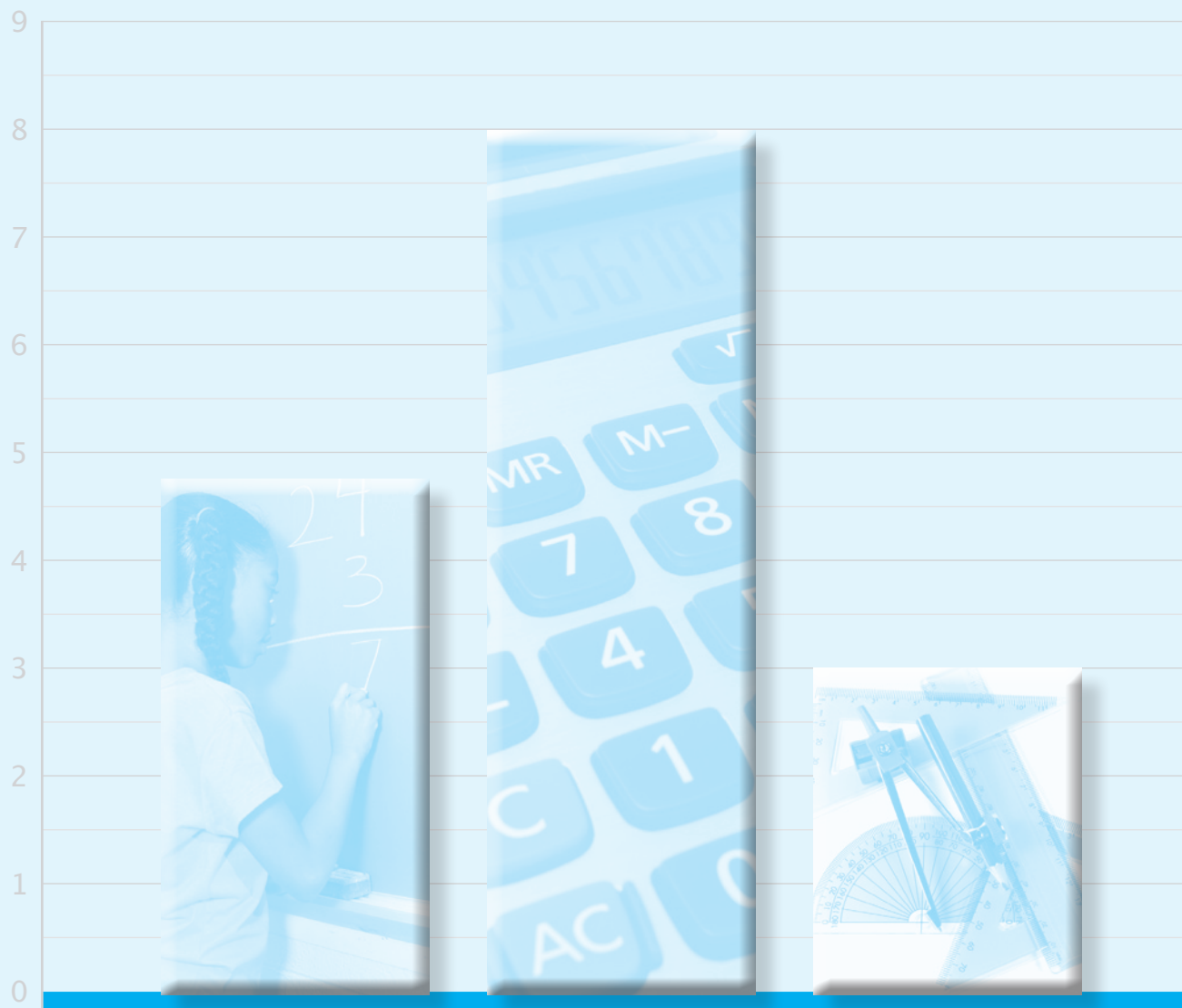


3rd
4th
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Grade
8

meapTM
Michigan Educational Assessment Program

Item Descriptors



MATHEMATICS
FALL 2009

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Portions of this work were previously published.

Printed in the United States of America.

Students were instructed to read the directions below silently as the test administrator read them aloud.

PART 1

DIRECTIONS

This test has two parts. You may **NOT** use a calculator on Part 1. You may use open space in this test booklet for scratch paper. No additional paper may be used.

Part 1 has only multiple-choice questions. You must choose the **best** answer from among four answer choices.

- Use only a No. 2 pencil to mark your answer in your **Answer Document**.
- If you erase an answer, be sure to erase it completely.
- If you skip a question, be sure to mark the answer to the next question in the correct place in your **Answer Document**.

Sample Multiple-Choice Question:

Marty wants to put 75 CDs into cases. Each case holds exactly 8 CDs. What is the **least** number of cases that Marty will need to hold all his CDs?

- A** 8
- B** 9
- C** 10
- D** 11

For this sample question, the correct answer is **C**. Circle **C** is filled in on the sample question in your **Answer Document**.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page.

If you finish early, you may check your work in Part 1 of the test **ONLY**. Do **NOT** look at questions in Part 2 of the test.

**MEAP GRADE 8 MATHEMATICS TEST
Reference Sheet**

Use this information as needed to answer questions on the MEAP Grade 8 Test.

Miscellaneous

Distance = rate × time

Interest = principal × rate × time

$\pi \approx 3.14$

Algebra

Straight Line: $y = mx + b$

If (x_1, y_1) and (x_2, y_2) are on a line, then

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Area



Triangle:

$$A = \frac{1}{2}(\text{base}) \times \text{height}$$



Rectangle:

$$A = \text{base} \times \text{height}$$



Trapezoid:

$$A = \frac{1}{2}(\text{sum of the bases}) \times \text{height}$$



Parallelogram:

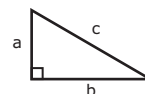
$$A = \text{base} \times \text{height}$$



Circle:

$$A = \pi r^2 \quad \text{Circumference} = 2\pi r = \pi d$$

Right Triangles



$$a^2 + b^2 = c^2$$

Total Surface Area		Volume	
Cylinder:	SA = circumference of the base × height + $2\pi r^2$		$V = \pi r^2 \times \text{height}$
Cube:	SA = $6 \times (\text{length of edge})^2$		$V = (\text{length of edge})^3$
Pyramid:	SA = $\frac{1}{2}$ (perimeter of base) × (slant height) + area of the base		$V = \frac{1}{3}$ (area of base) × (altitude)
Sphere:	SA = $4\pi r^2$		$V = \frac{4}{3} \pi r^3$
Cone:	SA = $\frac{1}{2}$ (circumference of base) × (slant height) + πr^2		$V = \frac{1}{3} \pi r^2 \times \text{height}$
Prism:	SA = sum of the area of the faces		$V = \text{area of base} \times \text{height}$

NOTE: For each item listed throughout this booklet, the first statement is a summary of the Michigan Grade Level Content Expectation (GLCE) and the second statement or problem is the descriptor for the item's stem or question.

- 1 A.PA.07.01:** Recognize proportional or linear relationships.

Identify the table that represents a linear relationship.

- A** table does not represent a linear relationship
- B** table does not represent a linear relationship
- C** correct
- D** table does not represent a linear relationship

- 2 A.PA.07.01:** Recognize proportional or linear relationships.

Identify the formula that shows a linear relationship.

- A** correct
- B** formula of quadratic relationship
- C** formula of third degree relationship
- D** formula of nonlinear relationship

- 3 A.RP.07.02:** Show linear relationships with tables, graphs, and formulas.

Translate the table to an equation.

- A** equation matches only first pair of values in table
- B** correct
- C** equation of inverse relationship
- D** equation matches only last pair of values in table

- 4 A.RP.07.02:** Show linear relationships with tables, graphs, and formulas.

Translate the linear equation to a graph.

- A** graph of equation with reciprocal of slope
- B** correct
- C** graph of equation with multiplicative inverse of slope
- D** graph of equation with additive inverse of reciprocal of slope

- 5 N.FL.07.09:** Estimate the results of computations with rationals.

Proper fraction \times 3-digit number

- A** correct
- B** overestimate of product
- C** overestimate of product
- D** overestimate of product

- 6 N.FL.07.09:** Estimate the results of computations with rationals.

Estimate the percentage of a 3-digit number.

- A** $ab\%$ of $cdf = cdf/ab$
- B** correct
- C** overestimate
- D** overestimate

- 7 N.FL.07.07:** Solve problems involving operations with integers.

Subtract a negative integer from a positive integer, in the context of temperature.

- A** $a - (-b) = a - b$
- B** incorrect subtraction
- C** incorrect subtraction
- D** correct

- 8 N.FL.07.07:** Solve problems involving operations with integers.

Subtract with integers, in context.

- A** addend
- B** correct
- C** incorrect operation
- D** incorrect operation

- 9 N.FL.07.08:** Add, subtract, multiply, and divide rational numbers.

Divide a mixed number by a mixed number.

- A** $a/b \div c/d = c/d \div a/b$
- B** $a/b \div c/d = (a + c)/(b + d)$
- C** correct
- D** $a/b \div c/d = a/b \times c/d$

- 10 N.FL.07.08:** Add, subtract, multiply, and divide rational numbers.

Add two rational numbers.

- A** $a/b + c/d = (a + b)/(c \times d)$
- B** $a/b + c/d = (a \times b)/(c \times d)$
- C** $a/b + c/d = (a + b)/(c + d)$
- D** correct

- 11 A.RP.07.10:** Know the properties of the graph of $y = k/x$.

Translate the equation to a graph.

- A** linear
- B** parabolic
- C** third degree
- D** correct

- 12 G.SR.07.01:** Use a ruler and other tools to draw polygons.

Identify the rectangle with the area given in square centimeters.

- A** smaller area
- B** half of area
- C** correct
- D** smaller area

- 13 A.PA.07.06:** Compute the slope of a linear equation.

Calculate the slope of the line represented in the table.

- A** reciprocal of change in y-values
- B** reciprocal of slope
- C** correct
- D** change in y-values, but no change in x-values

- 14 A.PA.07.11:** Understand and use basic properties of real numbers.

Solve the linear equation.

- A** additive inverse of reciprocal of solution
- B** additive inverse of solution
- C** correct
- D** reciprocal of solution

Students were instructed to read the directions below silently as the test administrator read them aloud.

PART 2

DIRECTIONS

You will now begin Part 2 of this test. You may use a calculator on this part of the test, and you may use open space in this test booklet for scratch paper. No additional paper may be used.

This part of the test has only multiple-choice questions. You must choose the **best** answer from among four answer choices.

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Sample Multiple-Choice Question:

Marty wants to put 75 CDs into cases. Each case holds exactly 8 CDs. What is the **least** number of cases that Marty will need to hold all his CDs?

- A** 8
- B** 9
- C** 10
- D** 11

For this sample question, the correct answer is **C**. Circle **C** is filled in on the sample question in your **Answer Document**.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page.

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**MEAP GRADE 8 MATHEMATICS TEST
Reference Sheet**

Use this information as needed to answer questions on the MEAP Grade 8 Test.

Miscellaneous

Distance = rate × time

Interest = principal × rate × time

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Straight Line: $y = mx + b$

If (x_1, y_1) and (x_2, y_2) are on a line, then

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Area



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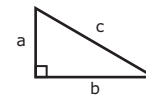
$A = \text{base} \times \text{height}$









Circle:

$A = \pi r^2$ Circumference = $2\pi r = \pi d$

Right Triangles



$a^2 + b^2 = c^2$

Total Surface Area		Volume	
Cylinder:	SA = circumference of the base × height + $2\pi r^2$		$V = \pi r^2 \times \text{height}$
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Sphere:	SA = $4\pi r^2$		$V = \frac{4}{3}\pi r^3$
Cone:	SA = $\frac{1}{2}(\text{circumference of base}) \times (\text{slant height}) + \pi r^2$		$V = \frac{1}{3}\pi r^2 \times \text{height}$
Prism:	SA = sum of the area of the faces		$V = \text{area of base} \times \text{height}$

- 15 A.PA.07.06:** Compute the slope of a linear equation.

Calculate the slope of the line on a coordinate plane.

- A correct
- B reciprocal of correct slope
- C additive inverse of reciprocal
- D additive inverse of correct slope

- 16 A.FO.07.12:** Compute simple linear algebraic expressions.

Apply the distributive property to the algebraic expression.

- A $a(bx + c) = (a + b)x + c$
- B $a(bx + c) = (a + b)x + a + b$
- C $a(bx + c) = (a)(b)x + c$
- D correct

- 17 A.PA.07.11:** Compute simple linear algebraic expressions.

Identify the algebraic property.

- A incorrect property
- B incorrect property
- C incorrect property
- D correct

- 18 A.FO.07.12:** Compute simple linear algebraic expressions.

Identify the equivalent expression.

- A subtracted instead of added linear variables
- B subtracted instead of added constants
- C correct
- D ignored one of the linear variables

- 19 D.RE.07.01:** Create, select, and interpret graphical representations.

Use a stem-and-leaf plot to find the range.

- A greatest value of 4th stem minus greatest value of 2nd stem
- B least value of middle stem minus greatest value of middle stem
- C least value of greatest stem minus greatest value of least stem
- D correct

- 20 D.RE.07.01:** Create, select, and interpret graphical representations.

Identify the box-and-whisker plot that matches the given data.

- A incorrect minimum
- B correct
- C incorrect Q1
- D missing minimum

- 21 D.AN.07.02:** Make and interpret scatterplots; find the line of best fit.

Interpret the line of best fit.

- A** incorrect claim about given scatterplot
- B** inverse relationship
- C** incorrect claim about scatterplots
- D** correct

- 22 D.AN.07.02:** Make and interpret scatterplots; find the line of best fit.

Find the line of best fit to estimate value.

- A** maximum value on y-axis
- B** overestimate
- C** correct
- D** underestimate

- 23 N.FL.07.03:** Calculate rates of change, including speed.

Calculate the total number of words typed, given the subtotal.

- A** words typed per minute
- B** subtotal \times subtotal time
- C** correct
- D** subtotal \times total time

- 24 A.PA.07.05:** Use proportional and linear relationships.

Compare the graphs of linear equations.

- A** correct
- B** incorrect statement about intercepts
- C** incorrect statement about relationships
- D** incorrect statement about origin

- 25 N.FL.07.03:** Calculate rates of change, including speed.

Calculate the total number of miles driven, given the subtotal.

- A** miles driven per hour
- B** correct
- C** subtotal \times subtotal time
- D** subtotal \times total time

- 26 N.FL.07.05:** Solve proportion problems.

Calculate the subtotal distance, given the total time and distance.

- A** total distance \div total time
- B** correct
- C** total distance $-$ total time
- D** total distance \times subtotal time

- 27 A.PA.07.03:** Graph linear equations and interpret the slope.

Identify the graph that matches, given the context.

- A** correct
- B** incorrect slope, incorrect y-intercept
- C** incorrect slope, correct y-intercept
- D** incorrect slope, incorrect y-intercept

- 28 A.PA.07.04:** Solve applied linear problems with graphs and equations.

Estimate value using a line graph.

- A** underestimate
- B** correct
- C** overestimate
- D** overestimate

- 29 A.PA.07.04:** Solve applied linear problems with graphs and equations.

Interpret the line graph.

- A** incorrect statement about point on graph
- B** correct
- C** incorrect statement about x-intercept
- D** incorrect statement about y-intercept

- 30 N.FL.07.05:** Solve proportion problems.

Interpret the table to find the missing value in the table.

- A** applied proportion, but used incorrect x-value
- B** incorrect proportion
- C** correct
- D** incorrect proportion; sum of two given y-values

- 31 N.FL.07.05:** Solve proportion problems.

Find the value for x in $a/b = x/c$.

- A** $c \div (a \times b)$
- B** $(0.c)(x)$
- C** correct
- D** b^2

- 32 N.MR.07.04:** Convert ratio quantities between systems of units.

Find the total cost of pounds, given the unit cost of an ounce.

- A** half of total cost
- B** three-fourths of total cost
- C** correct
- D** 1.25 times total cost

- 33 A.PA.07.03:** Graph linear equations and interpret the slope.

Use the linear equation to solve the problem, in context.

- A** used half of slope
- B** correct
- C** used incorrect slope
- D** used reciprocal of slope

- 34 A.PA.07.05:** Use proportional and linear relationships.

Use proportion to find the total, in context.

- A** multiplied by reciprocal of proportion
- B** did not apply proportion, i.e., subtotal
- C** correct
- D** multiplied by square of proportion

- 35 G.TR.07.03:** Know the properties of similar figures and scale factor.

Find the scale factor, given one side length of two similar triangles.

- A** incorrect scale factor
- B** subtracted instead of multiplied to find scale factor
- C** correct
- D** subtracted one from correct scale factor

- 36 G.TR.07.03:** Know the properties of similar figures and scale factor.

Find the length of the rectangle, given its width and the dimensions of a similar rectangle.

- A** scale factor
- B** incorrect scale factor \times incorrect side
- C** correct
- D** added scale factor to correct length

- 37 G.TR.07.04:** Solve problems of similar figures and scale drawings.

Find the height of a tree using a drawing of similar triangles.

- A** correct
- B** subtracted to find scale factor
- C** shadow length of larger tree + height of smaller tree
- D** incorrect height

- 38 G.TR.07.04:** Solve problems of similar figures and scale drawings.

Find the side length of a similar quadrilateral.

- A** truncated scale factor to whole number
- B** correct
- C** total of lengths of 3 sides of smaller quadrilateral
- D** total of lengths of all sides of smaller quadrilateral

- 39 G.TR.07.05:** Show the similarity of triangles using properties.

Identify the side lengths of similar triangles.

- A** correct
- B** incorrect side lengths
- C** incorrect side lengths
- D** incorrect side lengths

- 40 G.TR.07.05:** Show the similarity of triangles using properties.

Determine the properties of similar triangles.

- A** correct
- B** not property of all similar triangles
- C** not property of all similar triangles
- D** not property of all similar triangles

- 41 G.TR.07.06:** Show the similarity of triangles using properties.

Find the area of a similar triangle, given scale factor and area.

- A** correct
- B** multiplied by incorrect scale factor
- C** multiplied by incorrect scale factor
- D** multiplied by scale factor to find area

- 42 G.TR.07.06:** Use the similarity of triangles and scale factor.

Find the side length, given the area of two triangles and one side length.

- A** square of given side length of smaller triangle
- B** correct
- C** area of larger triangle \div scale factor
- D** area of larger triangle \div side length of smaller triangle

- 43 N.MR.07.02:** Solve problems involving derived quantities.

Calculate the weighted average, given weights and scores.

- A** incorrect average
- B** correct
- C** incorrect average
- D** incorrect average

- 44 A.PA.07.09:** Recognize inversely proportional relationships.

Translate the table to an equation.

- A** incorrect numerator, incorrect denominator
- B** incorrect numerator, correct denominator
- C** reciprocal
- D** correct

- 45 N.MR.07.06:** Understand the concept of square root and cube root.

Estimate the side length of the square in centimeters, given the area in square centimeters.

- A** correct
- B** divided area by 4
- C** divided area by 3
- D** divided area by 2

- 46 A.PA.07.07:** Graph linear equations; interpret slope and the y-intercept.

Find the y-intercept, given the linear equation, in slope-intercept form.

- A** slope
- B** additive inverse of y-intercept
- C** correct
- D** additive inverse of slope

- 47 A.PA.07.07:** Graph linear equations; interpret slope and the y-intercept.

Find the slope, given the linear equation.

- A** additive inverse of slope
- B** y-intercept
- C** additive inverse of y-intercept
- D** correct

- 48 A.FO.07.08:** Find and interpret the x- and y-intercepts.

Find the x-intercept of the line shown on the coordinate plane.

- A** transposed x and y of x-intercept
- B** correct
- C** y-intercept
- D** transposed x and y of y-intercept

- 49 A.FO.07.13:** Generate and solve linear equations.

Solve the linear equation, in context.

- A** correct
- B** y-intercept
- C** incorrect solution
- D** total minus y-intercept

- 50 D.AN.07.04:** Find and interpret the median, quartiles, and interquartile range (IQR).

Find the lower quartile, given the ordered list of data values.

- A** minimum
- B** correct
- C** not lower quartile
- D** not lower quartile

- 51 D.AN.07.03:** Interpret relative and cumulative frequencies.

Calculate the relative frequency from the table.

- A** relative frequency of different category
- B** relative frequency of different category
- C** incorrect relative frequency
- D** correct

3rd

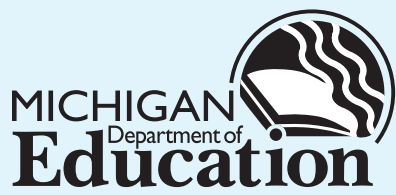
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