FCAT 2.0

Florida Comprehensive Assessment Test®

FCAT 2.0 Mathematics Sample Questions

The intent of these sample test materials is to orient teachers and students to the types of questions on FCAT 2.0 tests. By using these materials, students will become familiar with the types of items and response formats they will see on the actual test. The sample questions and answers are not intended to demonstrate the length of the actual test, nor should student responses be used as an indicator of student performance on the actual test. Additional information about test items can be found in the *FCAT 2.0 Test Item Specifications* at http://fcat.fldoe.org/fcat2/itemspecs.asp.

The FCAT 2.0 Mathematics tests and sample questions and answers are based on the 2007 Next Generation Sunshine State Standards.

The sample questions for students and the sample answers for teachers will only be available online, at http://fcat.fldoe.org/fcat2/fcatitem.asp.

Directions for Answering the Mathematics Sample Questions

Mark your answers on the Mathematics Sample Answer Sheets, which begin on page 14 of this booklet. If you don't know how to work a problem, ask your teacher to explain it to you. Your teacher has the answers to the sample questions.

You may need formulas and conversions to help you solve some of the problems. You may refer to the Reference Sheet on pages 5 and 6 as often as you like.

Rulers are NOT to be used with the Grade 7 FCAT 2.0 Mathematics Sample Questions.

Use the space in your Mathematics Sample Questions booklet to do your work on the multiple-choice and gridded-response questions, but be sure to put your answers on the Sample Answer Sheet.

> This symbol appears next to questions that require you to fill in your answer on a grid.

Directions for Completing the Response Grids

1. Work the problem and find an answer.
2. Write your answer in the answer boxes at the top of the grid.
   - Print your answer with the first digit in the left answer box OR with the last digit in the right answer box. Note that some grids only allow for a negative sign in the left answer box.
   - Print only one digit or symbol in each answer box. Do NOT leave a blank answer box in the middle of an answer.
   - Be sure to write a decimal point or fraction bar in the answer box if it is a part of the answer.
3. Fill in a bubble under each box in which you wrote your answer.
   - Fill in one and ONLY one bubble for each answer box. Do NOT fill in a bubble under an unused answer box.
   - Fill in each bubble by making a solid mark that completely fills the circle.
   - You MUST fill in the bubbles accurately to receive credit for your answer.

In Grade 7, there are two grids: a six-column grid that includes the digits 0 through 9, the decimal point (.), and the fraction bar (/); and a seven-column grid that includes the digits 0 through 9, the decimal point, the fraction bar, and a seventh column to allow for the negative sign (−).
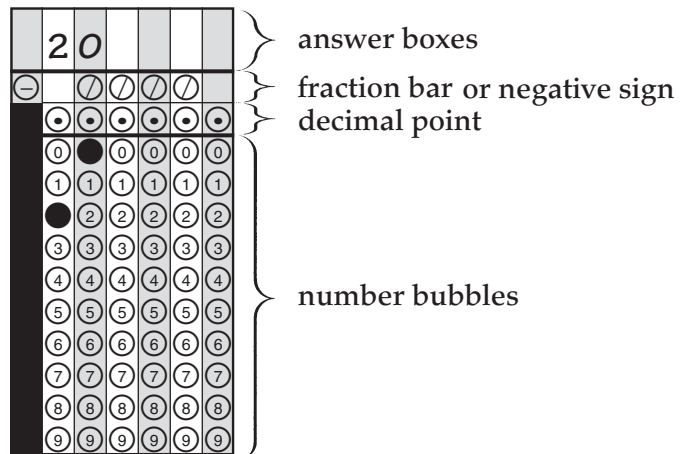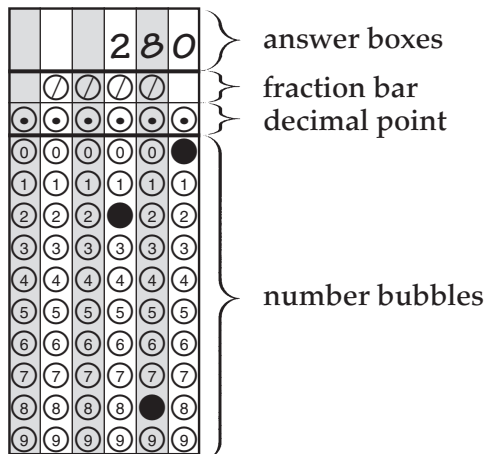
The following are examples of some of the ways to fill in answers correctly.

Grids may be filled in from the left or the right. Do NOT leave spaces in the middle. Fill in all bubbles for numbers and symbols.

When a percent is required to answer a question, do NOT convert the percent to its decimal or fractional equivalent. Grid in the percent value without the % symbol. Do the same with dollar amounts.
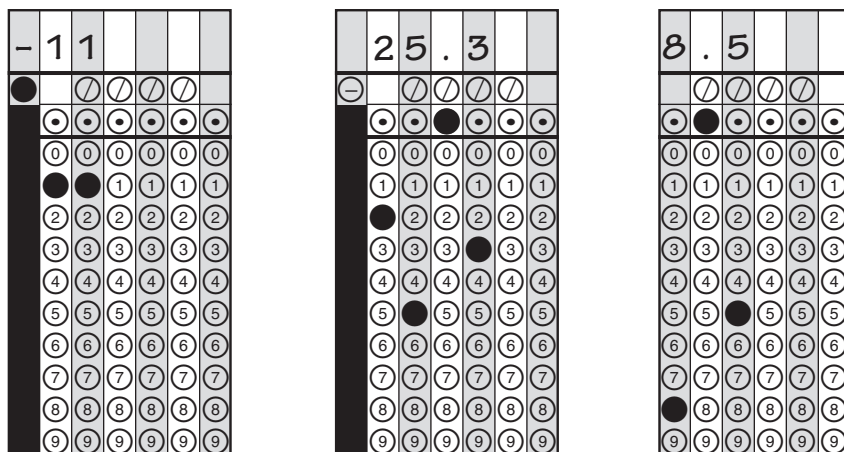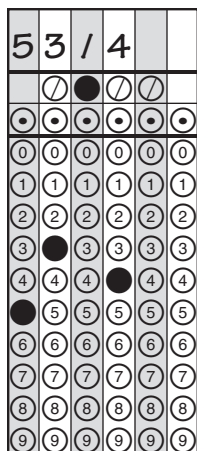
Do NOT write a **mixed number** such as $13\frac{1}{4}$ in the answer grid. Convert the answer to an improper fraction, such as $\frac{53}{4}$, or to a decimal number, such as 13.25. Do not try to fill in $13\frac{1}{4}$, as it would be read as $\frac{131}{4}$ and would be counted wrong.
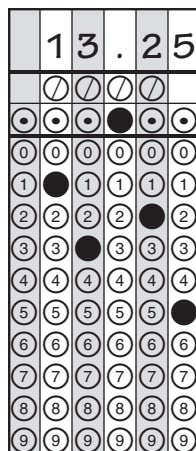
CORRECT   **INCORRECT**

$12\frac{3}{4} + \frac{1}{2} =$

OR

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HELPFUL HINTS FOR USING A FOUR-FUNCTION CALCULATOR

1. Read the problem very carefully. Then decide whether or not you need the calculator to help you solve the problem.
2. When starting a new problem, always clear your calculator by pressing the on/clear key.
3. If you see an **E** in the display, clear the error before you begin.
4. If you see an **M** in the display, clear the memory and the calculator before you begin.
5. If the number in the display is not one of the answer choices, check your work.
6. Remember, your calculator will NOT automatically perform the algebraic order of operations.
7. Calculators might display an incorrect answer if you press the keys too quickly. When working with calculators, use careful and deliberate keystrokes, and always remember to check your answer to make sure that it is reasonable.
8. The negative sign may appear either to the left or to the right of the number.
9. When solving items, wait until the final step to round decimal equivalents and/or approximations. Focus on whether the item specifies the decimal place, equivalent fraction, and/or *pi* approximation needed for the answer. In most cases, front-end estimation and truncation are not accurate processes for estimation.
10. Always check your answer to make sure that you have completed all of the necessary steps.

CALCULATOR MODEL
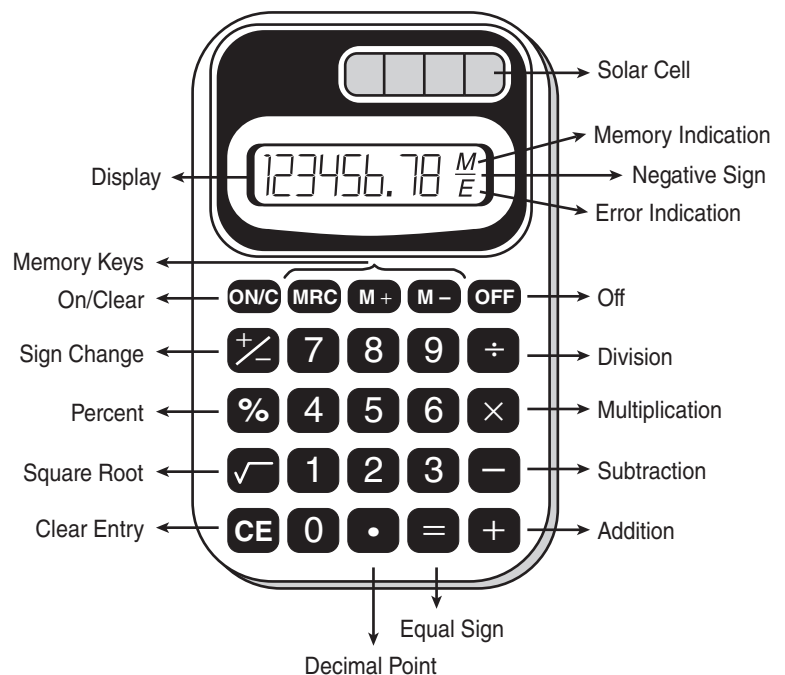
Grades 6–8 FCAT 2.0 Mathematics Reference Sheet

Area

Rectangle	$A = bh$	
Parallelogram	$A = bh$	
Triangle	$A = \frac{1}{2}bh$	
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$	
Circle	$A = \pi r^2$	

KEY

b = base	A = area
h = height	B = area of base
w = width	C = circumference
d = diameter	V = volume
r = radius	P = perimeter of base
ℓ = slant height	$S.A.$ = surface area
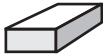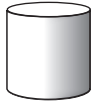
Use 3.14 or $\frac{22}{7}$ for π.

Circumference

$C = \pi d$ or $C = 2\pi r$

Volume/Capacity

Total Surface Area

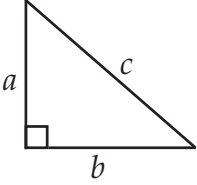|		Volume/Capacity	Total Surface Area
	Rectangular Prism	$V = bwh$ or $V = Bh$	$S.A. = 2bh + 2bw + 2hw$ or $S.A. = Ph + 2B$
	Right Circular Cylinder	$V = \pi r^2 h$ or $V = Bh$	$S.A. = 2\pi rh + 2\pi r^2$ or $S.A. = 2\pi rh + 2B$
	Right Square Pyramid	$V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}P\ell + B$
	Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$ or $V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}(2\pi r)\ell + B$

Sum of the measures of the interior angles of a polygon $= 180(n - 2)$

Measure of an interior angle of a regular polygon $= \dfrac{180(n - 2)}{n}$

where:

   n represents the number of sides

Grades 6–8 FCAT 2.0 Mathematics Reference Sheet

Pythagorean theorem	Simple interest formula
$a^2 + b^2 = c^2$	$I = prt$ where p = principal, r = rate, t = time
Slope-intercept form of a linear equation $y = mx + b$ where m = slope and b = y-intercept	**Distance, rate, time formula** $d = rt$ where d = distance, r = rate, t = time

Conversions within a System of Measure

1 yard = 3 feet
1 mile = 1,760 yards = 5,280 feet
1 acre = 43,560 square feet

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 pound = 16 ounces
1 ton = 2,000 pounds

1 meter = 100 centimeters = 1000 millimeters
1 kilometer = 1000 meters

1 liter = 1000 milliliters = 1000 cubic centimeters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

1 minute = 60 seconds
1 hour = 60 minutes
1 year = 52 weeks = 365 days

Conversions between Systems of Measure

When converting from Customary to Metric, use these approximations.

1 inch = 2.54 centimeters
1 foot = 0.305 meter
1 mile = 1.61 kilometers

1 cup = 0.24 liter
1 gallon = 3.785 liters
1 ounce = 28.35 grams
1 pound = 0.454 kilogram

When converting from Metric to Customary, use these approximations.

1 centimeter = 0.39 inch
1 meter = 3.28 feet
1 kilometer = 0.62 mile

1 liter = 4.23 cups
1 liter = 0.264 gallon
1 gram = 0.0352 ounce
1 kilogram = 2.204 pounds

Temperature conversions between Celsius and Fahrenheit

°C = (°F − 32) ÷ 1.8
°F = (°C × 1.8) + 32

1 A new museum has two circular display rooms. The radius of the large circular room is 6 yards. The radius of the smaller circular room is 3 yards. What is the area of the smaller room in relation to the area of the large room?

A. $\frac{1}{6}$ of the large room's area

B. $\frac{1}{4}$ of the large room's area

C. $\frac{1}{3}$ of the large room's area

D. $\frac{1}{2}$ of the large room's area

2 A magazine for people over 50 years of age asked its readers what type of tourist attraction interested them most.

TOURIST ATTRACTIONS
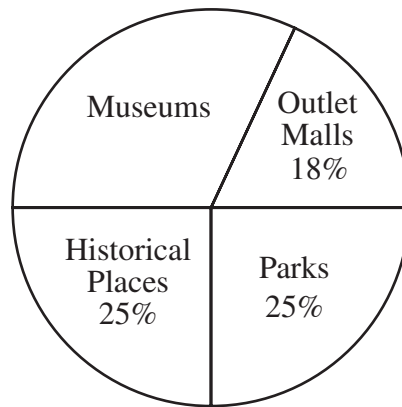
If 250 readers responded, how many chose **museums** as their favorite attraction?

F.   32
G.   45
H.   80
I.   170

3 The table below shows the theoretical probability for different outcomes of flipping a coin three times.

THEORETICAL PROBABILITY OF FLIPPING A COIN THREE TIMES

Outcome	Probability
3 heads	$\frac{1}{8}$
2 heads and 1 tail	$\frac{3}{8}$
1 head and 2 tails	$\frac{3}{8}$
3 tails	$\frac{1}{8}$

In a mathematics class of 24 students, each student flipped a coin three times and recorded the results. The results from the class are shown in the table below.

CLASS EXPERIMENT IN COIN FLIPPING

Outcome	Results
3 heads	2
2 heads and 1 tail	9
1 head and 2 tails	8
3 tails	5

For which possible outcome did the results of the class experiment match the theoretical probability?

A. 3 heads

B. 2 heads and 1 tail

C. 1 head and 2 tails

D. 3 tails

4 What value of x will make the equation $2x + 6x = 56$ true?

5 On a cold day in Alaska, Ronda recorded the temperature every few hours, as shown in the table below.

TEMPERATURE

| Time	Temperature (in degrees Fahrenheit)
6:00 a.m.	⁻10
9:00 a.m.	⁻5
12:00 noon	
3:00 p.m.	

From 9:00 a.m. to 12:00 noon, the temperature dropped 15 degrees, and from 12:00 noon to 3:00 p.m., the temperature rose 11 degrees. Using the information in the table above, what was the temperature, in degrees Fahrenheit, at 3:00 p.m.?

6 Mark designed a kite for his art project. His scale drawing is shown below.

$1\frac{1}{2}$ inches

SCALE
$\frac{1}{4}$ inch represents 6 inches
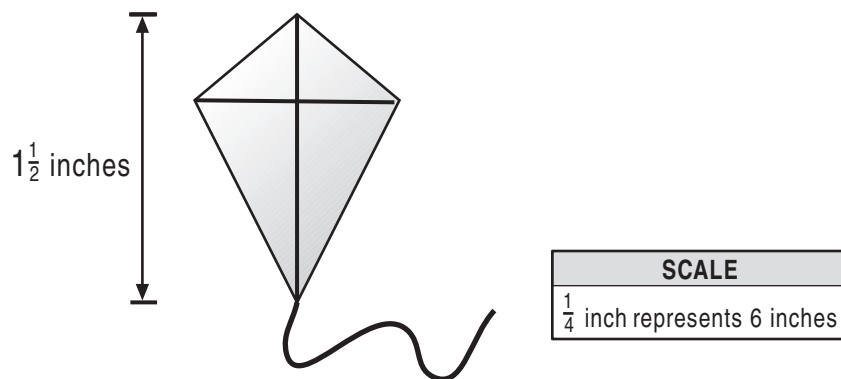
Using the scale given, what is the height, **in inches**, of the actual kite?

7 At 4:00 p.m., a palm tree casts a shadow of 27 feet while a 4-foot bird of paradise plant nearby casts a shadow of 3 feet.
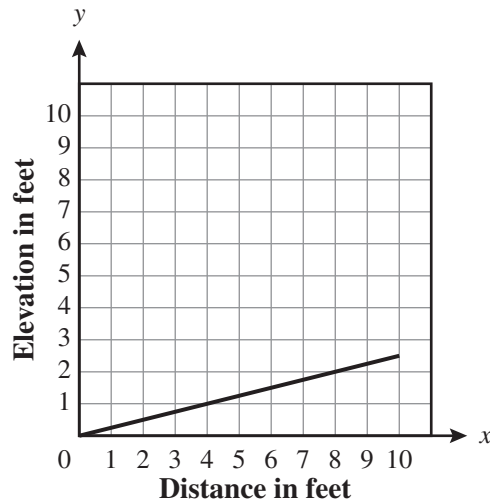
Palm Tree

x

not to scale

27 feet

Bird of Paradise

4 feet

3 feet
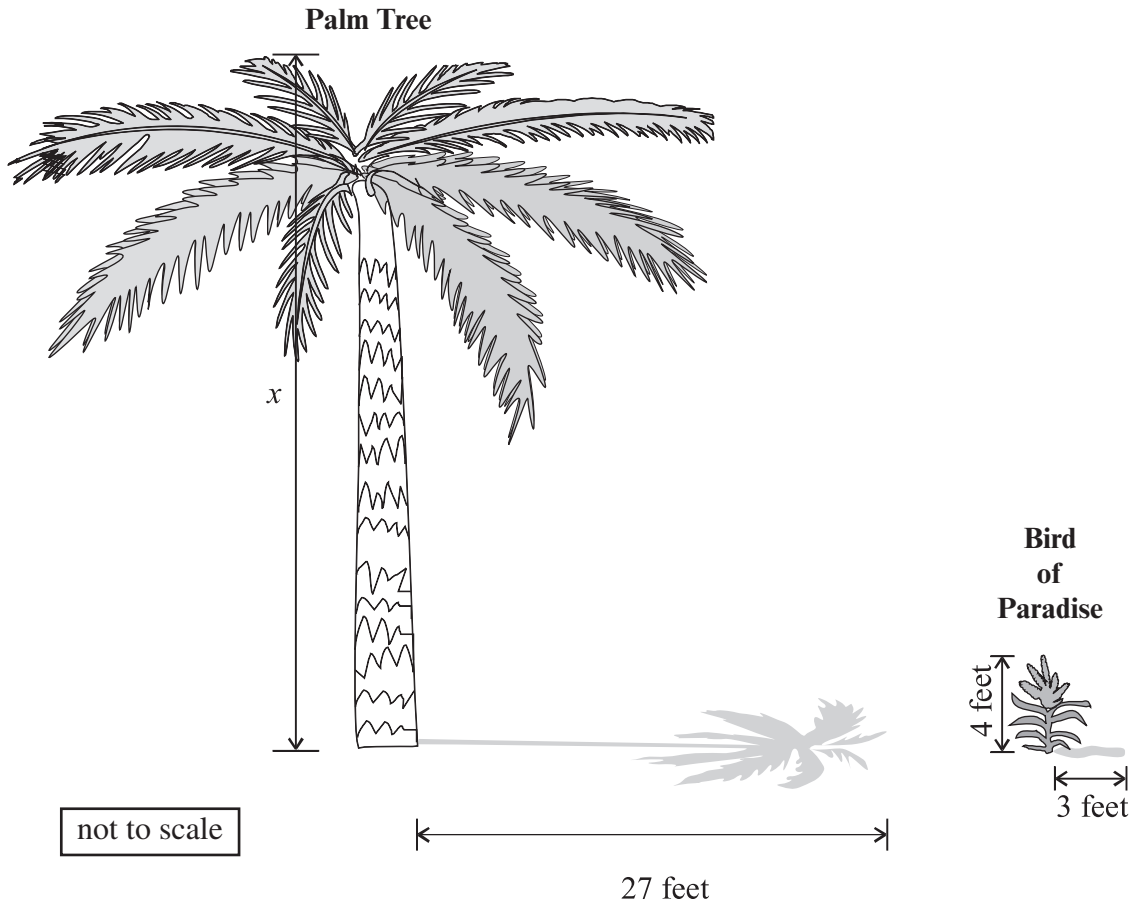
What is the height, in feet, of the palm tree?

F. 28 feet

G. 36 feet

H. 45 feet

I. 81 feet

8 The graph below shows the slope of a ramp at a skateboard park.

RAMP AT A SKATEBOARD PARK

The length of the base of the ramp is 10 feet, and the height at the end of the ramp is 2.5 feet. Which of the following is the slope of the ramp?

A. $\frac{1}{8}$

B. $\frac{1}{4}$

C. 4

D. 8

9 Joan bought a garden hose from the hardware store. The hose measured 50 meters in length. Which measurement is closest to the length of the hose, **in feet**?

F. 15.25

G. 152.5

H. 164

I. 1,640

10 Tino designed a tent in the shape of a triangular prism. Each face of the tent, including the bottom, will be made from nylon. The length of the tent and one triangular face with dimensions, in feet (ft), are shown below.

Tino's Tent Design

20 ft
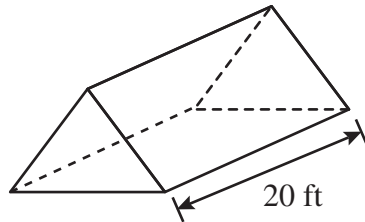
not to scale

Dimensions of Triangular Face

10 ft   10 ft

8 ft

12 ft
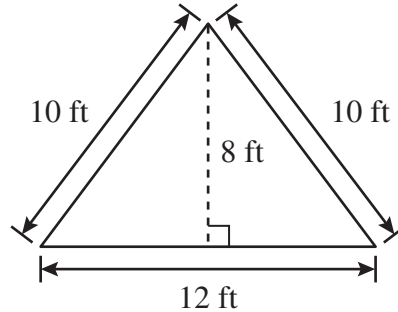
What is the total surface area, **in square feet**, of the tent Tino designed?

11 Which of the following tables represents an inverse variation between x and y?

A.

x	15	20	25	30
y	30	40	50	60

C.

x	1	2	3	4
y	24	12	8	6

B.

x	15	20	25	30
y	60	50	30	20

D.

x	-5	-6	-7	-8
y	25	36	49	64

12 Which of the following expressions has a value of 27?

F. $-|12 - 53 + 14|$

H. $|12| + |^-53| + |14|$

G. $|12 - 53 + 14|$

I. $|^-12| - |53| - |^-14|$

13 Last weekend, Jerry rented a canoe from a canoe rental company for a total of $32. The company charges $20 for the first hour and $1.50 for each additional hour. The equation below can be used to find h, the number of hours the canoe was rented.

$$20 + (h - 1)(1.5) = 32$$

Which of the following equations is equivalent to the equation above?

A. $20 + (1.5h - 1.5) = 32$

B. $20(h + 1)(1.5) = 32$

C. $20(1.5) + h = 32$

D. $20 + h(1.5) = 32$

14 A picture of Jay's fish tank, with its dimensions, is shown below.
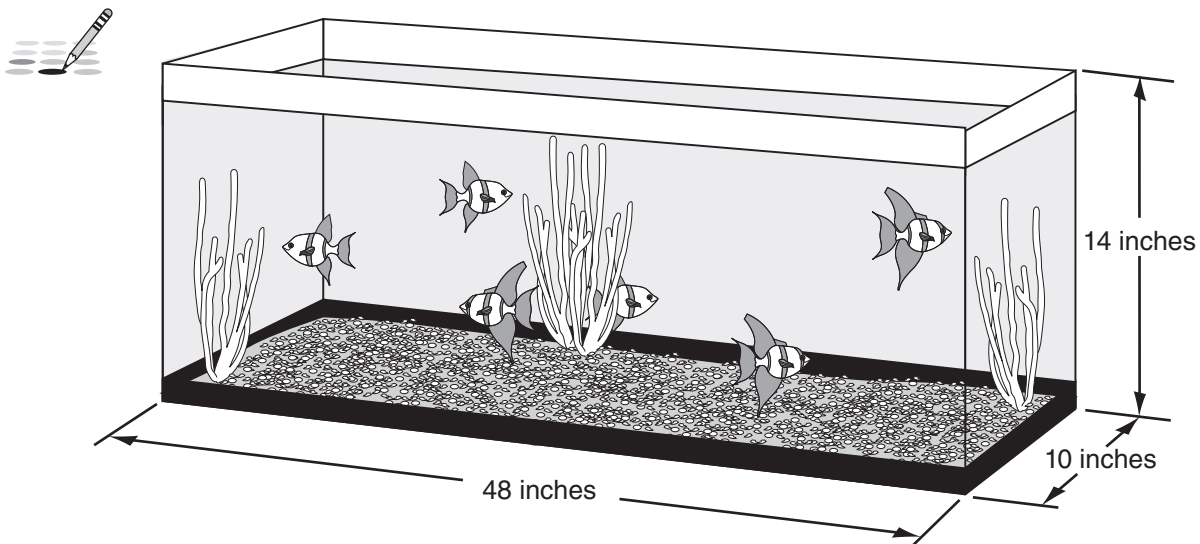
Jay filled the tank with water up to 2 inches below the top of the tank. He purchased 1 fish for every 144 cubic inches of water. How many fish did he purchase?

Name _____

Answer all the Mathematics Sample Questions on the Sample Answer Sheets.

1 Ⓐ Ⓑ Ⓒ Ⓓ

2 Ⓕ Ⓖ Ⓗ Ⓘ

3 Ⓐ Ⓑ Ⓒ Ⓓ

4

5

6

7 Ⓕ Ⓖ Ⓗ Ⓘ

8 Ⓐ Ⓑ Ⓒ Ⓓ

9 Ⓕ Ⓖ Ⓗ Ⓘ

10

FCAT 2.0 *Mathematics Sample Answer Sheet*

11 Ⓐ Ⓑ Ⓒ Ⓓ

12 Ⓕ Ⓖ Ⓗ Ⓘ

13 Ⓐ Ⓑ Ⓒ Ⓓ

14

	/	/	/	/	
⊙	⊙	⊙	⊙	⊙	⊙
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

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The Florida Department of Education and its test contractors currently employ strategies to protect the environment in the production and destruction of FCAT 2.0 materials. The Department encourages schools and districts to recycle nonsecure FCAT 2.0 interpretive publications after use.