MCAS Grade 10 Mathematics Test/Retest
Approved Blank Supplemental Reference Sheet for Students with Accommodation A9

INSTRUCTIONS:

The following supplemental reference sheet is ONLY for students who have accommodation A9 listed in their IEP or 504 plan.

Before testing:

Schools should print out the following pages and distribute to students who have accommodation A9 so that students can practice using the supplemental reference sheet. Schools should also remind students that during testing they may only use a reference sheet that has not yet been filled in.

During testing:

At the start of each test session, test administrators should check that that they are only providing supplemental reference sheets that have not already been filled in, and that they are providing them only to students who have accommodation A9 in their IEP or 504 plan.

Test administrators should remind students that they may not use any sheets that were filled in previously, nor any other reference materials or notes. Results **may be invalidated** for students who use a supplemental reference sheet that has already been filled in.

MCAS Grade 10 Mathematics Test/Retest

Approved Blank Supplemental Reference Sheet for Students with Accommodation A9

Note: Students may ONLY be provided with a blank reference sheet to use during testing.

General Problem-Solving Process

1. Read/reread the problem for understanding.
2. Identify what the question is asking.
3. Make a plan to solve the problem. (*Choose at least one strategy.*)
   - Draw a picture.
   - Create a table, chart, or list.
   - Look for a pattern.
   - Work backwards.
   - Write a number sentence or an equation.
4. Solve the problem.
5. Reread the problem to see if your solution makes sense.

Properties

- $a(b + c) = ab + ac$
- $a + (b + c) = (a + b) + c$
- $a \cdot (b \cdot c) = (a \cdot b) \cdot c$
- $a \cdot b = b \cdot a$
- $a + b = b + a$
- $a - (-b) = a + b$
- $a + (-b) = a - b$
- FOIL

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

	a	b
c	ac	bc
d	ad	bd

Fractions

- $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$
- $\frac{a}{b} - \frac{c}{d} = \frac{ad - bc}{bd}$
- $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$
- $\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}$

Vocabulary

- $factor \cdot factor = product$
- $dividend \div divisor = quotient$
- $\frac{numerator}{denominator}$

Divisibility Rules

2	If the last digit is even
3	If the sum of the digits can be divided by 3
5	If the last digit is 0 or 5
6	If the number is divisible by both 2 and 3
9	If the sum of the digits can be divided by 9
10	If the last digit is 0

Order of Operations

PEMDAS

1. **P**arentheses (brackets, etc.)
2. **E**xponents
3. **M**ultiplication or **D**ivision (left to right)
4. **A**ddition or **S**ubtraction (left to right)

GEMA

1. **G**rouping
2. **E**xponents
3. **M**ultiplicative operations (multiplication or division — left to right)
4. **A**dditive operations (addition or subtraction — left to right)

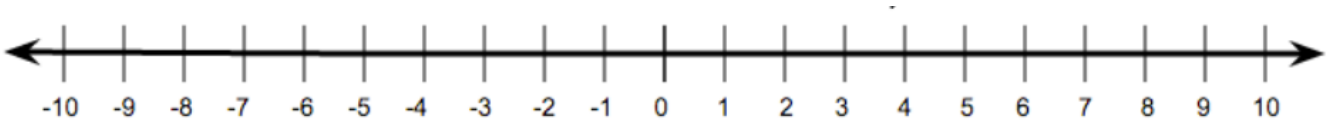
MASSACHUSETTS
Department of Elementary and Secondary Education

Probability	Percentages and Proportions
$\text{Probability} = \frac{favorable\ outcomes}{possible\ outcomes}$	• $\frac{is}{of} = \frac{\%}{100}$ • $x\% = \frac{x}{100}$ • if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$

Statistics	Transformations
• Mean—Average • Median—Middle • Mode—Most often • Range—Least to Greatest	• Translation—Slide • Reflection—Flip • Rotation—Turn

Geometry and Measurement Abbreviations	Symbols
• l = length • w = width • h = height • s = length of a side • b = length of the base • r = radius • d = diameter • A = area • B = area of the base • P = perimeter • C = circumference • M = midpoint	• $>$ is greater than • $<$ is less than • $=$ is equal to • $\lvert x \rvert$ = absolute value of x • $\geq$ is greater than or equal to • $\leq$ is less than or equal to • $\neq$ is not equal to • $\approx$ is approximately equal to • $\cong$ is congruent to • $\sim$ is similar to • $\parallel$ is parallel to • $\perp$ is perpendicular to

Number Line



Angles

- Complementary 90
- Supplementary 180

General Formulas	Coordinate Plane
• $\pi \approx 3.14$ • $a^2 + b^2 = c^2$ • $d = rt$ **d**istance = **r**ate • **t**ime • $I = prt$ **I**nterest = **p**rincipal • **r**ate • **t**ime • $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	• $Ax + By = C$ • Slope or Rate of Change $(m) = \frac{y_2 - y_1}{x_2 - x_1} = \frac{Rise}{Run}$ • $y = mx + b$ • $y - y_1 = m(x - x_1)$ • Midpoint $(M) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ • Distance $(d) = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$