2016 TEXAS STAAR TEST – GRADE 4 - MATH

Total Possible Score: 48
Needed Correct to Pass: For 2016 - 24 For 2017 - 26
Advanced Performance: 40

Time Limit: 4 Hours

This file contains the State of Texas Assessments of Academic Readiness (STAAR) administered in Spring, 2016, along with the answer key, learning objectives, and, for writing tests, the scoring guide. This document is available to the public under Texas state law. This file was created from information released by the Texas Education Agency, which is the state agency that develops and administers the tests. All of this information appears on the Texas Education Agency web site, but has been compiled here into one package for each grade and subject, rather than having to download pieces from various web pages.

The number of correct answers required to "pass" this test is shown above. Because of where the "passing" score is set, it may be possible to pass the test without learning some important areas of study. Because of this, I believe that making the passing grade should not be considered "good enough." A student's goal should be to master each of the objectives covered by the test. The "Advanced Performance" score is a good goal for mastery of all the objectives.

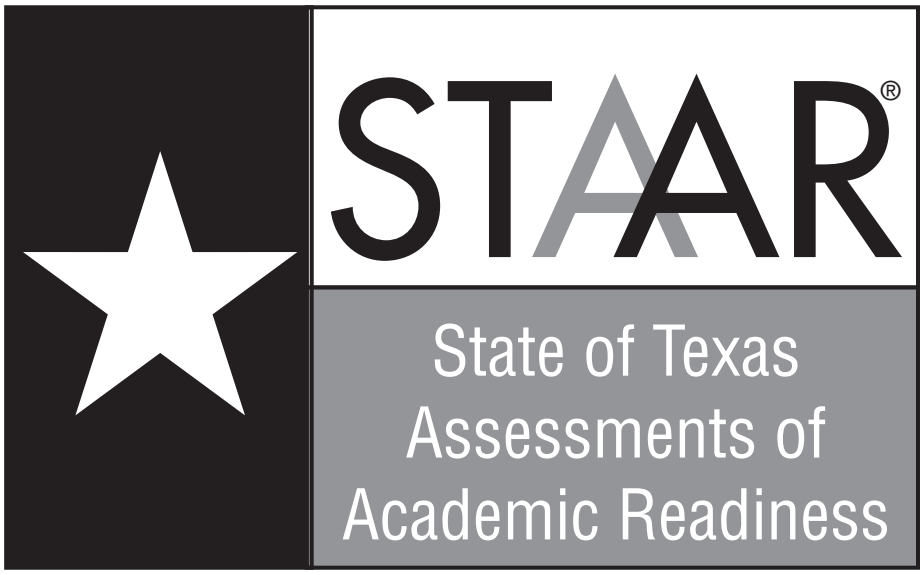
The test in this file may differ somewhat in appearance from the printed version, due to formatting limitations. Since STAAR questions are changed each year, some proposed questions for future tests are included in each year's exams in order to evaluate the questions. Questions being evaluated for future tests do not count toward a student's score. Those questions are also not included in the version of the test made available to the public until after they used as part of the official test.

Questions and comments about the tests should be directed to:
Texas Education Agency
Student Assessment Division
1701 N. Congress Ave, Room 3-122A
Austin, Texas 78701
phone: 512-463-9536 email: Student.Assessment@tea.state.tx.us

Hard copies of the released tests (including Braille) may be ordered online through Pearson Education at http://www.texasassessment.com/released-tests/ or by calling 855-333-7770.

When printing released questions for mathematics, make sure the Print Menu is set to print the pages at 100% to ensure that the art reflects the intended measurements.

For comments and questions about this file or the web site, you can e-mail me at scott@scotthochberg.com. Please direct any questions about the content of the test to the Texas Education Agency at the address above. To download additional tests, go to www.scotthochberg.com.



GRADE 4

Mathematics

Administered May 2016

RELEASED

STAAR GRADE 4 MATHEMATICS REFERENCE MATERIALS

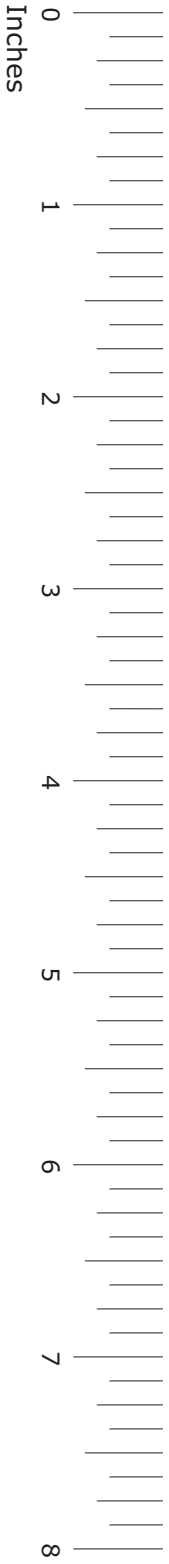
STAAR® State of Texas Assessments of Academic Readiness

PERIMETER

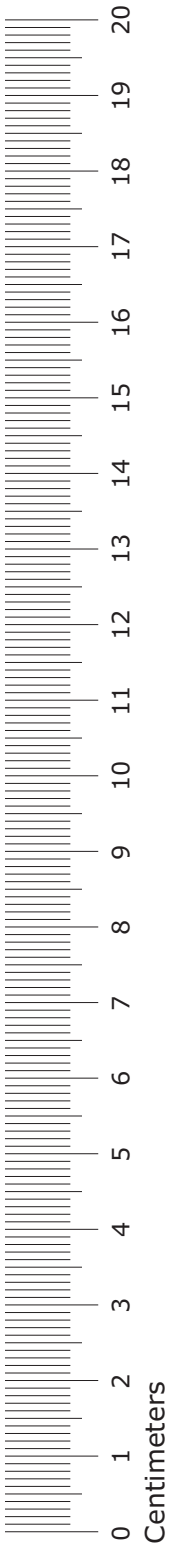
Square			$P = 4s$
Rectangle	$P = l + w + l + w$	or	$P = 2l + 2w$

AREA

Square	$A = s \times s$
Rectangle	$A = l \times w$



STAAR GRADE 4 MATHEMATICS REFERENCE MATERIALS



LENGTH

Customary	Metric
1 mile (mi) = 1,760 yards (yd)	1 kilometer (km) = 1,000 meters (m)
1 yard (yd) = 3 feet (ft)	1 meter (m) = 100 centimeters (cm)
1 foot (ft) = 12 inches (in.)	1 centimeter (cm) = 10 millimeters (mm)

VOLUME AND CAPACITY

Customary	Metric
1 gallon (gal) = 4 quarts (qt)	1 liter (L) = 1,000 milliliters (mL)
1 quart (qt) = 2 pints (pt)	
1 pint (pt) = 2 cups (c)	
1 cup (c) = 8 fluid ounces (fl oz)	

WEIGHT AND MASS

Customary	Metric
1 ton (T) = 2,000 pounds (lb)	1 kilogram (kg) = 1,000 grams (g)
1 pound (lb) = 16 ounces (oz)	1 gram (g) = 1,000 milligrams (mg)

TIME

1 year = 12 months

1 year = 52 weeks

1 week = 7 days

1 day = 24 hours

1 hour = 60 minutes

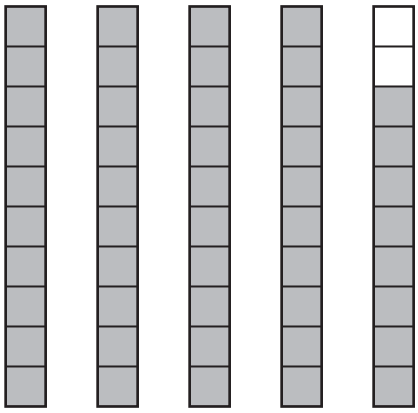
1 minute = 60 seconds

MATHEMATICS

DIRECTIONS

Read each question carefully. For a multiple-choice question, determine the best answer to the question from the four answer choices provided. For a griddable question, determine the best answer to the question. Then fill in the answer on your answer document.

1 Estelle shaded the model below to represent the height of a building that is 4.8 meters tall.



Which fraction represents the height of this building in meters?

A $4\frac{8}{10}$

B $\frac{48}{50}$

C $4\frac{8}{100}$

D $\frac{48}{100}$

2 Eric has 158 action figures to put in display cases. Each display case can hold 8 action figures. How many cases does Eric need to hold all his action figures?

F 18

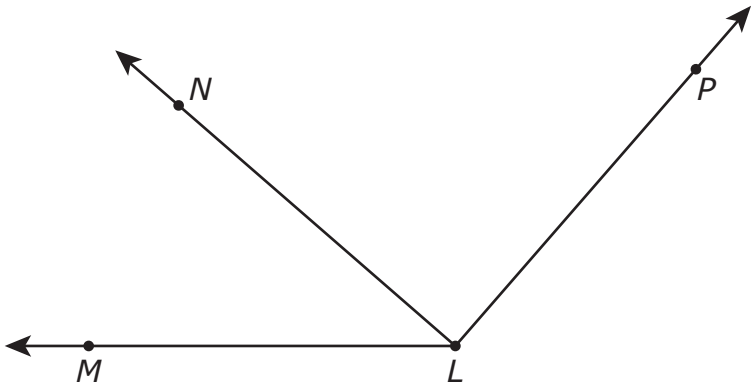
G 20

H 19

J 21

---

3 Angle *MLN* has a measure of 41°. Angle *NLP* is a right angle.



What is the measure of angle *MLP*?

A 82°

B 49°

C 180°

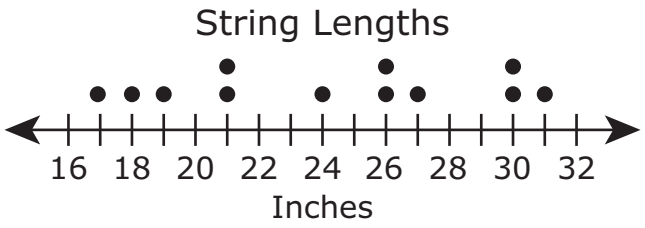
D 131°

4 The list shows the lengths of twelve strings in inches.

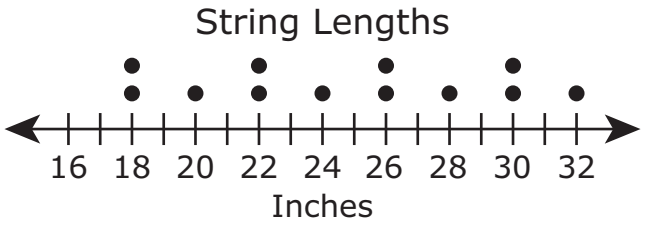
26, 30, 19, 21, 24, 26, 18, 31, 27, 21, 17, 29

Which plot represents the data in the list?

F



G



H

String Lengths

Stem	Leaf
1	7 8 9
2	1 1 4 6 6 7 9
3	1

1|8 means 18 inches.

J

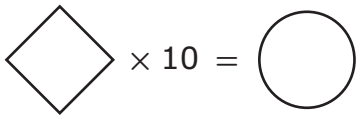
String Lengths

Stem	Leaf
1	7 8 9
2	1 1 4 6 6 7 9
3	0 1

1|8 means 18 inches.

GO ON

5 A number sentence is shown below.



Which table shows numbers that make the number sentence true?

A

◇	○
44	54
66	76
99	109
150	160

C

◇	○
44	4,400
66	6,600
99	9,900
150	15,000

B

◇	○
44	440
66	660
99	990
150	1,500

D

◇	○
44	404
66	606
99	909
150	1,050

6 The fraction $\frac{3}{8}$ can be represented by this expression.

$$\frac{1}{8} + \frac{1}{8} + \square$$

Which fraction belongs in the $\square$ to complete the expression?

F $\frac{2}{8}$

G $\frac{3}{8}$

H $\frac{1}{8}$

J $\frac{1}{16}$

---

7 A basketball team plays 82 games each year. How many games will the team play in 25 years?

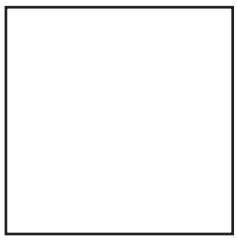
A 1,050

B 2,040

C 2,090

D 2,050

8 Use the ruler provided to measure the length and width of each rectangle to the nearest centimeter.



What is the difference between the perimeters of these rectangles in centimeters?

F 3 cm, because $6 - 3 = 3$

G 2 cm, because $8 - 6 = 2$

H 4 cm, because $16 - 12 = 4$

J 1 cm, because $9 - 8 = 1$

---

9 The table below shows the length of the railway network in each of five countries.

Railway Networks

Country	Length of Railway (meters)
Brazil	28,538,000
France	29,640,000
Italy	20,255,000
Japan	27,182,000
South Africa	20,192,000

Which list shows these countries in order from shortest to longest railway network?

A France, Brazil, Japan, Italy, South Africa

B South Africa, Italy, Japan, Brazil, France

C France, South Africa, Italy, Japan, Brazil

D South Africa, Italy, Japan, France, Brazil

10 A factory makes 400 refrigerators every day. The factory makes 125 more stoves per day than refrigerators. Which equation can be used to find x, the total number of refrigerators and stoves the factory makes in one day?

F $x = 400 + 400 + 125$

G $x = 400 + 125$

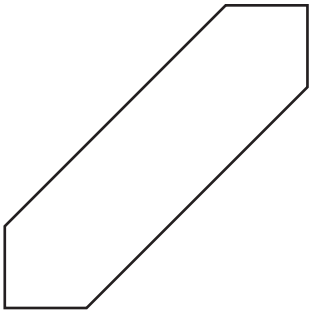
H $x = 400 + 400 - 125$

J $x = 400 - 125$

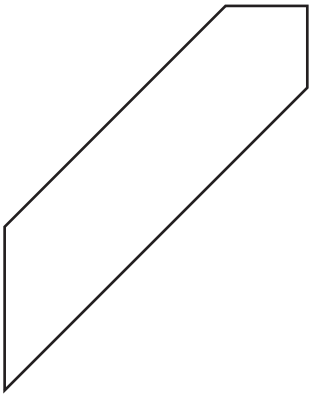
---

11 Which figure appears to have exactly 1 line of symmetry?

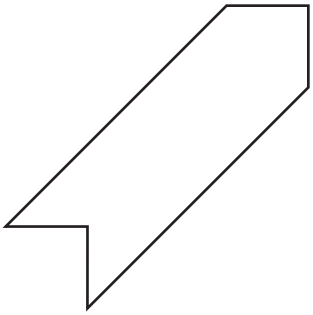
A



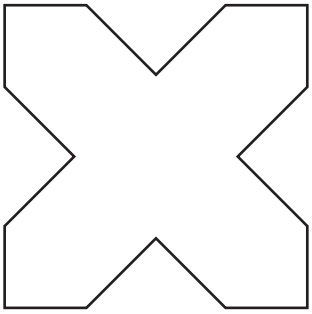
C



B



D



12 Yasmine made waffles for her family.

- $\frac{4}{7}$ of the waffles were blueberry.
- $\frac{1}{7}$ of the waffles were chocolate chip.
- The rest of the waffles did not have blueberries or chocolate chips.

What fraction of the waffles did not have blueberries or chocolate chips?

F $\frac{5}{7}$, because $\frac{4}{7} + \frac{1}{7} = \frac{5}{7}$

G $\frac{12}{7}$, because $\frac{4}{7} + \frac{1}{7} = \frac{5}{7}$ and $\frac{7}{7} + \frac{5}{7} = \frac{12}{7}$

H $\frac{3}{7}$, because $\frac{4}{7} - \frac{1}{7} = \frac{3}{7}$

J $\frac{2}{7}$, because $\frac{4}{7} + \frac{1}{7} = \frac{5}{7}$ and $\frac{7}{7} - \frac{5}{7} = \frac{2}{7}$

13 The frequency table shows the favorite school lunches of some students. The table is missing the information for the number of students who chose a hamburger.

Favorite School Lunches

Lunch Choice	Tally	Frequency
Pizza	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 II	32
Hamburger		
Chicken	𝍸 𝍸 III	13

The number of students who chose a hamburger is half the number of students who chose pizza. How many students chose a hamburger or chicken as their favorite school lunch?

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

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14 Liza drew a figure on the front of her notebook that has two obtuse angles. Which figure could be the one Liza drew?

F Rectangle

G Obtuse triangle

H Parallelogram

J Right triangle

15 The list shows the number of trees Isaiah planted in three years.

- He planted 521 trees in the first year.
- He planted 387 trees in the second year.
- He planted 438 trees in the third year.

Isaiah wants to plant a total of 2,000 trees. How many more trees does Isaiah need to plant?

A 654

B 1,346

C 874

D 764

---

16 Which statement about the number 726,483.19 is true?

F The digit 9 has a value of (9×100).

G The digit 4 has a value of (4×100).

H The digit 8 has a value of (8×0.1).

J The digit 2 has a value of (2×10).

---

17 Sebastian had a rectangular piece of paper that was 90 mm long and 50 mm wide. He cut the paper in half. What is the area of each half of the paper in square millimeters?

A 4,500 square millimeters

B 9,000 square millimeters

C 2,250 square millimeters

D 1,125 square millimeters

18 Which comparison is true?

F $\frac{1}{5} < \frac{2}{4}$

G $\frac{2}{3} < \frac{1}{2}$

H $\frac{1}{4} < \frac{2}{10}$

J $\frac{1}{3} < \frac{2}{7}$

---

19 A geyser is an underground hot spring that shoots water and steam into the air. At Yellowstone National Park there is a geyser that erupts once every 44 to 125 minutes. If the geyser erupted one day at 1:04 P.M., at which time could the geyser erupt next?

A 1:44 P.M.

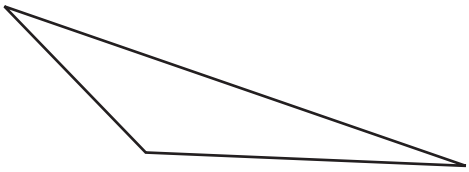
B 3:29 P.M.

C 3:05 P.M.

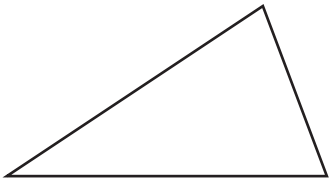
D 1:25 P.M.

20 Which triangle appears to be an acute triangle?

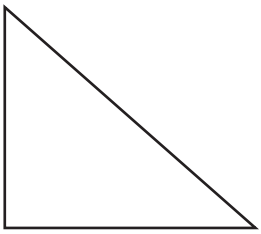
F



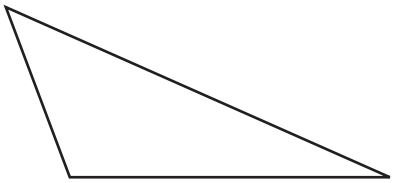
G



H



J



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21 Mark had 45 football cards. Josh had twice as many football cards as Mark. Josh then bought 5 more football cards. Which equation can be used to find f, the number of football cards Josh has now?

A $2 \times 45 + 5 = f$

B $2 \times 45 - 5 = f$

C $2 + 45 \times 5 = f$

D $2 + 45 + 5 = f$

22 Which equation shows an equivalent decimal and fraction?

F $12.09 = 12\frac{9}{10}$

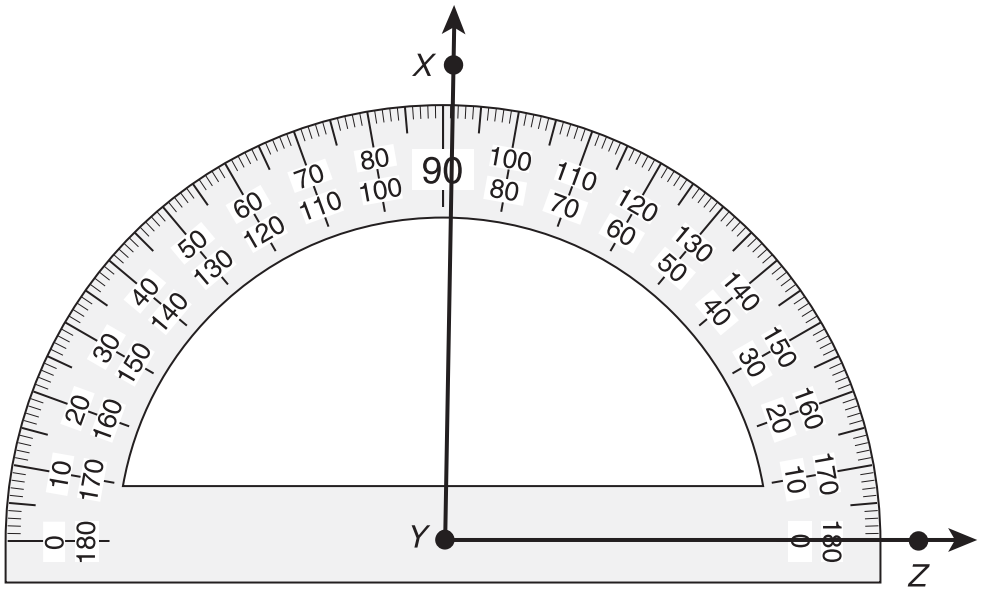
G $12.09 = 12\frac{9}{100}$

H $12.90 = 12\frac{1}{90}$

J $12.90 = 12\frac{90}{10}$

---

23 What is the measure of angle *XYZ* to the nearest degree?



A 180°

B 109°

C 91°

D 89°

24 A number pattern begins with the values shown.

8, 16, 24, 32, . . .

Which table correctly represents the relationship between the position of a number in the pattern and the value of that number?

F

Position	Numerical Expression	Value
1	$1 + 8$	9
2	$2 + 8$	10
3	$3 + 8$	11
4	$4 + 8$	12

G

Position	Numerical Expression	Value
8	$8 + 0$	8
16	$16 + 0$	16
24	$24 + 0$	24
32	$32 + 0$	32

H

Position	Numerical Expression	Value
1	1×8	8
2	2×8	16
3	3×8	24
4	4×8	32

J

Position	Numerical Expression	Value
8	8×1	8
16	16×1	16
24	24×1	24
32	32×1	32

25 Gwen bought an old table. She repaired it and painted it so that it looked new. Then she sold the table. Gwen made this list about what she did.

- Price paid for old table: $10.00
- Cost to repair: $5.00
- Cost to paint: $7.50
- Selling price: $50.00

What was Gwen's profit from selling the table?

A $27.50

B $50.00

C $22.50

D $40.00

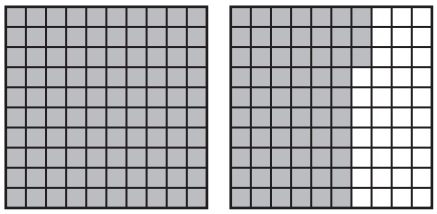
---

26 The distance between Henry's house and his school is 648 feet. How many yards are equivalent to 648 feet?

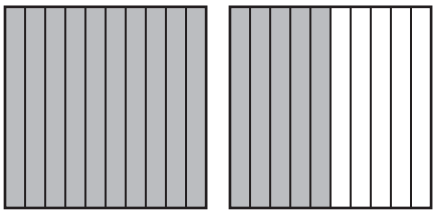
Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

27 The distances in meters that four students jumped are modeled below.

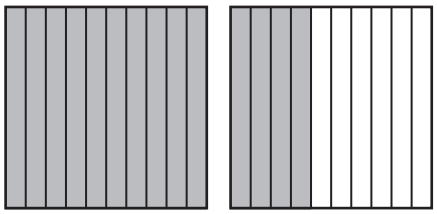
Marisol



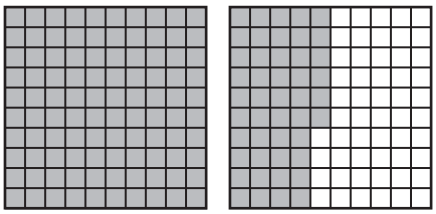
Benito



Otis



Angie



Which list shows these distances in order from greatest to least?

A 1.46 m 1.5 m 1.4 m 1.63 m

B 1.63 m 1.46 m 1.5 m 1.4 m

C 1.4 m 1.46 m 1.5 m 1.63 m

D 1.63 m 1.5 m 1.46 m 1.4 m

---

28 Diane worked 18 hours each week during the summer. She worked a total of 8 weeks and earned $9 an hour. How much money did Diane earn during the summer?

F $306

G $1,296

H $156

J $1,386

29 Some people borrow money to buy cars. They have to make car payments to pay back the money they borrowed. What kind of expenses are most car payments?

A Variable expenses, because the amount usually changes every month

B Variable expenses, because the payment is not due every month

C Fixed expenses, because the amount is usually the same every month

D Fixed expenses, because the car is usually paid for after one month

---

30 There are 1,092 people who work in an office building. The building has 4 floors, and the same number of people work on each floor. How many people work on each floor?

F 273

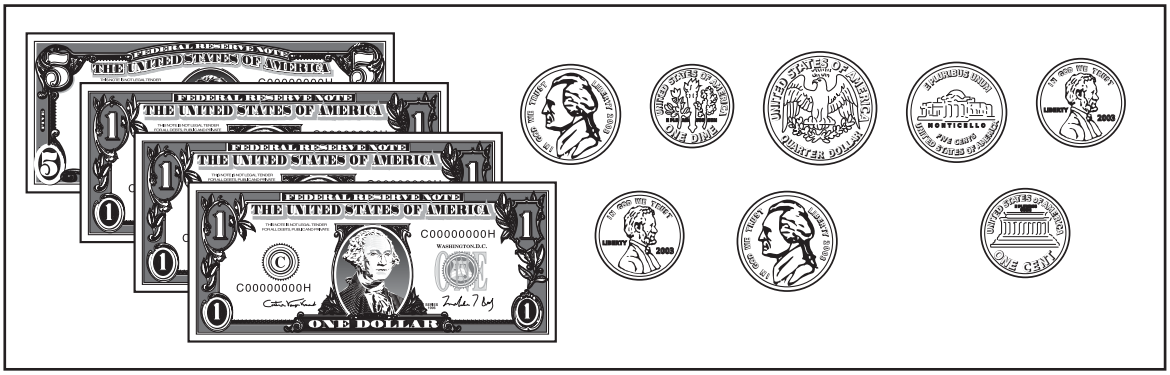
G 223

H 373

J 348

31 Each picture below represents a different amount of money. In which amount of money does the digit 8 represent eight cents?

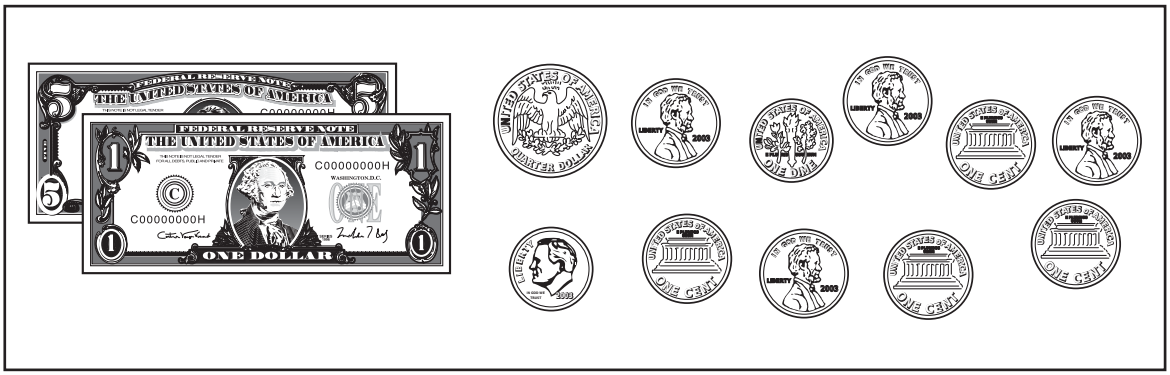
A



B

C

D



GO ON

32 Jorge swam a total of 173 minutes during 3 days. He swam the same number of minutes each day. Which of the following is the best estimate of the number of minutes Jorge swam each day?

F 60

G 40

H 20

J 30

---

33 A rug shaped like a rectangle has a width of 3 m. The length of the rug is 2 m greater than its width. What is the perimeter of the rug in meters?

A 10 m

B 16 m

C 8 m

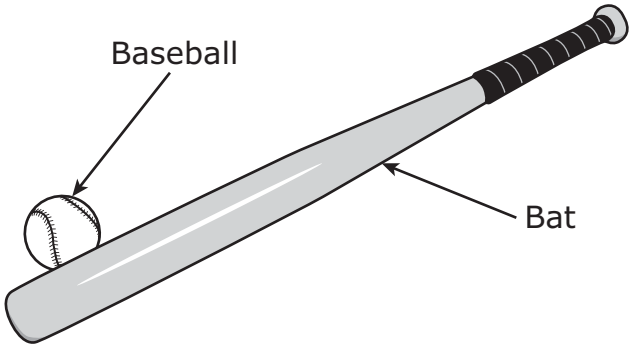
D 15 m

---

34 Jana bought 1 hat and 2 skirts. The hat cost $28.53, and the skirts cost $15.88 each. What was the total cost in dollars and cents of the items Jana bought?

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

35 Garrett has a baseball and a bat like the ones shown in the picture.



Which measurement best describes the length of the bat?

A 35 in.

B 35 m

C 35 ft

D 35 mm

---

36 Mrs. Briones has a pitcher that contains $3\frac{75}{100}$ quarts of lemonade. Which decimal is equivalent to this number?

F 3.075

G 3.75

H 0.375

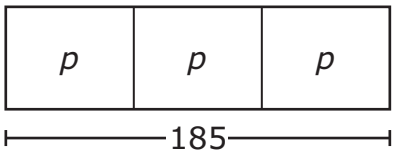
J 300.75

37 Sabra read a total of 185 pages in three days.

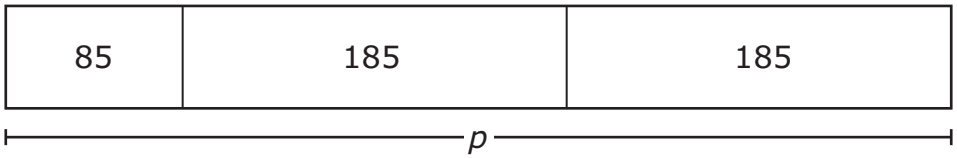
- On the first day, she read 85 pages.
- On the second and third days, she read the same number of pages.

Which diagram shows a way to find p, the number of pages Sabra read on the third day?

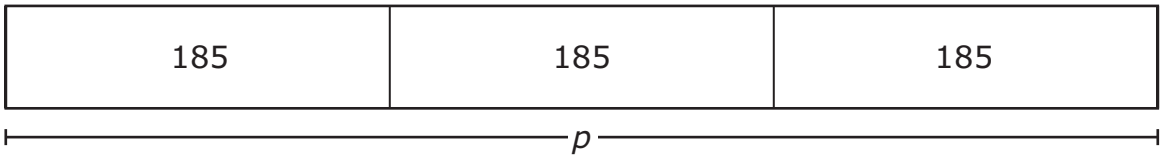
A



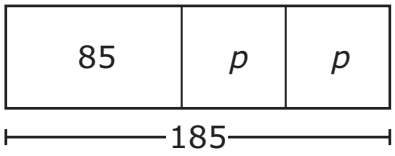
B



C



D



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38 Tyra opened a new bag of birdseed and filled 3 bird feeders. She put 2,500 grams of birdseed into each feeder. There were 1,500 grams of birdseed left in the bag. What was the mass of the bag of birdseed in kilograms before Tyra opened it?

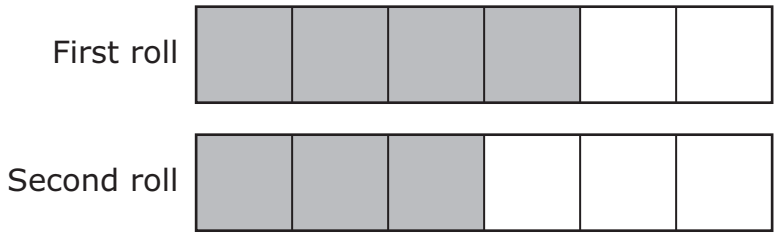
F 4 kg

G 4,000 kg

H 9 kg

J 9,000 kg

39 Mrs. Bernstein used parts of two identical rolls of paper to wrap packages. The models are shaded to represent the part of each roll of paper she used.



What fraction of the rolls of paper did Mrs. Bernstein use to wrap the packages?

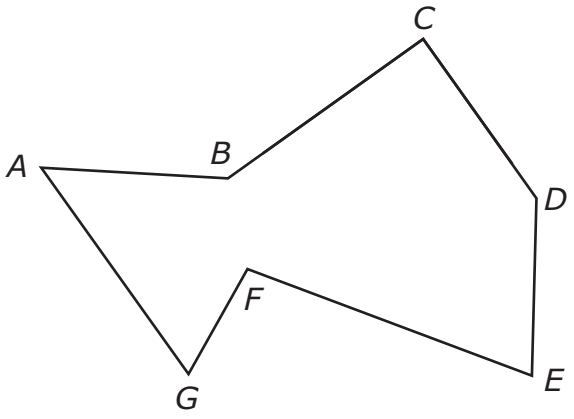
A $\frac{1}{6}$

B $1\frac{3}{6}$

C $\frac{3}{6}$

D $1\frac{1}{6}$

40 A figure is shown below.



Which two line segments appear to be perpendicular?

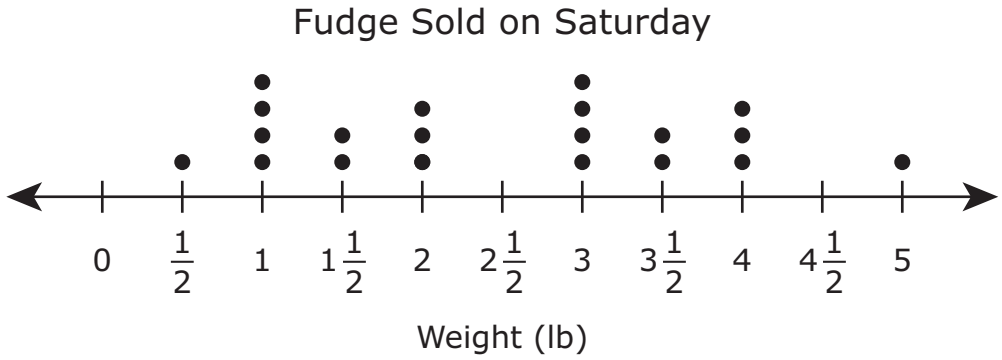
F Line segments *AG* and *CD*

G Line segments *BC* and *CD*

H Line segments *DE* and *EF*

J Line segments *AG* and *FG*

41 A candy store sells fudge by the pound. The dot plot shows the number of customers who bought different numbers of pounds of fudge on Saturday.



Which frequency table represents the same data shown on the dot plot?

A

Fudge Sold on Saturday

Weight (lb)	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
Tally	I	IIII	II	III		IIII	II	III		I

B

Fudge Sold on Saturday

Weight (lb)	1	4	2	3	0	4	2	3	0	1
Tally	I	IIII	II	III		IIII	II	III		I

C

Fudge Sold on Saturday

Weight (lb)	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
Tally	I	IIII	II	III	I	IIII	II	III	I	I

D

Fudge Sold on Saturday

Weight (lb)	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
Tally	I	IIII	II	III	IIII	II	III	I		

42 In 2008 the total number of cell phone users in Indonesia was about 140,578,000. Which expression has the same value as 140,578,000?

F $100{,}000{,}000 + 40{,}000{,}000 + 5{,}000{,}000 + 700{,}000 + 80{,}000$

G $100{,}000{,}000 + 40{,}000{,}000 + 500{,}000 + 70{,}000 + 8{,}000$

H $10{,}000{,}000 + 4{,}000{,}000 + 500{,}000 + 70{,}000 + 8{,}000$

J $100{,}000{,}000 + 40{,}000{,}000 + 500 + 70 + 8$

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43 Four figures are shown.

Figure P

Figure Q

Figure R

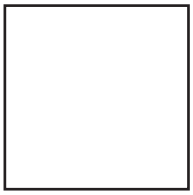
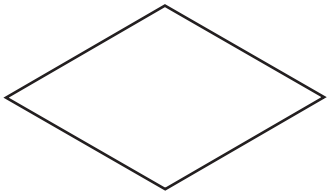


Figure S



Which figures appear to be rectangles?

A Figures Q and S

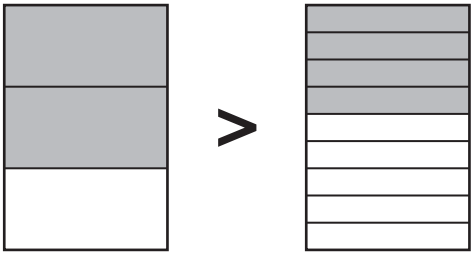
B Figures R and S

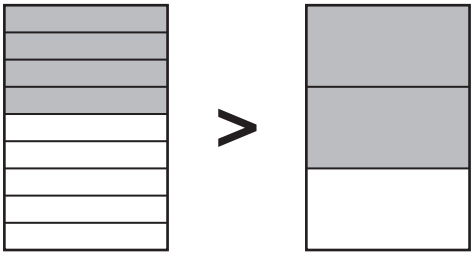
C Figures P and R

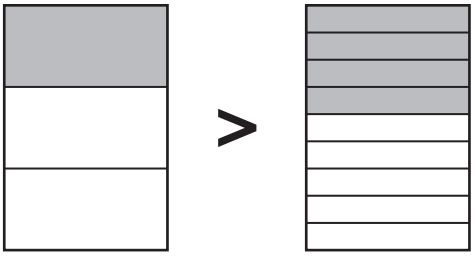
D Figures P and Q

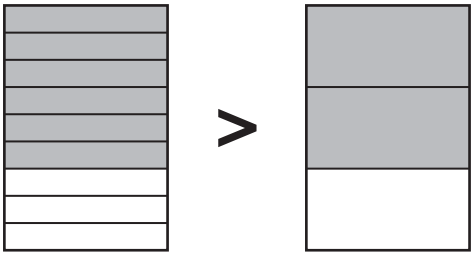
44 Sergio completed $\frac{2}{3}$ of a project. Julius completed $\frac{4}{9}$ of an identical project. Each student shaded a model to represent the fraction of the project he completed.

Which student completed more of his project?

F Sergio completed more, because 

G Julius completed more, because 

H Sergio completed more, because 

J Julius completed more, because 

45 Mr. Conrad makes chess pieces. A chess club ordered a set of chess pieces for each of its members.

- Each set has 32 chess pieces.
- There are 27 members of the chess club.
- Mr. Conrad put these chess pieces in 6 boxes with the same number of pieces in each box.

How many chess pieces did Mr. Conrad put in each box?

A 864

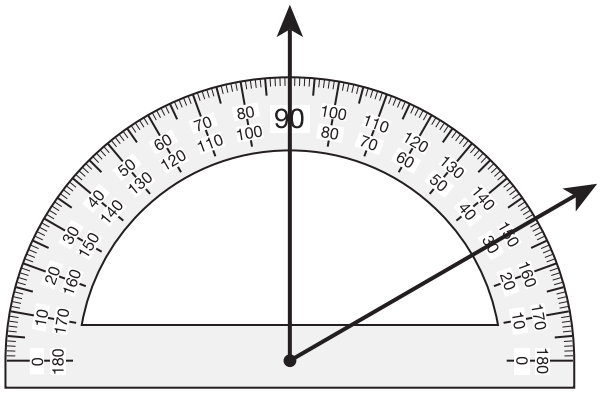
B 192

C 354

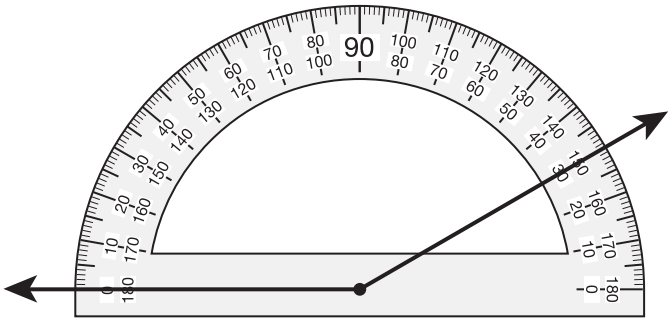
D 144

46 Which angle has a measure closest to 30°?

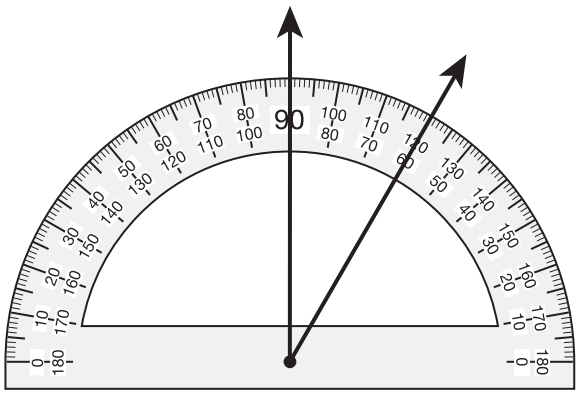
F



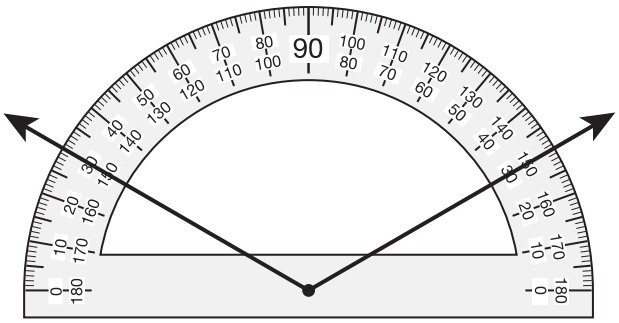
G



H



J



GO ON

47 The table shows a relationship between the input numbers and the output numbers generated by a number machine.

Number Machine

Input	Output
1	251
2	252
3	253
4	254

Which number machine shows the same relationship as the one shown in the table?

A Input → +200 → Output

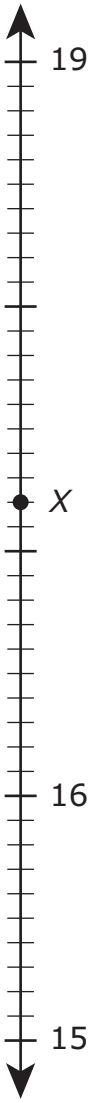
B Input → −1 → Output

C Input → +250 → Output

D Input → +1 → Output

GO ON

48 Point *X* on the number line below represents the height of a puppy in centimeters.



What measurement does point *X* represent on the number line?

F 16.12 cm

G 17.2 cm

H 18.8 cm

J 17.8 cm

BE SURE YOU HAVE RECORDED ALL OF YOUR ANSWERS ON THE ANSWER DOCUMENT.

STOP

STAAR
GRADE 4
Mathematics
May 2016

Item Number	Reporting Category	Readiness or Supporting	Content Student Expectation	Process Student Expectation	Correct Answer
1	1	Readiness	4.2(G)	4.1 (A),(B),(E),(F)	A
2	2	Readiness	4.4(H)	4.1 (A),(B),(F)	G
3	3	Supporting	4.7(E)	4.1 (B),(E),(F)	D
4	4	Readiness	4.9(A)	4.1 (A),(B),(D),(F)	J
5	2	Supporting	4.4(B)	4.1 (B),(D),(F)	B
6	1	Supporting	4.3(A)	4.1 (B),(F)	H
7	2	Supporting	4.4(D)	4.1 (A),(B),(F)	D
8	3	Readiness	4.5(D)	4.1 (B),(C),(E),(G)	H
9	1	Supporting	4.2(C)	4.1 (A),(B),(E),(F)	B
10	2	Readiness	4.5(A)	4.1 (A),(B),(D),(F)	F
11	3	Supporting	4.6(B)	4.1 (B),(E),(F)	B
12	2	Readiness	4.3(E)	4.1 (A),(B),(G)	J
13	4	Supporting	4.9(B)	4.1 (A),(B),(E),(F)	29
14	3	Readiness	4.6(D)	4.1 (A),(B),(F)	H
15	2	Readiness	4.4(A)	4.1 (A),(B),(F)	A
16	1	Readiness	4.2(B)	4.1 (B),(G)	G
17	3	Readiness	4.5(D)	4.1 (A),(B),(C),(F)	C
18	1	Readiness	4.3(D)	4.1 (B),(F)	F
19	3	Readiness	4.8(C)	4.1 (A),(B),(F)	C
20	3	Supporting	4.6(C)	4.1 (B),(E),(F)	G
21	2	Readiness	4.5(A)	4.1 (A),(B),(D),(F)	A
22	1	Readiness	4.2(G)	4.1 (B),(F)	G
23	3	Readiness	4.7(C)	4.1 (B),(C),(E),(F)	D
24	2	Readiness	4.5(B)	4.1 (B),(D),(F)	H
25	4	Supporting	4.10(B)	4.1 (A),(B),(F)	A
26	3	Supporting	4.8(B)	4.1 (A),(B),(C),(F)	216
27	1	Supporting	4.2(F)	4.1 (A),(B),(E),(F)	D
28	2	Readiness	4.4(H)	4.1 (A),(B),(F)	G
29	4	Supporting	4.10(A)	4.1 (A),(B),(G)	C
30	2	Supporting	4.4(F)	4.1 (A),(B),(F)	F
31	1	Supporting	4.2(E)	4.1 (B),(C),(E),(F)	C
32	2	Supporting	4.4(G)	4.1 (A),(B),(C),(F)	F
33	3	Readiness	4.5(D)	4.1 (A),(B),(C),(F)	B
34	2	Readiness	4.4(A)	4.1 (A),(B),(F)	60.29
35	3	Supporting	4.8(A)	4.1 (A),(B),(F)	A
36	1	Readiness	4.2(G)	4.1 (A),(B),(F)	G
37	2	Readiness	4.5(A)	4.1 (A),(B),(D),(F)	D
38	3	Readiness	4.8(C)	4.1 (A),(B),(C),(F)	H
39	2	Readiness	4.3(E)	4.1 (A),(B),(D),(F)	D
40	3	Supporting	4.6(A)	4.1 (B),(E),(F)	G
41	4	Readiness	4.9(A)	4.1 (A),(B),(D),(F)	A
42	1	Readiness	4.2(B)	4.1 (A),(B),(F)	G
43	3	Readiness	4.6(D)	4.1 (B),(E),(F)	C
44	1	Readiness	4.3(D)	4.1 (A),(B),(E),(G)	F
45	2	Readiness	4.4(H)	4.1 (A),(B),(F)	D
46	3	Readiness	4.7(C)	4.1 (B),(C),(E),(F)	H
47	2	Readiness	4.5(B)	4.1 (B),(D),(F)	C
48	1	Supporting	4.2(H)	4.1 (A),(B),(D),(F)	G

STAAR Grade 4 Mathematics Assessment

Mathematical Process Standards

These student expectations will not be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement.

(4.1) **Mathematical process standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to

(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

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Student Assessment Division
January 2014

Reporting Category 1:
Numerical Representations and Relationships

The student will demonstrate an understanding of how to represent and manipulate numbers and expressions.

(4.2) **Number and operations.** The student applies mathematical process standards to represent, compare, and order whole numbers and decimals and understand relationships related to place value. The student is expected to

(A) interpret the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left; ***Supporting Standard***

(B) represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals; ***Readiness Standard***

(C) compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or =; ***Supporting Standard***

(D) round whole numbers to a given place value through the hundred thousands place; ***Supporting Standard***

(E) represent decimals, including tenths and hundredths, using concrete and visual models and money; ***Supporting Standard***

(F) compare and order decimals using concrete and visual models to the hundredths; ***Supporting Standard***

(G) relate decimals to fractions that name tenths and hundredths; and ***Readiness Standard***

(H) determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line. ***Supporting Standard***

(4.3) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. The student is expected to

(A) represent a fraction a/b as a sum of fractions $1/b$, where a and b are whole numbers and $b > 0$, including when $a > b$; ***Supporting Standard***

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(B) decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations; ***Supporting Standard***

(C) determine if two given fractions are equivalent using a variety of methods; ***Supporting Standard***

(D) compare two fractions with different numerators and different denominators and represent the comparison using the symbols >, =, or <; and ***Readiness Standard***

(G) represent fractions and decimals to the tenths or hundredths as distances from zero on a number line. ***Supporting Standard***

Reporting Category 2:
Computations and Algebraic Relationships

The student will demonstrate an understanding of how to perform operations and represent algebraic relationships.

(4.3) **Number and operations.** The student applies mathematical process standards to represent and generate fractions to solve problems. The student is expected to

(E) represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations; and ***Readiness Standard***

(F) evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, 1/4, 1/2, 3/4, and 1, referring to the same whole. ***Supporting Standard***

(4.4) **Number and operations.** The student applies mathematical process standards to develop and use strategies and methods for whole number computations and decimal sums and differences in order to solve problems with efficiency and accuracy. The student is expected to

(A) add and subtract whole numbers and decimals to the hundredths place using the standard algorithm; ***Readiness Standard***

(B) determine products of a number and 10 or 100 using properties of operations and place value understandings; ***Supporting Standard***

(C) represent the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 by 15; ***Supporting Standard***

(D) use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties; ***Supporting Standard***

(E) represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations; ***Supporting Standard***

(F) use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor; ***Supporting Standard***

(G) round to the nearest 10, 100, or 1,000 or use compatible numbers to estimate solutions involving whole numbers; and ***Supporting Standard***

(H) solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders. ***Readiness Standard***

(4.5) **Algebraic reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to

(A) represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity; and ***Readiness Standard***

(B) represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence. ***Readiness Standard***

Reporting Category 3:
Geometry and Measurement

The student will demonstrate an understanding of how to represent and apply geometry and measurement concepts.

(4.5) **Algebraic reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to

(D) solve problems related to perimeter and area of rectangles where dimensions are whole numbers. ***Readiness Standard***

(4.6) **Geometry and measurement.** The student applies mathematical process standards to analyze geometric attributes in order to develop generalizations about their properties. The student is expected to

(A) identify points, lines, line segments, rays, angles, and perpendicular and parallel lines; ***Supporting Standard***

(B) identify and draw one or more lines of symmetry, if they exist, for a two-dimensional figure; ***Supporting Standard***

(C) apply knowledge of right angles to identify acute, right, and obtuse triangles; and ***Supporting Standard***

(D) classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. ***Readiness Standard***

(4.7) **Geometry and measurement.** The student applies mathematical process standards to solve problems involving angles less than or equal to 180 degrees. The student is expected to

(C) determine the approximate measures of angles in degrees to the nearest whole number using a protractor; ***Readiness Standard***

(D) draw an angle with a given measure; and ***Supporting Standard***

(E) determine the measure of an unknown angle formed by two non-overlapping adjacent angles given one or both angle measures. ***Supporting Standard***

(4.8) **Geometry and measurement.** The student applies mathematical process standards to select appropriate customary and metric units, strategies, and tools to solve problems involving measurement. The student is expected to

(A) identify relative sizes of measurement units within the customary and metric systems; ***Supporting Standard***

(B) convert measurements within the same measurement system, customary or metric, from a smaller unit into a larger unit or a larger unit into a smaller unit when given other equivalent measures represented in a table; and ***Supporting Standard***

(C) solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate. ***Readiness Standard***

Reporting Category 4:
Data Analysis and Personal Financial Literacy

The student will demonstrate an understanding of how to represent and analyze data and how to describe and apply personal financial concepts.

(4.9) **Data analysis.** The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to

(A) represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions; and ***Readiness Standard***

(B) solve one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot. ***Supporting Standard***

(4.10) **Personal financial literacy.** The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to

(A) distinguish between fixed and variable expenses; ***Supporting Standard***

(B) calculate profit in a given situation; and ***Supporting Standard***

(E) describe the basic purpose of financial institutions, including keeping money safe, borrowing money, and lending. ***Supporting Standard***

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