

GRADE 8

MATHEMATICS

Administered Spring 2004

Test by Objectives

Mathematics Chart

LENGTH

Metric	Customary
1 kilometer = 1000 meters	1 mile = 1760 yards
1 meter = 100 centimeters	1 mile = 5280 feet
1 centimeter = 10 millimeters	1 yard = 3 feet
	1 foot = 12 inches

CAPACITY AND VOLUME

Metric	Customary
1 liter = 1000 milliliters	1 gallon = 4 quarts
	1 gallon = 128 ounces
	1 quart = 2 pints
	1 pint = 2 cups
	1 cup = 8 ounces

MASS AND WEIGHT

Metric	Customary
1 kilogram = 1000 grams	1 ton = 2000 pounds
1 gram = 1000 milligrams	1 pound = 16 ounces

TIME

1 year = 365 days
1 year = 12 months
1 year = 52 weeks
1 week = 7 days
1 day = 24 hours
1 hour = 60 minutes
1 minute = 60 seconds

Mathematics Chart

Perimeter	square	$P = 4s$
	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
Circumference	circle	$C = 2\pi r$ or $C = \pi d$
Area	square	$A = s^2$
	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
Surface Area	cube	$S = 6s^2$
	cylinder (lateral)	$S = 2\pi rh$
	cylinder (total)	$S = 2\pi rh + 2\pi r^2$ or $S = 2\pi r(h + r)$
	cone (lateral)	$S = \pi rl$
	cone (total)	$S = \pi rl + \pi r^2$ or $S = \pi r(l + r)$
	sphere	$S = 4\pi r^2$
Volume	prism	$V = Bh^*$
	cylinder	$V = Bh^*$
	pyramid	$V = \frac{1}{3}Bh^*$
	cone	$V = \frac{1}{3}Bh^*$
	sphere	$V = \frac{4}{3}\pi r^3$
<i>*B represents the area of the Base of a solid figure.</i>		
Pi	π	$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$
Pythagorean Theorem		$a^2 + b^2 = c^2$
Simple Interest Formula		$I = prt$

Grade 8

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.1) Number, operation, and quantitative reasoning. The student understands that different forms of numbers are appropriate for different situations. The student is expected to

(D) express numbers in scientific notation, including negative exponents, in appropriate problem situations [using a calculator].

3 The diameter of a blood cell is measured in micrometers. A micrometer is 0.000001 meter. Which expression represents this number in scientific notation?

- A 1.0×10^7
- B 1.0×10^6
- C 1.0×10^{-6}
- D 1.0×10^{-7}

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.2) Number, operation, and quantitative reasoning. The student selects and uses appropriate operations to solve problems and justify solutions. The student is expected to

(A) select and use appropriate operations to solve problems and justify the selections;

6 The Webster Junior High faculty includes 37 teachers. The principal's and teachers' annual salaries total \$1,266,140. If the principal's salary is \$54,250, which equation can be used to find s , the average salary for a teacher at Webster Junior High?

F $s = \frac{(1,266,140 + 54,250)}{37}$

G $s = 1,266,140 + \frac{54,250}{37}$

H $s = 1,266,140 - \frac{54,250}{37}$

J $s = \frac{(1,266,140 - 54,250)}{37}$

Grade 8

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.2) **Number, operation, and quantitative reasoning.** The student selects and uses appropriate operations to solve problems and justify solutions. The student is expected to

C) evaluate a solution for reasonableness

16 Cody's parents bought a big-screen television for \$1,099.99 and a DVD player for \$99.99, including tax. Cody's parents plan to pay the total amount in 18 equal monthly payments. What is a reasonable amount for each monthly payment?

- F** \$50.00
- G** \$150.00
- H** \$113.00
- J** \$67.00

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.1) **Number, operation, and quantitative reasoning.** The student understands that different forms of numbers are appropriate for different situations. The student is expected to

(A) compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals;

25 Which fraction is between $\frac{2}{3}$ and $\frac{3}{4}$?

- A** $\frac{1}{2}$
- B** $\frac{3}{5}$
- C** $\frac{5}{7}$
- D** $\frac{7}{8}$

Grade 8

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.2) Number, operation, and quantitative reasoning. The student selects and uses appropriate operations to solve problems and justify solutions. The student is expected to

(B) add, subtract, multiply, and divide rational numbers in problem situations;

35 On Friday the low temperature in Nome, Alaska, was -12°F , and the high temperature was 23°F . How much warmer was the high temperature than the low temperature?

- A -35°F
- B -11°F
- C 11°F
- D 35°F

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.2) Number, operation, and quantitative reasoning. The student selects and uses appropriate operations to solve problems and justify solutions. The student is expected to

(D) use multiplication by a constant factor (unit rate) to represent proportional relationships; for example, the arm span of a gibbon is about 1.4 times its height, $a = 1.4h$.

37 The Childress family went on a camping trip. They paid \$28.00 for a 2-night stay at a campground that allows a maximum stay of 30 nights. Which equation can they use to find c , the cost of camping at this campground for the maximum number of nights?

- A $c = 60 \cdot 56$
- B $c = 30 \cdot 28$
- C $c = 28 \cdot 28$
- D $c = 30 \cdot 14$

Grade 8

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.1) **Number, operation, and quantitative reasoning.** The student understands that different forms of numbers are appropriate for different situations. The student is expected to

(B) select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships;

40 Carlos, Jackie, Lester, and Margie ate lunch at a restaurant. The total amount of the bill, including tax and tip, was \$44.60. Carlos paid \$15.00, Jackie paid $\frac{1}{4}$ of the bill, Lester paid 20% of the bill, and Margie paid the rest of the bill. Who paid the greatest part of the bill?

- F** Carlos
- G** Jackie
- H** Lester
- J** Margie

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.1) **Number, operation, and quantitative reasoning.** The student understands that different forms of numbers are appropriate for different situations. The student is expected to

(C) approximate mentally [and with calculators] the value of irrational numbers as they arise from problem situations (II , 2)

42 Mr. Harrington wrote four irrational numbers on the board and asked Jared to choose the number closest to 3. Which irrational number should Jared choose?

- F** $\sqrt{6}$
- G** $\sqrt{10}$
- H** $\sqrt{12}$
- J** $\sqrt{14}$

Grade 8

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.1) **Number, operation, and quantitative reasoning.** The student understands that different forms of numbers are appropriate for different situations. The student is expected to

D) express numbers in scientific notation, including negative exponents, in appropriate problem situations [using a calculator].

43 The sun's core temperature reaches close to 2.7×10^7 degrees Fahrenheit. Which of the following represents this temperature in standard notation?

- A 270,000°F
- B 2,700,000°F
- C 27,000,000°F
- D 270,000,000°F

Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

(8.2) **Number, operation, and quantitative reasoning.** The student selects and uses appropriate operations to solve problems and justify solutions. The student is expected to

B) add, subtract, multiply, and divide rational numbers in problem situations;

47 A gift basket contains $6\frac{2}{3}$ ounces of chocolate candy, $4\frac{1}{2}$ ounces of hard candy, and 4 ounces of dried fruit. What is the total weight of the contents of the gift basket?

- A $11\frac{1}{6}$ oz
- B $14\frac{1}{2}$ oz
- C $14\frac{3}{5}$ oz
- D $15\frac{1}{6}$ oz

Grade 8

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.5) Patterns, relationships, and algebraic thinking. The student uses graphs, tables, and algebraic representations to make predictions and solve problems. The student is expected to

(A) estimate, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations;

1 The table below shows land-speed records.

Land-Speed Records

Driver	Year	Speed (mph)
Campbell	1935	301.13
Elyston	1938	357.5
Cobb	1947	394.2
Breedlove	1965	600.6
Noble	1983	633.47
Green	1997	763.04

Whose land-speed record did Green exceed by exactly 368.84 miles per hour?

- A** Elyston
- B** Cobb
- C** Breedlove
- D** Noble

Grade 8

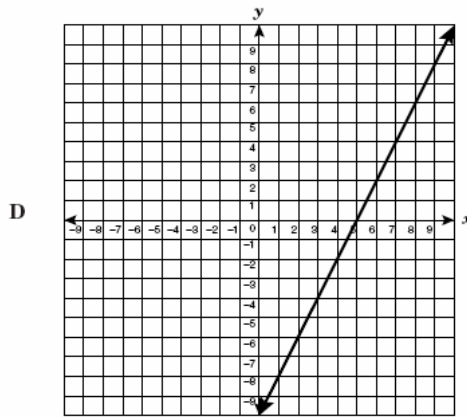
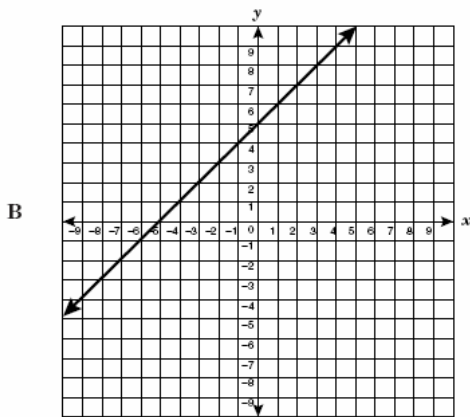
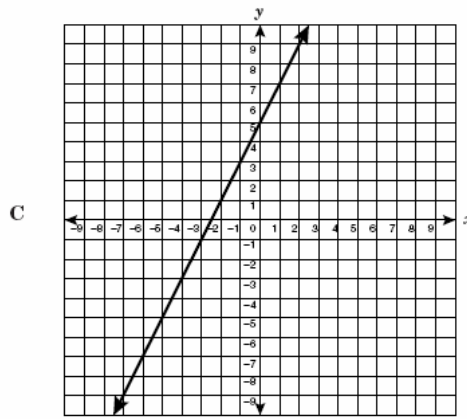
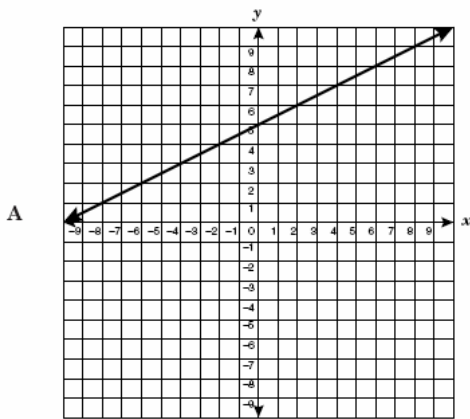
Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.4) **Patterns, relationships, and algebraic thinking.** The student makes connections among various representations of a numerical relationship. The student is expected to

(A) generate a different representation given one representation of data such as a table, graph, equation, or verbal description.

7 Which line graphed below best represents the table of values for the ordered pair (x, y) ?

x	y
-3	3.5
0	5
2	6
5	7.5



Grade 8

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.5) Patterns, relationships, and algebraic thinking.

The student uses graphs, tables, and algebraic representations to make predictions and solve problems. The student is expected to

(A) estimate, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations;

14 Mr. Flores ran a 26.1-mile marathon last year. He completed the race in 5 hours 6 minutes. This year Mr. Flores would like to run the same marathon in 4.5 hours. How many miles per hour should Mr. Flores run to complete the marathon in 4.5 hours?

$[D = rt]$

F 5.8 mph

G 6.2 mph

H 11.8 mph

J 5.6 mph

Grade 8

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.4) Patterns, relationships, and algebraic thinking. The student makes connections among various representations of a numerical relationship. The student is expected to

(A) generate a different representation given one representation of data such as a table, graph, equation, or verbal description

19 A software company employs 450 workers. It plans to increase its workforce by 8 employees per month until it has doubled in size. Which equation can be used to determine m , the number of months it will take for the company's workforce to double in size?

A $8m + 450m = 900$

B $2m + 450 = 900$

C $2(8m + 450) = 900$

D $8m + 450 = 900$

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.3) Patterns, relationships, and algebraic thinking. The student identifies proportional relationships in problem situations and solves problems. The student is expected to

(B) estimate and find solutions to application problems involving percents and proportional relationships such as similarity and rates.

21 Sheila made a scale drawing of a room. The actual room has a width of 16 feet and a length of 24 feet. Her drawing has a length of 3 inches. What is the width, in inches, of the scale drawing of the room?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Grade 8

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.3) Patterns, relationships, and algebraic thinking. The student identifies proportional relationships in problem situations and solves problems. The student is expected to

(A) compare and contrast proportional and non-proportional relationships;

23 To make a certain shade of orange paint, Calvin must add 20 ounces of yellow paint to every 50 ounces of red paint. If he uses 200 ounces of red paint, which proportion can he use to find x , the number of ounces of yellow paint he should add to get the shade of orange he wants?

A $\frac{20}{50} = \frac{x}{200}$

B $\frac{30}{20} = \frac{x}{200}$

C $\frac{20}{x} = \frac{200}{30}$

D $\frac{50}{x} = \frac{200}{20}$

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.3) Patterns, relationships, and algebraic thinking. The student identifies proportional relationships in problem situations and solves problems. The student is expected to

(B) estimate and find solutions to application problems involving percents and proportional relationships such as similarity and rates.

24 Mr. Johnson is considering renting an office that has 325 square feet of space. The rent is \$1,300 per month. A larger office in the same building is available for \$2,100 per month at the same rate per square foot as the smaller office. What is the area of the larger office?

F 525 ft^2

G $1,625 \text{ ft}^2$

H $3,400 \text{ ft}^2$

J 840 ft^2

Grade 8

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.5) Patterns, relationships, and algebraic thinking. The student uses graphs, tables, and algebraic representations to make predictions and solve problems. The student is expected to

(B) use an algebraic expression to find any term in a sequence.

32 In the sequence below, which expression can be used to find the value of the term in the n th position?

Position	Value of Term
1	0.25
2	0.5
3	0.75
4	1.0
5	1.25
n	

F $n - 0.75$

G $\frac{n}{4}$

H $4n$

J $n - 1.5$

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.5) Patterns, relationships, and algebraic thinking. The student uses graphs, tables, and algebraic representations to make predictions and solve problems. The student is expected to

(B) use an algebraic expression to find any term in a sequence.

39 The expression shown below describes a pattern of numbers.

$$n(n \square 1) + 4$$

If n represents a number's position in the sequence, which pattern of numbers does the expression describe?

A 4, 6, 8, 10, 12, . . .

B 1, 4, 6, 10, 16, . . .

C 4, 6, 10, 16, 24, . . .

D 4, 10, 18, 28, 40, . . .

Grade 8

Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

(8.3) Patterns, relationships, and algebraic thinking. The student identifies proportional relationships in problem situations and solves problems. The student is expected to

(A) compare and contrast proportional and non-proportional relationships;

48 The Wright Pen Company sells 3-pen packages for \$1.50. Which company sells pens for the same price per pen?

- F** Jones Pen Company 4-pen packages for \$2.50
- G** Cavazos Pen Company 5-pen packages for \$3.00
- H** Smother Pen Company 7-pen packages for \$3.50
- J** Nottingham Pen Company 9-pen packages for \$5.00

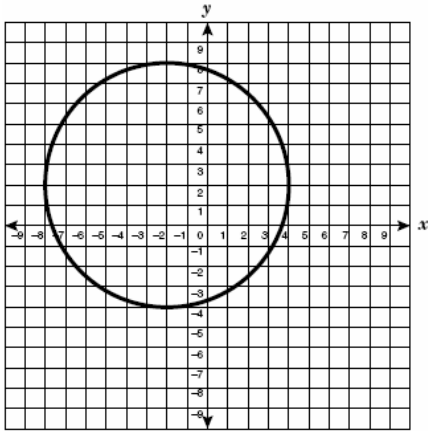
Grade 8

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(8.7) **Geometry and spatial reasoning.** The student uses geometry to model and describe the physical world. The student is expected to

D) locate and name points on a coordinate plane using ordered pairs of rational numbers.

2 A circle with a radius of 6 units is shown below.



What are the coordinates of the center of the circle?

- F** $(-1, 2)$
- G** $(-2, 3)$
- H** $(-2, 2)$
- J** $(-3, 2)$

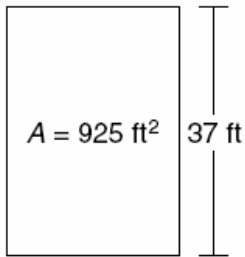
Grade 8

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(8.7) **Geometry and spatial reasoning.** The student uses geometry to model and describe the physical world. The student is expected to

(B) use geometric concepts and properties to solve problems in fields such as art and architecture;

5 An architect designed a rectangular room with an area of 925 square feet.



What is the width of the room if the length is 37 feet?

- A** 25 ft
- B** 74 ft
- C** 425.5 ft
- D** 462.5 ft

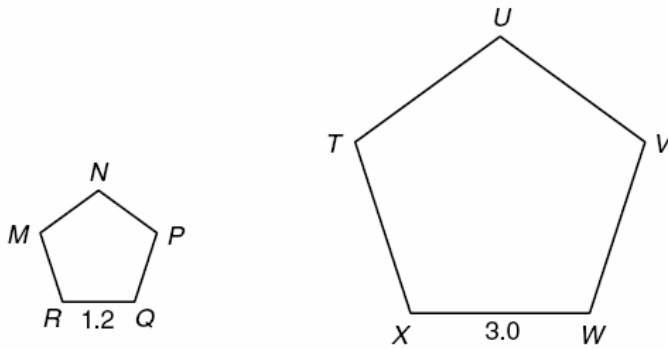
Grade 8

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning

(8.6) **Geometry and spatial reasoning.** The student uses transformational geometry to develop spatial sense. The student is expected to

(A) generate similar shapes using dilations including enlargements and reductions;

15 Regular pentagon $MNPQR$ is similar to pentagon $TUVWX$.



What scale factor was used to dilate regular pentagon $MNPQR$ to pentagon $TUVWX$?

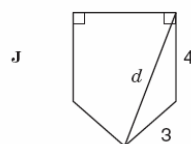
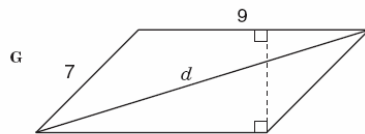
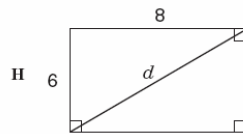
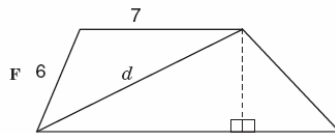
- A 0.4
- B 1.8
- C 2.5
- D 4.2

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning

(8.7) **Geometry and spatial reasoning.** The student uses geometry to model and describe the physical world. The student is expected to

(C) use pictures or models to demonstrate the Pythagorean Theorem;

22 Line segment d is a diagonal in each polygon shown below. Which drawing shows enough information to find the length of line segment d ?



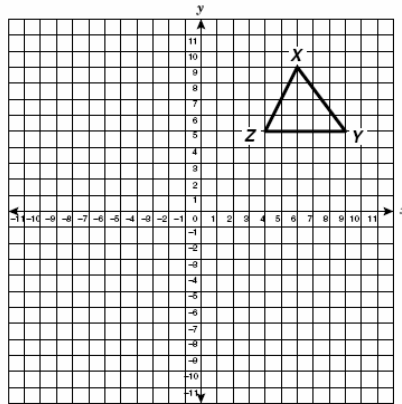
Grade 8

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning

(8.6) **Geometry and spatial reasoning.** The student uses transformational geometry to develop spatial sense. The student is expected to

(B) graph dilations, reflections, and translations on a coordinate plane.

27 If $\triangle XYZ$ is translated 8 units to the left and 3 units down, what are the coordinates of point Y_2 ?



- A** (9, 5)
- B** (-2, 6)
- C** (1, 2)
- D** (-4, 2)

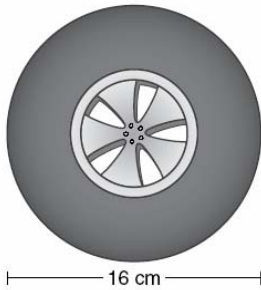
Grade 8

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

(8.7) **Geometry and spatial reasoning.** The student uses geometry to model and describe the physical world. The student is expected to

(B) use geometric concepts and properties to solve problems in fields such as art and architecture;

38 A toy truck wheel is shown below.



Which is closest to the distance traveled during 2 full rotations of the toy truck wheel?

- F** 50.2 centimeters
- G** 100.5 centimeters
- H** 200.9 centimeters
- J** 401.9 centimeters

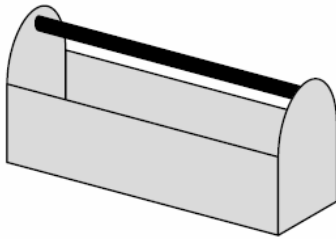
Grade 8

Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.

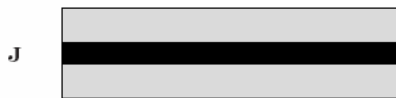
(8.7) Geometry and spatial reasoning. The student uses geometry to model and describe the physical world. The student is expected to

(A) draw solids from different perspectives;

44 The picture below shows a toolbox with a black handle.



Which drawing best represents a top view of the toolbox?



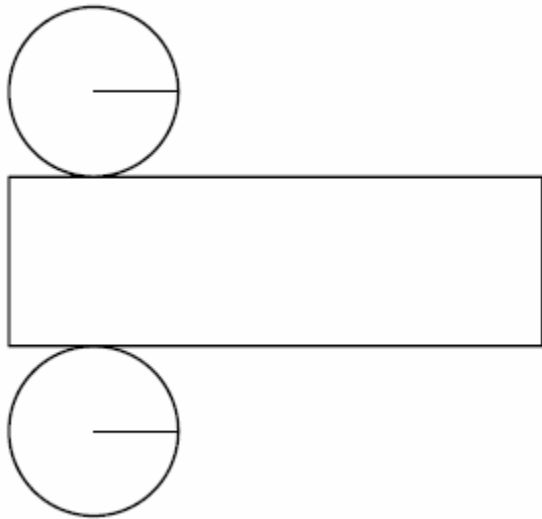
Grade 8

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(8.8) **Measurement.** The student uses procedures to determine measures of solids. The student is expected to

(A) find surface area of prisms and cylinders using [concrete] models and nets (two-dimensional models);

13 Mrs. Juárez has a cylindrical pincushion with the net shown below. Use the ruler on the Mathematics Chart to measure the dimensions of the net in centimeters.



SCALE IS ALTERED IN ELECTRONIC TRANSFER.

Which is closest to the lateral surface area of the cylindrical pincushion?

- A** 3.0 cm^2
- B** 6.3 cm^2
- C** 9.4 cm^2
- D** 12.6 cm^2

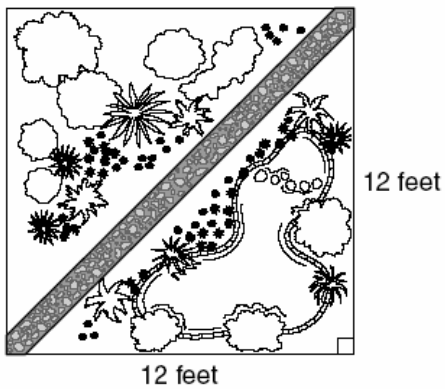
Grade 8

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(8.9) **Measurement.** The student uses indirect measurement to solve problems. The student is expected to

(A) use the Pythagorean Theorem to solve real-life problems;

17 Mr. Elliott designed a flower garden in the shape of a square. He plans to build a walkway through the garden, as shown below.



Which is closest to the length of the walkway?

- A** 36 ft
- B** 24 ft
- C** 17 ft
- D** 13 ft

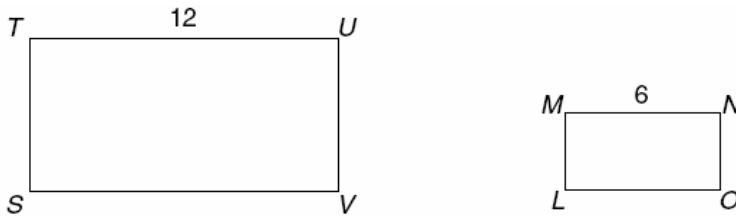
Grade 8

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(8.10) **Measurement.** The student describes how changes in dimensions affect linear, area, and volume measures. The student is expected to

(A) describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally;

28 Rectangle $STUV$ is similar to rectangle $LMNO$.



If the area of rectangle $STUV$ is 72 square units, what is the area of rectangle $LMNO$?

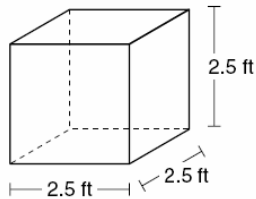
- F 36 units²
- G 24 units²
- H 18 units²
- J 12 units²

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(8.8) **Measurement.** The student uses procedures to determine measures of solids. The student is expected to

(C) estimate answers and use formulas to solve application problems involving surface area and volume.

33 Jonathan shipped a birthday gift to his grandmother in a cubical box.



Which is closest to the surface area of the box?

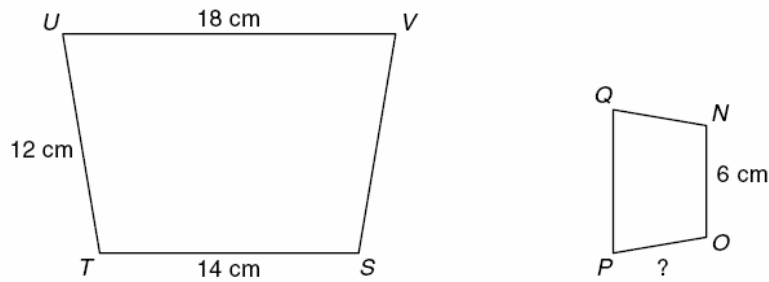
- A 16 square feet
- B 15 square feet
- C 8 square feet
- D 38 square feet

Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.

(8.9) **Measurement.** The student uses indirect measurement to solve problems. The student is expected to

(B) use proportional relationships in similar shapes to find missing measurements.

36 Trapezoid $STUV$ is similar to trapezoid $NOPQ$.



What is the length of \overline{OP} ?

F $4\frac{2}{3}$ centimeters

G $5\frac{1}{7}$ centimeters

H 28 centimeters

J 36 centimeters

Grade 8

Objective 5: The student will demonstrate an understanding of probability and statistics.

(8.12) Probability and statistics. The student uses statistical procedures to describe data. The student is expected to

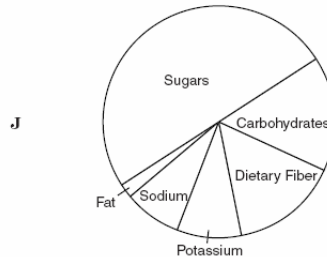
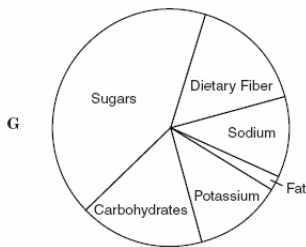
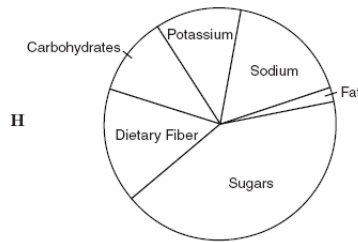
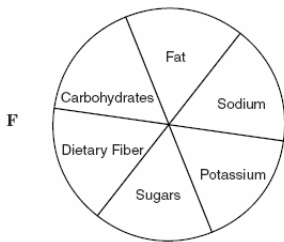
(C) construct circle graphs, bar graphs, and histograms, [with and] without technology.

4 Miss Koziel eats a bowl of her favorite cereal every morning. The table below shows the nutritional content of one serving of this cereal.

Cereal's Nutritional Content

Nutrition	Percent of Serving
Fat	2%
Sodium	11%
Potassium	12%
Carbohydrates	17%
Dietary Fiber	16%
Sugars	42%

Which circle graph best represents these data?



Grade 8

Objective 5: The student will demonstrate an understanding of probability and statistics.

(8.13) **Probability and statistics.** The student evaluates predictions and conclusions based on statistical data. The student is expected to

(A) evaluate methods of sampling to determine validity of an inference made from a set of data;

8 Principal Alcocer determined that 80% of the students at his school wore boots to school at least two days a week during winter. If his school has 1,200 students, which statement does NOT represent Principal Alcocer's data?

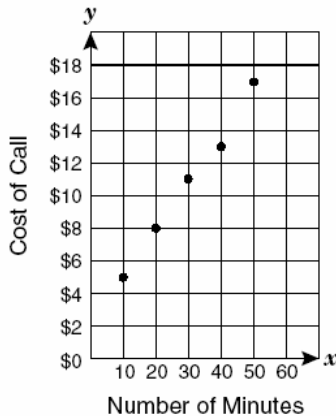
- F** During winter 960 students wear boots to school at least two days a week.
- G** During winter 240 students wear boots to school fewer than two days a week.
- H** During winter more than $\frac{1}{2}$ of the students wear boots to school at least two days a week.
- J** During winter less than $\frac{1}{5}$ of the students wear boots to school fewer than two days a week.

Objective 5: The student will demonstrate an understanding of probability and statistics.

(8.12) **Probability and statistics.** The student uses statistical procedures to describe data. The student is expected to

(B) draw conclusions and make predictions by analyzing trends in scatterplots;

11 The scatterplot below shows the cost of phone calls Betsy made to her brother overseas in relation to the number of minutes per phone call.



Based on the information in the scatterplot, which statement is a valid conclusion?

- A** As Betsy made more phone calls, the cost of the phone calls increased.
- B** As Betsy made fewer phone calls, the cost of the phone calls decreased.
- C** As Betsy decreased the number of minutes on the phone, the number of phone calls decreased.
- D** As Betsy increased the number of minutes on the phone, the cost of the phone calls increased.

Grade 8

Objective 5: The student will demonstrate an understanding of probability and statistics.

(8.12) **Probability and statistics.** The student uses statistical procedures to describe data. The student is expected to

(A) select the appropriate measure of central tendency to describe a set of data for a particular purpose;

18 A retail store had total sales of \$436, \$650, \$530, \$500, \$650, \$489, and \$423 last week. Which measure of data would make the store's sales last week appear the most profitable?

- F** Mode
- G** Median
- H** Mean
- J** Range

Objective 5: The student will demonstrate an understanding of probability and statistics.

(8.11) **Probability and statistics.** The student applies concepts of theoretical and experimental probability to make predictions. The student is expected to

(A) find the probabilities of compound events (dependent and independent);

30 Fidel tosses four fair coins. What is the probability that all four coins will land heads up?

- F** $\frac{1}{16}$
- G** $\frac{1}{8}$
- H** $\frac{1}{4}$
- J** $\frac{1}{2}$

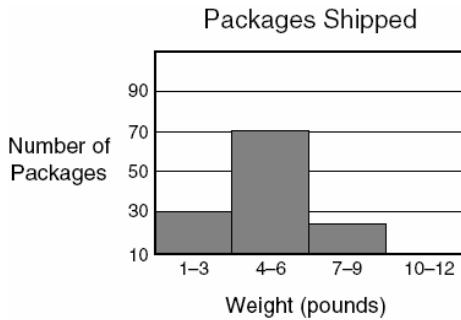
Grade 8

Objective 5: The student will demonstrate an understanding of probability and statistics.

(8.13) **Probability and statistics.** The student evaluates predictions and conclusions based on statistical data. The student is expected to

(B) recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis.

45 The graph below displays the weights of packages shipped from a post office on Tuesday.



According to information in the graph, no 10- to 12-pound packages were shipped. Which statement explains why this representation may be inaccurate?

- A** The scale for the number of packages does not start at 0.
- B** The vertical bars are too wide.
- C** The intervals are too small.
- D** The scale for the number of packages goes higher than 90.

Objective 5: The student will demonstrate an understanding of probability and statistics.

(8.11) **Probability and statistics.** The student applies concepts of theoretical and experimental probability to make predictions. The student is expected to

(B) use theoretical probabilities and experimental results to make predictions and decisions.

49 The probability of a table-tennis ball being defective is $\frac{1}{10}$. About how many balls would be defective in a case of 725 table-tennis balls?

- A** 1
- B** 7
- C** 73
- D** 80

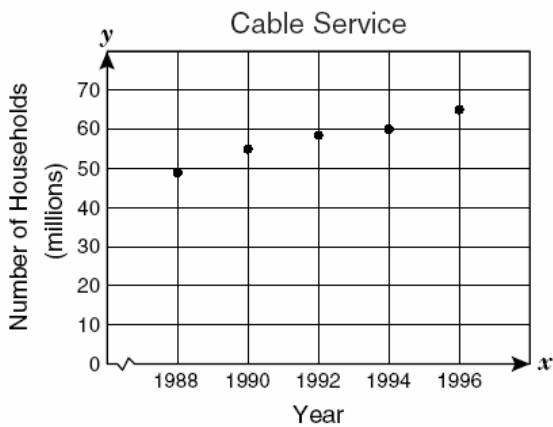
Grade 8

Objective 5: The student will demonstrate an understanding of probability and statistics.

(8.12) **Probability and statistics.** The student uses statistical procedures to describe data. The student is expected to

(B) draw conclusions and make predictions by analyzing trends in scatterplots;

50 The scatterplot below shows the number of households with cable television service during certain years.



Which statement best describes the relationship on the scatterplot?

- F** The number of households with cable service increased over time.
- G** The number of households with cable service decreased over time.
- H** The number of households with cable service remained the same over time.
- J** The number of households with cable service could not be determined over time.

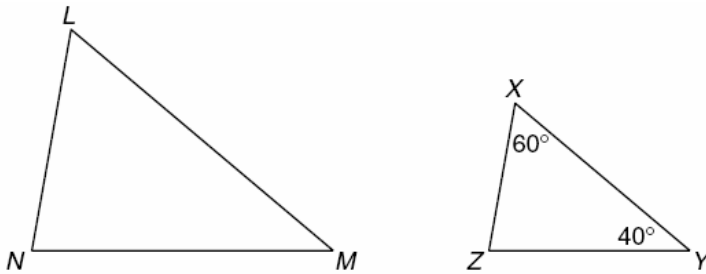
Grade 8

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.15) **Underlying processes and mathematical tools.** The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models. The student is expected to

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.

9 $\triangle LMN$ is similar to $\triangle XYZ$.



Which procedure can be used to find the number of degrees in $\angle N$?

- A Subtract 100 from 360
- B Subtract 100 from 180
- C Divide 100 by 2
- D Divide 180 by 3

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.16) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to

(A) make conjectures from patterns or sets of examples and nonexamples;

10 A pattern of equations is shown below.

$$1\% \text{ of } 800 = 8$$

$$2\% \text{ of } 400 = 8$$

$$4\% \text{ of } 200 = 8$$

$$8\% \text{ of } 100 = 8$$

$$16\% \text{ of } 50 = 8$$

Which statement best describes this pattern of equations?

- F When the percent is doubled and the other number is halved, the answer is 8.
- G When the percent is doubled and the other number is doubled, the answer is 8.
- H When the percent is increased by 2 and the other number remains the same, the answer is 8.
- J When the percent remains the same and the other number is increased by 2, the answer is 8.


Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.14) **Underlying processes and mathematical tools.** The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness

12 After careful consideration of the menu shown below, Mireya purchased Charlie's Value Meal No. 2.

Charlie's Menu

Value Meal #1	Sandwiches	Sides
\$4.29 Regular Burger, Medium Fries, Medium Drink	Regular Burger \$1.99 Bacon Burger \$2.39 Chicken Sandwich \$2.49 Fish Sandwich \$2.29	Small Fries \$0.99 Medium Fries \$1.29 Large Fries \$1.69 Small Onion Rings \$1.19 Medium Onion Rings \$1.39 Large Onion Rings \$1.69
Value Meal #2	Drinks	
\$4.69 Chicken Sandwich, Medium Fries, Medium Drink	Small Soft Drink \$0.99 Medium Soft Drink \$1.29 Large Soft Drink \$1.59 Shake or Malt \$1.89	

Mireya calculated her savings by finding the sum of \$2.49 plus 2 times \$1.29. What did Mireya do next to calculate her savings?

- F** Add \$1.29 to the sum
- G** Divide the sum by 3
- H** Subtract \$4.29 from the sum
- J** Subtract \$4.69 from the sum

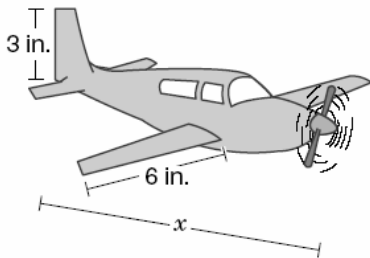
Grade 8

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.16) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to

(B) validate his/her conclusions using mathematical properties and relationships.

20 Roderick is building a model of an actual airplane with a length of 20 feet.



What other information is necessary in order to find x , the length of the model airplane?

- F** The ratio of the length of the model airplane's tail to the length of its wing
- G** The speed of the model airplane
- H** The scale factor used
- J** The model airplane's wingspan

Grade 8

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.14) **Underlying processes and mathematical tools.** The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;

26 Mr. Thomas is framing a 28-by-40-foot area for a concrete slab. If the concrete company charges \$120.00 per cubic yard of concrete, what other information is needed in order to find c , the cost of the concrete slab?

- F** The area of the slab
- G** The thickness of the slab
- H** The perimeter of the slab
- J** The price per cubic foot of concrete

Grade 8

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.16) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to

(B) validate his/her conclusions using mathematical properties and relationships.

29 Mrs. Avery bought a 5-pound bag of white potatoes for \$4.25. If red potatoes sold for \$0.89 per pound, why did Mrs. Avery believe that she made the better buy?

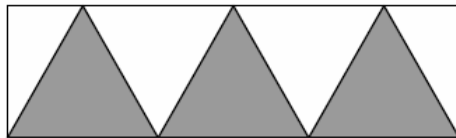
- A** The number of red potatoes in a 5-pound bag is greater than the number of white potatoes in a 5-pound bag.
- B** The cost for all kinds of potatoes in 5-pound bags is the same.
- C** The cost per pound of white potatoes is \$0.04 less than the cost per pound of red potatoes.
- D** The cost per pound of white potatoes is \$0.04 more than the cost per pound of red potatoes.

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.15) **Underlying processes and mathematical tools.** The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models. The student is expected to

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.

31 The figure below shows three shaded equilateral triangles inside a rectangle.



Which statement about this figure is true?

- A** The shaded area is more than 50% of the area of the rectangle.
- B** The shaded area is $\frac{3}{4}$ of the unshaded area of the rectangle.
- C** The unshaded area is $\frac{2}{3}$ of the shaded area of the rectangle.
- D** The shaded area is equal to the unshaded area of the rectangle.

Grade 8

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.14) **Underlying processes and mathematical tools.** The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(C) select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem.

34 On Monday Cornelius's mother gave him school money for the week. He spent \$2.80 for lunch every day for 5 school days. He paid a \$0.75 book fine at the library and bought school supplies for \$3.50. If Cornelius had \$1.75 left at the end of the school week, which expression can he use to find the amount of money he received on Monday?

- F** $1.75 + 5(2.80) + 3.50 + 0.75$
- G** $5(2.80) + 3.50 + 0.75 - 1.75$
- H** $1.75 + 2.80 + 0.75 + 3.50$
- J** $5(2.80 + 3.50 + 0.75 + 1.75)$

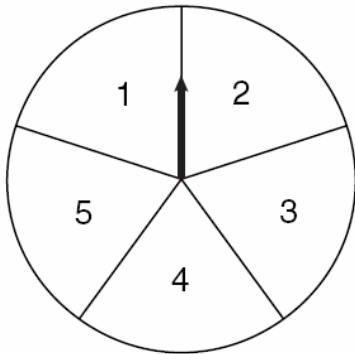
Grade 8

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.16) **Underlying processes and mathematical tools.** The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to

(B) validate his/her conclusions using mathematical properties and relationships.

41 Valdemar has a spinner like the one shown below.



Valdemar would like to increase the chances of the following events:

- Spinning an even number
- Spinning a number less than 4
- Spinning the square root of 9

Valdemar decides to remove the 5 from the spinner. Which statement best supports his reasoning?

- A** The number 5 takes up more space on the spinner.
- B** Spinning the number 5 has the greatest probability.
- C** The number 5 is the greatest number.
- D** Spinning the number 5 is not a desired event.

Grade 8

Objective 6: The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(8.14) **Underlying processes and mathematical tools.** The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(C) select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem.

46 Mr. Polanco purchased 12 boxes of tile. Each box contained 15 square tiles. If Mr. Polanco wants to tile the wall 14 tiles high and 13 tiles long, which procedure can he use to determine whether he has enough tiles to complete the job?

- F** Multiply 14 by 12
- G** Subtract 14 from 15 and then multiply by 12
- H** Multiply 12 by 15 and then compare the product with the product of 13 and 14
- J** Add 15 and 14 and then multiply by 13

Grade: 08
Subject: Mathematics
Administration: April 2004

Item Number	Correct Answer	Objective Measured	Student Expectations
01	B	02	8.5 (A)
02	H	03	8.7 (D)
03	C	01	8.1 (D)
04	G	05	8.12 (C)
05	A	03	8.7 (B)
06	J	01	8.2 (A)
07	A	02	8.4 (A)
08	J	05	8.13 (A)
09	B	06	8.15 (A)
10	F	06	8.16 (A)
11	D	05	8.12 (B)
12	J	06	8.14 (B)
13	D	04	8.8 (A)
14	F	02	8.5 (A)
15	C	03	8.6 (A)
16	J	01	8.2 (C)
17	C	04	8.9 (A)
18	F	05	8.12 (A)
19	D	02	8.4 (A)
20	H	06	8.14 (B)
21	Z	02	8.3 (B)
22	H	03	8.7 (C)
23	A	02	8.3 (A)
24	F	02	8.3 (B)
25	C	01	8.1 (A)
26	G	06	8.14 (A)
27	C	03	8.6 (B)
28	H	04	8.10 (A)
29	C	06	8.16 (B)
30	F	05	8.11 (A)
31	D	06	8.15 (A)
32	G	02	8.5 (B)
33	D	04	8.8 (C)
34	F	06	8.14 (C)
35	D	01	8.2 (B)
36	G	04	8.9 (B)
37	D	01	8.2 (D)
38	G	03	8.7 (B)
39	C	02	8.5 (B)
40	F	01	8.1 (B)
41	D	06	8.16 (B)
42	G	01	8.1 (C)
43	C	01	8.1 (D)
44	J	03	8.7 (A)
45	A	05	8.13 (B)
46	H	06	8.14 (C)
47	D	01	8.2 (B)
48	H	02	8.3 (A)
49	C	05	8.11 (B)
50	F	05	8.12 (B)