. side, side, side SSS
2. side, angle, side SAS
3. angle, side, angle ASA
4. hypotenuse, side HyS

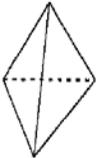
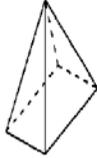
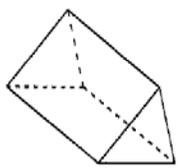
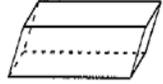


$$\triangle ABC \cong \triangle XYZ$$

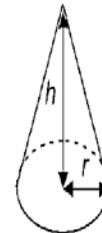
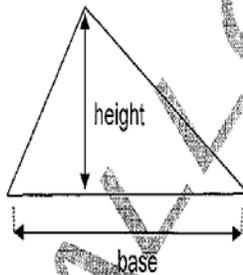
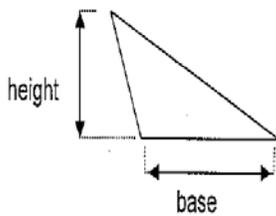
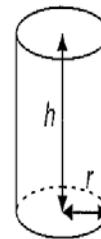
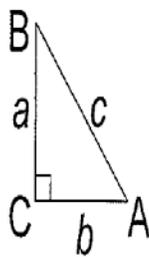
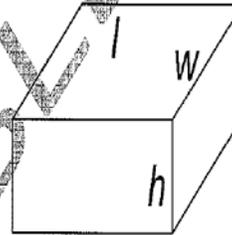
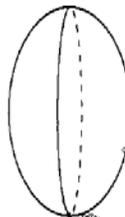
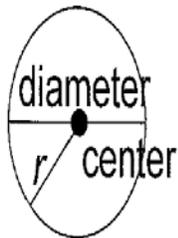
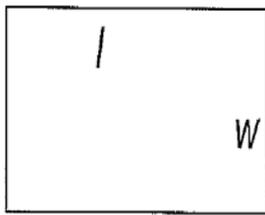
POLYGONS

 <p>POLYGON</p>	 <p>QUADRILATERAL</p>
 <p>TRAPEZOID</p>	 <p>PARALLELOGRAM</p>
 <p>RECTANGLE</p>	 <p>RHOMBUS</p>
 <p>SQUARE</p>	 <p>REGULAR PENTAGON</p>
 <p>REGULAR HEXAGON</p>	 <p>REGULAR OCTAGON</p>

SOLIDS

 <p>TRIANGULAR PYRAMID</p>	 <p>RECTANGULAR PYRAMID</p>
 <p>TRIANGULAR PRISM</p>	 <p>RECTANGULAR PRISM</p>
 <p>CUBE</p>	 <p>PARALLELEPIPED</p>
 <p>CYLINDER</p>	 <p>CONE</p>
 <p>SPHERE</p>	 <p>ELLIPSOID</p>

GEOMETRIC LABELS



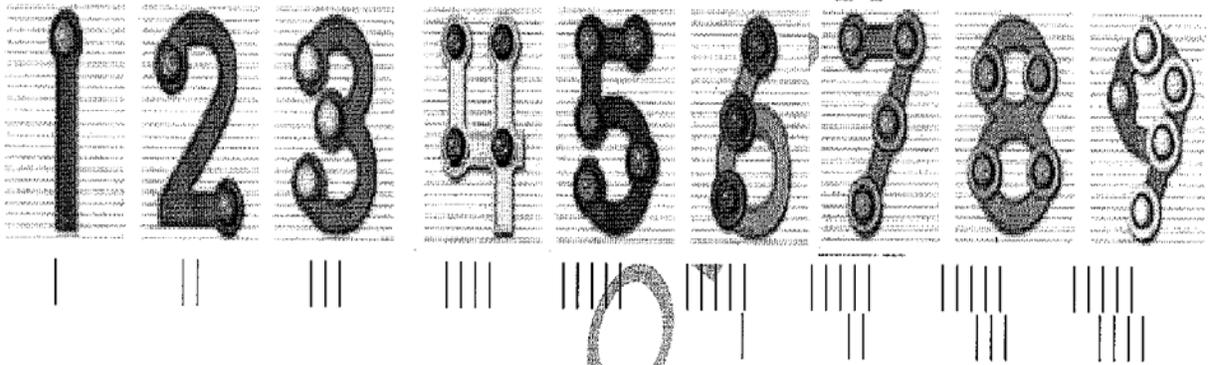
NON-ALIGNABLE

MULTIPLICATION TABLES

$1 \times 1 = 1$	$2 \times 1 = 2$	$3 \times 1 = 3$	$4 \times 1 = 4$	$5 \times 1 = 5$	$6 \times 1 = 6$
$1 \times 2 = 2$	$2 \times 2 = 4$	$3 \times 2 = 6$	$4 \times 2 = 8$	$5 \times 2 = 10$	$6 \times 2 = 12$
$1 \times 3 = 3$	$2 \times 3 = 6$	$3 \times 3 = 9$	$4 \times 3 = 12$	$5 \times 3 = 15$	$6 \times 3 = 18$
$1 \times 4 = 4$	$2 \times 4 = 8$	$3 \times 4 = 12$	$4 \times 4 = 16$	$5 \times 4 = 20$	$6 \times 4 = 24$
$1 \times 5 = 5$	$2 \times 5 = 10$	$3 \times 5 = 15$	$4 \times 5 = 20$	$5 \times 5 = 25$	$6 \times 5 = 30$
$1 \times 6 = 6$	$2 \times 6 = 12$	$3 \times 6 = 18$	$4 \times 6 = 24$	$5 \times 6 = 30$	$6 \times 6 = 36$
$1 \times 7 = 7$	$2 \times 7 = 14$	$3 \times 7 = 21$	$4 \times 7 = 28$	$5 \times 7 = 35$	$6 \times 7 = 42$
$1 \times 8 = 8$	$2 \times 8 = 16$	$3 \times 8 = 24$	$4 \times 8 = 32$	$5 \times 8 = 40$	$6 \times 8 = 48$
$1 \times 9 = 9$	$2 \times 9 = 18$	$3 \times 9 = 27$	$4 \times 9 = 36$	$5 \times 9 = 45$	$6 \times 9 = 54$
$1 \times 10 = 10$	$2 \times 10 = 20$	$3 \times 10 = 30$	$4 \times 10 = 40$	$5 \times 10 = 50$	$6 \times 10 = 60$
$1 \times 11 = 11$	$2 \times 11 = 22$	$3 \times 11 = 33$	$4 \times 11 = 44$	$5 \times 11 = 55$	$6 \times 11 = 66$
$1 \times 12 = 12$	$2 \times 12 = 24$	$3 \times 12 = 36$	$4 \times 12 = 48$	$5 \times 12 = 60$	$6 \times 12 = 72$

$7 \times 1 = 7$	$8 \times 1 = 8$	$9 \times 1 = 9$	$10 \times 1 = 10$	$11 \times 1 = 11$	$12 \times 1 = 12$
$7 \times 2 = 14$	$8 \times 2 = 16$	$9 \times 2 = 18$	$10 \times 2 = 20$	$11 \times 2 = 22$	$12 \times 2 = 24$
$7 \times 3 = 21$	$8 \times 3 = 24$	$9 \times 3 = 27$	$10 \times 3 = 30$	$11 \times 3 = 33$	$12 \times 3 = 36$
$7 \times 4 = 28$	$8 \times 4 = 32$	$9 \times 4 = 36$	$10 \times 4 = 40$	$11 \times 4 = 44$	$12 \times 4 = 48$
$7 \times 5 = 35$	$8 \times 5 = 40$	$9 \times 5 = 45$	$10 \times 5 = 50$	$11 \times 5 = 55$	$12 \times 5 = 60$
$7 \times 6 = 42$	$8 \times 6 = 48$	$9 \times 6 = 54$	$10 \times 6 = 60$	$11 \times 6 = 66$	$12 \times 6 = 72$
$7 \times 7 = 49$	$8 \times 7 = 56$	$9 \times 7 = 63$	$10 \times 7 = 70$	$11 \times 7 = 77$	$12 \times 7 = 84$
$7 \times 8 = 56$	$8 \times 8 = 64$	$9 \times 8 = 72$	$10 \times 8 = 80$	$11 \times 8 = 88$	$12 \times 8 = 96$
$7 \times 9 = 63$	$8 \times 9 = 72$	$9 \times 9 = 81$	$10 \times 9 = 90$	$11 \times 9 = 99$	$12 \times 9 = 108$
$7 \times 10 = 70$	$8 \times 10 = 80$	$9 \times 10 = 90$	$10 \times 10 = 100$	$11 \times 10 = 110$	$12 \times 10 = 120$
$7 \times 11 = 77$	$8 \times 11 = 88$	$9 \times 11 = 99$	$10 \times 11 = 110$	$11 \times 11 = 121$	$12 \times 11 = 132$
$7 \times 12 = 84$	$8 \times 12 = 96$	$9 \times 12 = 108$	$10 \times 12 = 120$	$11 \times 12 = 132$	$12 \times 12 = 144$

TOUCH-POINT NUMBERS



adapted from <https://www.touchmath.com/index.cfm?fuseaction=products.welcome&Cid=2&Pid=109>

PARTS OF A DOLLAR

Dollar
100¢ = \$1.00
1 dollar



\$1.00



75¢



50¢



25¢

NON-EXAMPLE

COIN REPRESENTATIONS

Penny
 $1\text{¢} = \$0.01$
1 cent



Nickel
 $5\text{¢} = \$0.05$
5 cents



Dime
 $10\text{¢} = \$0.10$
10 cents



Quarter
 $25\text{¢} = \$0.25$
25 cents



PROPERTIES OF ADDITION AND MULTIPLICATION

Commutative property
of addition

$$a + b = b + a$$

Commutative property
of multiplication

$$ab = ba$$

Associative property
of addition

$$a + (b + c) = (a + b) + c$$

Associative property
of multiplication

$$a(bc) = (ab)c$$

Distributive property
of multiplication over addition

$$a(b + c) = ab + ac$$

Distributive property
of multiplication over subtraction

$$a(b - c) = ab - ac$$

METRIC SYSTEM

kilo	hecto	deca		deci	centi	milli
------	-------	------	--	------	-------	-------

NON-AVAILABLE

METRIC SYSTEM CONVERSIONS

1000	100	10	1	0.1	0.01	0.001
kilo	hecto	deca		deci	centi	milli
km	hm	dam	m	dm	cm	mm
kg	hg	dag	g	dg	cg	mg
kl	hl	dal	l	dl	cl	ml

COMMON UNITS used with the International System

UNITS OF MEAS. ABBREV. RELATION

meter	m	length
hectare	ha	area
ton	t	mass
kilogram	kg	mass
nautical mile	M	distance (navigation)
knot	kn	speed (navigation)
liter	L	volume or Capacity
second	s	time
hertz	Hz	frequency
candela	cd	luminous intensity
degree Celsius	°C	temperature
kelvin	K	thermodynamic temperature
pascal	Pa	pressure, stress
joule	J	energy, work
newton	N	force
watt	W	power, radiant flux
ampere	A	electric current
volt	V	electric potential
ohm	Ω	electric resistance
coulomb	C	electric charge

MEASUREMENT CONVERSIONS

LENGTH / AREA			WEIGHT / CAPACITY		
to go from	to	multiply by	to go from	to	multiply by
cm	→ in	0.3937	g	→ oz	0.0353
in	→ cm	2.54	oz	→ g	28.35
m	→ ft	3.2808	kg	→ lbs	2.2046
km	→ mi	0.6214	t	→ T	1.1023
mi	→ km	1.609	T	→ t	0.9072
m ²	→ ft ²	10.76	ml	→ fl oz	0.0338
ft ²	→ m ²	0.0929	fl oz	→ ml	29.575
km ²	→ mi ²	0.3861	L	→ US gal	0.2642
mi ²	→ km ²	2.59	US gal	→ L	3.785

NON-AVAILABLE

METRIC SYSTEM

- 1 m² = 10,000 cm²
- 1 hectare (ha) = 10,000 m²
- 1 km² = 100 ha
- 1 metric ton (t) = 1,000 kg

ENGLISH SYSTEM

Length

$$1 \text{ foot (ft)} = 12 \text{ inches (in)} = 1' = 12''$$

$$1 \text{ yard (yd)} = 3 \text{ feet} = 36 \text{ inches}$$

$$1 \text{ mile (mi)} = 1,760 \text{ yards} = 5,280 \text{ feet}$$

Liquid

$$1 \text{ tablespoon (T)} = 3 \text{ teaspoons (t)}$$

$$1 \text{ cup (c)} = 16 \text{ T} = 8 \text{ fluid ounces (fl oz)}$$

$$1 \text{ pint (pt)} = 2 \text{ c}$$

$$1 \text{ quart (qt)} = 2 \text{ pt} = 4 \text{ c} = 32 \text{ fl oz}$$

$$1 \text{ gallon (gal)} = 4 \text{ qt}$$

Weight

$$1 \text{ pound (lb)} = 16 \text{ ounces (oz)}$$

$$1 \text{ ton (t)} = 2000 \text{ pounds}$$

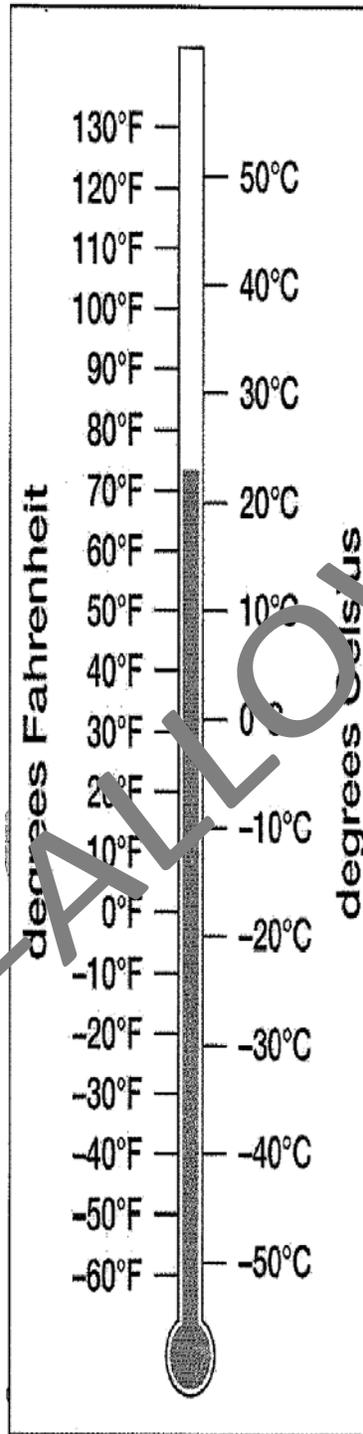
Area

$$1 \text{ ft}^2 = 144 \text{ in}^2$$

$$1 \text{ yd}^2 = 9 \text{ ft}^2$$

$$1 \text{ acre} = 4,840 \text{ yd}^2$$

TEMPERATURE



NON ALLOWABLE

TEMPERATURE CONVERSIONS

$^{\circ}\text{C} \rightarrow ^{\circ}\text{F}$

$n \times 1.8$; add 32

$^{\circ}\text{F} \rightarrow ^{\circ}\text{C}$

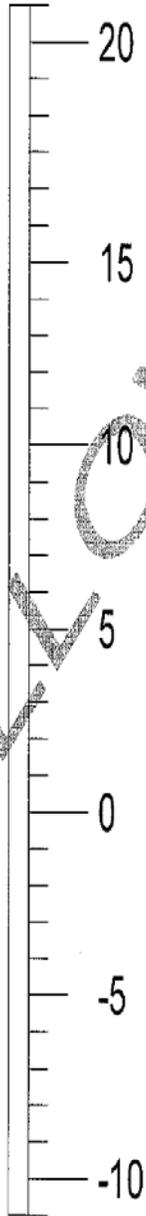
$n - 32$; multiply by 0.5555

TEMPERATURE



NON-ALLOWABLE

TEMPERATURE



NON-AVAILABLE

PLACE VALUE

hundred millions ten millions millions
hundred thousands ten thousands thousands
hundreds tens ones
tenths hundredths thousandths

NON-ALL AVAILABLE

COMPASS



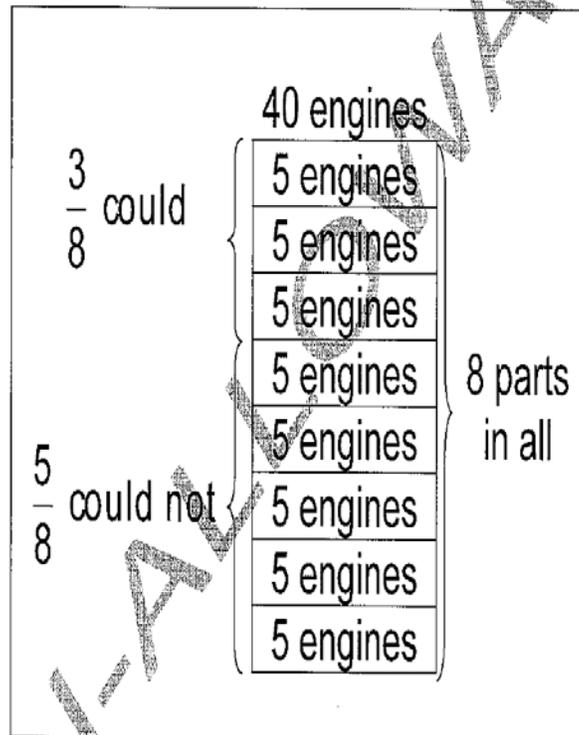
The sun rises in the east
and sets in the west.

NON-AVAILABLE

HALF OF A NUMBER

To find half of a number,
divide by two.

$\frac{3}{8}$ OF THE 40 ENGINES COULD



FIND THE MISSING NUMBERS

(Word Problem Thinking Patterns: Sketch the pattern. Record the information.)

<p>SOME, SOME MORE</p>	<p>Some ← If missing, subtract. <u>+ Some more</u> ← If missing, subtract. Total ← If missing, add.</p>
<p>SOME WENT AWAY</p>	<p>Some ← If missing, add. <u>- Some went away</u> ← If missing, subtract. What's left ← If missing, subtract.</p>
<p>LARGER, SMALLER, DIFFERENCE</p>	<p>Larger ← If missing, add. <u>- Smaller</u> ← If missing, subtract. Difference ← If missing, subtract.</p>
<p>LATER, EARLIER, DIFFERENCE</p>	<p>Later ← If missing, add. <u>- Earlier</u> ← If missing, subtract. Difference ← If missing, subtract.</p>
<p>EQUAL GROUPS</p>	<p>Number in each group ← If missing, divide. <u>× Number of groups</u> ← If missing, divide. How many ← If missing, multiply.</p>

PRIME NUMBERS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

DIVISIBILITY RULES

A whole number is divisible by...

2	if the last digit is 0,2,4,6,8.	6	if the number is divisible by both 2 and 3.
3	if the sum of the digits is divisible by 3.	9	if the sum of the digits is divisible by 9.
5	if the last digit is 5 or 0.	10	if the last digit is 0.

SYMBOLS

Addition	+	Equal	=	Percent	%
Angle	\sphericalangle	Greater than	$>$	Perpendicular	\perp
Arc	\frown	Less than	$<$	Pi	π
Decimal point	.	Line segment	—	Ray	$\overrightarrow{\quad}$
Degree	$^\circ$	Multiplication	\times	Right Angle	L
Division	\div	Number	#	Set	{ }
Dollar	\$	Parallel		Subtraction	-

NUMBERS

Prime Number:	A whole number which has only two factors, itself and 1.	Examples: 2, 3, 7, 11, 13, 17.
Common Factor:	A number that is a factor of two or more numbers.	Examples: 1, 2, and 4 are common factors of 12 and 16.
Greatest Common Factor:	The greatest number that is a factor of two or more numbers	Example: 4 is the greatest common factor of 12 and 16.
Least Common Multiple:	The smallest number that is a multiple of two or more numbers.	Example: 12 is the least common multiple of 2, 3, 4, and 6.

METRIC SYSTEM

Length		
	1 centimeter (cm)	= 10 millimeters (mm)
	1 decimeter (dm)	= 100 millimeters
	1 decimeter	= 10 centimeters
	1 meter (m)	= 1000 millimeters
	1 meter	= 100 centimeters
	1 meter	= 10 decimeters
	1 decameter (dkm)	= 10 meters
	1 kilometer (km)	= 1000 meters
Liquid		
	1 liter (L)	= 1000 milliliters (mL)
Weight		
	1 gram (g)	= 1000 milligrams (mg)
	1 kilogram (kg)	= 1000 grams

ROMAN NUMERALS

I	=	1
V	=	5
X	=	10
L	=	50
C	=	100
D	=	500
M	=	1000

NON-AVAILABLE

CONVERSIONS

Small to Large	Multiply
Large to Small	Divide

COMMON SQUARES AND SQUARE ROOTS

n	n^2	\sqrt{n}	n	n^2	\sqrt{n}
1	1	1	15	225	3.873
2	4	1.414			
3	9	1.732	20	400	4.472
4	16	2			
5	25	2.236	25	625	5
6	36	2.449			
7	49	2.646	100	10000	10
8	64	2.828			
9	81	3	1/2	1/4	0.707
10	100	3.162	1/4	1/16	1/2
11	121	3.317			
12	144	3.464			

PROBLEM SOLVING STEPS

1	UNDERSTAND & EXPLORE	First things first: find out what the real problem is.
2	GUESS & CHECK	Make a reasonable guess and check it out; try again if necessary.
3	SOLVE THE PROBLEM	Sort out all the information, draw a picture, graph or table, and write it out in math. Sometimes it may help to work backward!
4	CHECK YOUR ANSWER	Think logically... does your solution make sense? Try it out if you can.

$$a(b+c) = ab + ac$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

EXPANDING

$$(a+b)(c+d) = ac + ad + bc + bd$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

FACTORING

$$a^2 - b^2 = (a+b)(a-b)$$

$$a^2 + 2ab + b^2 = (a+b)^2$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$a^2b - ab = ab(a^2 - 1) = ab(a+1)(a-1)$$

$$a^2 - 2ab + b^2 = (a-b)^2$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

QUADRATIC FORMULA

The solution for a quadratic equation

$$ax^2+bx+c=0$$

is given by the

quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

PROPERTIES OF EXPONENTS

If $a, b \in \mathbb{R}$, $a, b \geq 0$, and $p, q, r, s \in \mathbb{Q}$, then:

1	$a^r a^s = a^{r+s}$	}	$\frac{a^p a^q}{a^r} = a^{p+q-r}$	5	$\left(\frac{a}{b}\right)^r = \frac{a^r}{b^r} \quad (b \neq 0)$
2	$\frac{a^r}{a^s} = a^{r-s}$			6	$a^0 = 1 \quad (a \neq 0)$
3	$(a^r)^s = a^{rs}$	7	$a^{-r} = \frac{1}{a^r} \quad (a \neq 0)$		
4	$(ab)^r = a^r b^r$	8	$a^{\frac{r}{s}} = \sqrt[s]{a^r} \quad a^{\frac{1}{2}} = \sqrt{a} \quad a^{\frac{1}{3}} = \sqrt[3]{a}$		

PROPERTIES OF LOGARITHMS

$\log(xy) = \log x + \log y$	$\log\left(\frac{x}{y}\right) = \log x - \log y$
$\log y^r = r \log x$	
$\log x = n \leftrightarrow x = 10^n$ (common log)	$\pi \approx 3.14159265$
$\log_a x = n \leftrightarrow x = a^n$ (log to the base a)	$e \approx 2.71828183$
$\ln x = n \leftrightarrow x = e^n$ (natural log)	

Testing Accommodations Chart (CUM Copy)

Directions: Complete the information below and circle the accommodations for each assessment in which the student will participate.

School: _____ Grade: _____ Age: _____ Student Name: _____

Form Completed by (print name): _____ Initial Review Date: _____

Teacher's Signature: _____ Subsequent Review Date: _____

Circle one: General ELL 504 Plan IEP

	#	ACCOMMODATION	GEN	ELL		CPAS	MCT2			SATP2				MWAP3	MST
			General (ALL students)	SATP2, CPAS, MCT2, MST, MWAP	ACCESS for ELLs®	Vocational Education	L.A. - Reading	L.A. - Writing	Mathematics	Algebra I	Biology I	Eng. II MC - Read. / Vocab.	Eng. II MC - Writing/Grammar	U.S. History	Writing Assessment English II
Setting	1	At the front of the room	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	2	Facing test administrator while directions given	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	3	In a small group	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	4	Individually to accommodate specific disability	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	5	In a familiar room	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	6	With a familiar teacher	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	7	At home (only for homebound students)	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	8	In a study carrel	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	9	With special lighting	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	10	Specialized table to fit a student's wheelchair	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

11	Secure paper to work area with magnets/tape	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
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	#	ACCOMMODATION	GEN	ELL		CPAS	MCT2			SATP2				MWAP3	MST
			General (ALL students)	SATP2, CPAS, MCT2, MST, MWAP	ACCESS for ELLs®	Vocational Education	L.A. - Reading	L.A. - Writing	Mathematics	Algebra I	Biology I	Eng. II MC - Read. / Vocab.	Eng. II MC - Writing/Grammar	U.S. History	Writing Assessment English II
Timing / Scheduling	21	With scheduled rest breaks	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	22	At time of day to accommodate student's disability	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	23	Until, in test administrator's judgment, the pupil can no longer continue the activity	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	24	Administer the test over several sessions, specifying the duration of each session (MDE prior approval required) REFER TO NOTE 4	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	25	Administer the test over several days, specifying the duration of each day's session (MDE prior approval required) REFER TO NOTES 4 & 16	N	Y	Note 16	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Presentation	40	Large print	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	41	Braille REFER TO NOTE 5	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	42	Hearing aids	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	43	Auditory trainers	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	44	Transparent color overlays	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	45	Magnifying glasses/magnifying equipment	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	46	Templates to reduce visible print	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

47	Provide cues (e.g., arrows and stop signs) on answer form in pencil REFER TO NOTE 6	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
48	Use of memory aids, fact charts, resource sheets, and/or abacus REFER TO NOTE 7	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

#	ACCOMMODATION	GEN	ELL		CPAS	MCT2			SATP2				MWAP3	MST	
		General (ALL students)	SATP2, CPAS, MCT2, MST, MWAP	ACCESS for ELLs®	Vocational Education	L.A. - Reading	L.A. - Writing	Mathematics	Algebra I	Biology I	Eng. II MC - Read. / Vocab.	Eng. II MC - Writing/Grammar	U.S. History	Writing Assessment English II	Science 5 & 8
49	Clue student to stay on task	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
50	Highlight key words/phrases in directions (e.g., complete sentences, show your work) by the teacher	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
53	Read test directions (but not test items) to individual students or a group -- repeating and/or paraphrasing directions if needed REFER TO NOTE 8 & 9	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
55	Read test directions and test items to individual students or a group -- repeating directions/items, but not paraphrasing REFER TO NOTES 8 & 9	N	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
58	Read test directions and test items to individual students or a group -- repeating and/or paraphrasing only the directions if needed REFER TO NOTES 8 & 9	N	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y
60	Use of highlighter (yellow only) by student in test booklet	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

	61	Calculator (MCT2 Mathematics: Allowable only in grades 7 and 8) REFER TO NOTE 15	N	Note 15	N	N	N	N	Note 15	Y	N	N	N	N	N	N
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#	ACCOMMODATION	GEN	ELL		CP AS	MCT2			SATP2				MWAP3	MST	
		General (ALL students)	SATP2, CPAS, MCT2, MST, MWAP	ACCESS for ELLs®	Vocational Education	L.A. - Reading	L.A. - Writing	Mathematics	Algebra I	Biology I	Eng. II MC - Read. / Vocab.	Eng. II MC - Writing/Grammar	U.S. History	Writing Assessment English II	Science 5 & 8
Response	70	Dictation of answers to test administrator/proctor (scribe) REFER TO NOTE 10	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	72	Allow marking of answers in booklet and transferring of answers from test booklet/answer document to answer document by test administrator (i.e., large print) REFER TO NOTE 11	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	73	Tape record responses for later verbatim translation REFER TO NOTE 12	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	74	Provide copying assistance between drafts REFER TO NOTES 10 & 11	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	75	Braille	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	76	Communication board	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	77	Augmentative communicative device	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	78	Computer / word processor (without grammar/syntax checker & without work completion/prediction feature) REFER TO NOTE 13	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	79	Computer / word processor (without grammar/syntax checker, with completion/prediction activated)	N	N	N	Y	Y	Y	Y	Y	Y	N	Y	N	Y
	80	Adapted keyboards	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

		GEN	ELL		CP AS	MCT2			SATP2				MWAP3	MST		
#	ACCOMMODATION	General (ALL students)	SATP2, CPAS, MCT2, MST, MWAP	ACCESS for ELLs®	Vocational Education	L.A. - Reading	L.A. - Writing	Mathematics	Algebra I	Biology I	Eng. II MC - Read. / Vocab.	Eng. II MC - Writing/Grammar	U.S. History	Writing Assessment English II	Science 5 & 8	
Response	81	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	
		Native language dictionaries for ELL students (i.e. dictionaries that translate English words into the native language - no definitions are given in either language REFER TO NOTE 14														
	82	N	N	N	N	N	N	Y	Y	Y	N	N	Y	N	Y	
		Spelling dictionaries (dictionaries show correct spelling of English words; do not give definitions).														
98	Other allowable accommodation	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
99	Other non-allowable accommodation	N	N	N	N	N	N	N	N	N	N	N	N	N	N	