# 2006 <br> FCAT 

## Student Name

Florida Comprehensive Assessment Test

# MATHEMATICS SUNSHINE STATE STANDARDS TEST B00K <br> <br> 

 <br> <br> GRADE} <br> <br> GRADE
}

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This symbol appears next to questions that require you to fill in your answer on a grid in your answer book. Answers may be gridded using several correct formats. You MUST fill in the bubbles accurately to receive credit for your answer.

## Directions for Completing the Response Grid

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.
- 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 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 black mark that completely fills the circle.
- You MUST fill in the bubbles accurately to receive credit for your answer.


## Parts of a Response Grid

Response grids have these parts:


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## Grades 9-10 FCAT Mathematics Reference Sheet



In the following formulas, $n$ represents the number of sides.

- In a polygon, the sum of the measures of the interior angles is equal to $180(n-2)$.
- In a regular polygon, the measure of an interior angle is equal to $\frac{180(n-2)}{n}$.

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## Grades 9-10 FCAT Mathematics Reference Sheet

Pythagorean theorem:


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

Slope-intercept form of an equation of a line:

$$
y=m x+b
$$

where $m=$ slope and $b=$ the $y$-intercept.
Distance, rate, time formula:

$$
d=r t
$$

where $d=$ distance, $r=$ rate, $t=$ time.

Distance between two points

$$
\begin{aligned}
& P_{1}\left(x_{1}, y_{1}\right) \text { and } P_{2}\left(x_{2}, y_{2}\right): \\
& \quad \sqrt{\left(x_{2}-x_{1}\right)^{2}+\left(y_{2}-y_{1}\right)^{2}}
\end{aligned}
$$

Midpoint between two points
$P_{1}\left(x_{1}, y_{1}\right)$ and $P_{2}\left(x_{2}, y_{2}\right)$ :

$$
\left(\frac{x_{2}+x_{1}}{2}, \frac{y_{2}+y_{1}}{2}\right)
$$

Simple interest formula:

$$
\mathrm{I}=p r t
$$

where $p=$ principal, $r=$ rate, $t=$ time.

## Conversions

1 yard $=3$ feet $=36$ inches
1 mile $=1760$ yards $=5280$ feet
1 acre $=43,560$ square feet
1 hour = 60 minutes
1 minute $=60$ seconds
1 liter = 1000 milliliters $=1000$ cubic centimeters
1 meter $=100$ centimeters $=1000$ millimeters
1 kilometer $=1000$ meters
1 gram = 1000 milligrams
1 kilogram = 1000 grams
Metric numbers with four digits are presented without a comma (e.g., 9960 kilometers).
For metric numbers greater than four digits, a space is used instead of a comma (e.g., 12500 liters).

1 cup = 8 fluid ounces
1 pint $=2$ cups
1 quart = 2 pints
1 gallon = 4 quarts

1 pound = 16 ounces
1 ton $=2000$ pounds

This is a picture of a generic calculator and its parts.


## HELPFUL HINTS FOR TAKING THE FCAT MATHEMATICS SSS TEST

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 clear key.
3. If you see an $\mathbf{E}$ in the display, clear the error before you begin.
4. If you see an $\mathbf{M}$ 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. Remember that when computing with certain types of fractions, you may have to round the number in the display.
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. Always check your answer to make sure that you have completed all of the necessary steps.

## Page 6

Use the space in the Test Book to do your work. If you change your answer, be sure to erase completely.

1) Only part of an iceberg is visible above the water line. The picture shows an iceberg with a height of about 450 feet above the water line.


Which is the closest to the total height, in feet, of the iceberg?
A. 1,000 feet
B. 2,000 feet
C. 4,000 feet
D. 6,000 feet

2 A rock climber burns 12 calories per minute of climbing. How many calories does the rock climber burn in one-half hour of climbing?
F. 6
G. 24
H. 360
I. 720

3 The seesaw shown below is an example of a type of lever. A lever will balance when the product of the force (weight of one child) and the distance on one side of the fulcrum equals the product of the force (weight of the other child) and the distance on the other side.


The fulcrum is at point $A$ where the seesaw balances. $H$ is the force applied at a distance $j$ on one side of the fulcrum and $F$ is the force applied at a distance $d$ on the other side of the fulcrum. Which of the following equations represents this relationship?
A. $F d=H j$
B. $F H=d j$
C. $\frac{F}{H}=\frac{d}{j}$
D. $\frac{F}{j}=\frac{d}{H}$

4 In developing her science project, Leigh learned that light travels at a constant rate and that it takes 500 seconds for light to travel the 93 million miles from the Sun to Earth. Mars is 142 million miles from the Sun. About how many seconds will it take for light to travel from the Sun to Mars?
F. 235 seconds
G. 327 seconds
H. 642 seconds
I. 763 seconds

5 Tony Seeger, a researcher from the Smithsonian Institution, spent many years with the Suya Indians in Brazil. Tony, shown dancing with a group of the Indians, is about a head taller than any of the Suya.


The heights of 80 dancers were recorded. If Tony Seeger's height was included in the data, which measure below would be most affected?
A. mean
B. median
C. mode
D. range

## Page 9

6 The population of a town is 13,000 and is increasing by about 250 people per year. This information can be represented by the following equation, where $y$ represents the number of years and $p$ represents the population.

$$
p=13,000+250 y
$$

According to the equation above, in how many years will the population of the town be 14,500 ?


7 In 1990, the city of St. Petersburg, Florida, had the greatest population density of any city in the state, about 3,040 persons per square mile. The city of Inverness, Florida, had a population density equal to $\frac{1}{19}$ the density of St. Petersburg. What was the population density of Inverness, in persons per square mile?


8 Two sailboats leave Key Largo, Florida. One of the sailboats travels 3 miles east and then 4 miles north. The second sailboat travels 8 miles south and 6 miles west.


How far apart, in miles, are the boats?


9 On a coordinate grid, the location of a lighthouse is at $L$, and the location of a buoy is at $B$. At noon, a ship was at the midpoint of the segment connecting $L$ and $B$ on the grid.


Which coordinates best represent the ship's position at noon?
F. $\left(2, \frac{1}{2}\right)$
G. $\left(1, \frac{1}{2}\right)$
H. $\left(\frac{1}{2}, 2\right)$
I. $\left(\frac{1}{2}, 5\right)$

10 Lt. Dahlia Johnson is a jet pilot in the United States Navy. After her jet is launched from the flight deck of an aircraft carrier, the jet's altitude above sea level increases at a constant rate of 95 feet per second.

If the flight deck of the carrier is 90 feet above sea level, which equation could be used to find $t$, the number of seconds it will take Lt. Johnson to reach her cruising altitude of 30,000 feet above sea level?
A. $t=\frac{30,000}{90}$
B. $t=\frac{30,000-95}{90}$
C. $t=\frac{30,000}{95}$
D. $t=\frac{30,000-90}{95}$

11 While in Tokyo, Callie spent 547,000 Japanese yen for a strand of pearls. The cost of the pearls was equivalent to $\$ 5,000$ in U.S. currency. At the time of Callie's purchase, how many yen were equivalent to $\$ 20$ in U.S. currency?
F. 109 yen
G. 2,188 yen
H. 5,470 yen
I. 27,350 yen

12 Denise's great-grandfather gave her an antique violin. He paid $\$ 18$ for the violin 84 years ago. She found that the dollar value of the violin had doubled approximately every 12 years, and that the violin currently had a dollar value of $\$ 2,300$. If the dollar value of her violin doubles every 12 years, what would be the dollar value of Denise's antique violin in 36 more years?
A. $\$ 6,900$
B. $\$ 8,100$
C. $\$ 18,400$
D. $\$ 24,300$

13 Mike delivers pizzas for a restaurant. He is paid $\$ 5$ per hour worked, plus $\$ 3$ for each pizza delivered. Last week Mike worked 35 hours and earned $\$ 265$. This week Mike wants to earn $\$ 295$. If Mike works the same number of hours, how many more pizzas must Mike deliver this week than he delivered last week?


14 Sergio works at his father's electronics shop after school. He needs to drill a hole at each of the points $A, B, C, D$, and $E$ on circle $P$, as shown below.

## CIRCUIT BOARD



If Sergio drills the holes so that $\angle A P E$ measures $110^{\circ}$ and the other 4 central angles are congruent to each other, what will be the measure of $\angle C P D$ ?


15 Jesse and Jordan are playing a game using two spinners. Each spinner contains the numbers $1,2,3$, and 4 . The spinner is equally likely to stop on any of the four numbers.


In the game, a player spins both spinners and calculates the product of the two numbers on which the spinners stopped. What product has the greatest probability of occurring in this game?


16 Florence has a circular piece of artwork 18 inches in diameter. She wants to display the artwork on a square piece of fabric that has a cord attached to the edges of the square, as shown below. The fabric will extend 3 inches (in.) beyond the artwork.


What is the perimeter, in inches, of the square piece of fabric?
F. 54 in .
G. 84 in .
H. 96 in.
I. $\quad 108 \mathrm{in}$.

17 The design for a machine part is shown below.


Which of these is a correct statement about the symmetry of the design?
A. The design is symmetrical only about the $y$-axis.
B. The design is symmetrical only about the $x$-axis.
C. The design is symmetrical about both the $y$-and the $x$-axes.
D. There is no symmetry in the design.

18 Current is defined as the movement of electrical charges. The current, $I$, in a simple electrical circuit is given by the formula $I=\frac{V}{R}$, where $V$ is the voltage and $R$ is the resistance of the circuit. If the voltage remains unchanged, what effect will doubling the resistance of the circuit have on the current?
F. The current will remain the same.
G. The current will be half its previous value.
H. The current will double its previous value.
I. The current will be two units more than its previous value.

19 A pyrometer is an instrument used to record very high temperatures. It produces a small electric current called a microampere when exposed to heat. The microampere reading indicates the temperature of the substance being measured. The linear relation is shown in the table below.

PYROMETER MEASUREMENTS

| Pyrometer Reading <br> (microamperes) | Temperature <br> (degrees Fahrenheit) |
| :---: | :---: |
| 5.00 | 300.0 |
| 5.94 | 356.4 |
| 6.88 | 412.8 |
| 7.82 |  |

What should be the temperature, in degrees Fahrenheit, if the pyrometer reading is 7.82 microamperes?


20 Jodi is studying plant growth rates for her science project. For her project, she selected three bean plants of equal height. Then, for the next five days, she measured the height, in centimeters, of each plant and plotted the values on the graph below.


She drew a line of best fit passing through points $(1,1)$ and $(5,7)$ on the graph to show one way of calculating the mean growth rate of the plants. What is the slope of the line she drew?


21 A circle that has a radius of 5 inches has an area of $25 \pi$ square inches. If the radius is doubled, what is the area of the new circle?
A. $10 \pi$ square inches
B. $50 \pi$ square inches
C. $100 \pi$ square inches
D. $200 \pi$ square inches

22 Players of a game at the school carnival will be allowed to draw a token for a prize. The prizes include 8 yo-yos, 9 key chains, 12 stuffed animals, 11 movie passes, 16 video rentals, and 14 flying disks. For each prize, there is one token available to be drawn.

What is the probability that the first winner to draw a token will win a stuffed animal?
F. $\frac{6}{29}$
G. $\frac{6}{35}$
H. $\frac{1}{6}$
I. $\frac{1}{12}$

23 The numbers of paid subscriptions for four magazine types are shown on the table below.

TOTAL PAID SUBSCRIPTIONS

| Magazine <br> Type | Circulation |
| :--- | :---: |
| Business | $9.5 \times 10^{5}$ |
| Family | $5.0 \times 10^{6}$ |
| Style | $9.0 \times 10^{5}$ |
| Teen | $2.4 \times 10^{6}$ |

Which of the following lists these magazine types by circulation from greatest to least?
A. Business, Style, Family, Teen
B. Family, Teen, Business, Style
C. Style, Business, Teen, Family
D. Teen, Family, Style, Business

24 Dori created four categories to describe different types of newspaper comic strips. She then surveyed 293 high school freshmen to identify the one type of comic strip each student preferred. The results of her survey are shown in the table below.

COMIC STRIP PREFERENCE

| Type of <br> Comic Strip | Number of <br> Responses |
| :---: | :---: |
| Political | 9 |
| Animal | 126 |
| Sports | 108 |
| Family | 50 |

Which of the following is closest to the percent of freshmen surveyed who preferred Family comic strips?
F. $3 \%$
G. $5 \%$
H. $17 \%$
I. $50 \%$

25 Which point on the number line represents a number that, when cubed, will result in a number greater than itself?

A. P
B. Q
C. R
D. S

26 In triangle $A D G$ below, the length of side $D G$ is 18 units. Line segments $A G, B F$, and $C E$ are all parallel.


What is the approximate length of line segment $E G$ ?
F. 4.9 units
G. 7.4 units
H. 11.0 units
I. $\quad 12.5$ units

27 Albert wants to simplify the expression:
$8(3-y)+5(3-y)$
Which of the following is equivalent to the expression above?
A. $39-y$
B. $13(3-y)$
C. $40(30-y)$
D. $13(6-2 y)$

28 Monica's father owns a racecar. The table below lists 5 racecar finishing times for recent practice trials.

TIMES FOR PRACTICE TRIALS

| Trial | Time (in seconds) |
| :---: | :---: |
| 1 | 5.09 |
| 2 | 5.10 |
| 3 | 4.95 |
| 4 | 4.91 |
| 5 | 5.05 |

What is the mean time, in seconds, for the 5 practice trials?


29 Joseph volunteered to fertilize the grass at a neighborhood playground. He needs to determine the area of the grass-covered portion, shaded in the diagram below, so he can buy enough fertilizer.

NEIGHBORHOOD PLAYGROUND


What is the area, in square feet, of the grass-covered portion of the playground?


30 Home plate on a baseball field has a shape that is a square with two isosceles right triangles removed from 2 adjacent corners.


What is the measure of angle $A B C$ ?


31 As shown in the drawing, Raymond used similar triangles to find the height of a pole. When he stood 6.5 feet from a small puddle, he could see the reflection of the top of the pole in the puddle. The puddle was 26 feet from the pole, and Raymond's eye level was 5.5 feet above the ground.


What is the height of the pole in feet?


32 An artist is designing a pattern of triangular tiles to cover a wall. Each section of the pattern is identical to the section shown below.


If the wall is 576 cm long and 384 cm high, how many black tiles will the artist need to use on the wall?
F. $\quad 72$
G. 576
H. 1,152
I. 1,728

33 A rectangular solid is shown below.


Which expression represents the sum of the lengths of the 12 edges on this rectangular solid?
A. $2(a+b+c)$
B. $3(a+b+c)$
C. $4(a+b+c)$
D. $12(a+b+c)$

34 At Jerry's annual family reunion, cheesecake was served for dessert. Jerry cut a slice for himself, as shown below.


If the entire cheesecake contained 4480 calories, which is closest to the number of calories contained in Jerry's slice?
F. 280 calories
G. 373 calories
H. 498 calories
I. 560 calories

35 Sylvia conducted a survey in her homeroom in order to report which of 3 types of candy were liked by the 24 students．Some students chose more than one type．She made tally marks on a chart to show the candies each student liked．

SYLVIA＇S TALLY CHART

## Hard Candy HHII <br> Gummy HHHHII <br> Chocolate册册朋

Which of these Venn diagrams could represent Sylvia＇s tally chart？


36 Groups of students stood in a circle and passed a ball from one student to the next student on the left. Another student recorded the time it took for the ball to go completely around the circle to each student once. The table below shows the recorded times for different numbers of students in the circle.

TIME NEEDED TO PASS THE BALL COMPLETELY AROUND THE CIRCLE

| Number of Students $(\boldsymbol{n})$ | Time, in seconds $(\boldsymbol{t})$ |
| :---: | :---: |
| 5 | 9.5 |
| 7 | 13.3 |
| 9 | 17.1 |

Based on the linear relation in the table, which equation can be used to approximate $t$, the time in seconds it will take for any number of students, $n$, to pass the ball completely around the circle?
F. $n=1.9 t$
G. $t=1.9 n$
H. $n=0.52 t$
I. $t=0.52 n$

37 Sally is making a mosaic with ceramic tiles shaped like regular octagons, as shown in the diagram below.


She marked all of the lines of symmetry on one tile to form triangular pieces. If she cut the tile along all of its marked lines of symmetry, what is the total number of triangular pieces formed?


38 The graph shows line $l$, which represents the equation $y=5 x-1$.


Which of these describes the transformation of line $l$ to a line represented by the equation $y=5 x+2$ ?
A. line $l$ shifted 3 units up
B. line $l$ shifted 3 units down
C. line $l$ shifted 3 units to the left
D. line $l$ shifted 3 units to the right

39 Triangle $A B C$ has vertices at $A(-4,-3), B(-2,-7)$ and $C(4,-5)$.


Triangle $R S T$ has one vertex at $R(0,5)$ and one vertex at $S(2,1)$ and represents a slide of triangle $A B C$. Which point would be $T$, the third vertex of triangle RST?
F. $(8,2)$
G. $(5,2)$
H. $(6,3)$
I. $(8,3)$

40 Segment $A B$ represents the path of a sailboat that passed through the coordinates $(2,2)$ and $(5,3)$.


What is the slope of a line that represents the path of another boat that is traveling parallel to the first boat?
A. -3
B. $-\frac{1}{3}$
C. $\frac{1}{3}$
D. 3

41 The graph below represents the cost to print duplicate pictures.

## COST OF PRINTING DUPLICATE PICTURES



The Sabos just returned from a trip to Costa Rica. After developing their ten rolls of film, they decided to print duplicate copies of some of their pictures. They chose a total of 60 pictures for duplication. What will be the cost to print 60 duplicates?


42 Mr. Hobbs used box-and-whisker plots to compare the final exam scores of students in two of his classes.

FINAL EXAM SCORES


Based on the information in the plots, how many points higher was the median final exam score of Class $A$ than the median final exam score of Class $B$ ?


43 Jason earned a quiz score of 25 out of 40 points. What percent is equivalent to 25 out of 40 ?
F. $1.6 \%$
G. $6.25 \%$
H. $16 \%$
I. $62.5 \%$

44 Danny wants to buy a new car. The salesperson showed him the list of options below that are available for the model of car he is interested in buying.

## LIST OF NEW CAR OPTIONS

Interior

- Cloth
- Leather

Rim Style

- Standard
- Aluminum
- Chrome


## Color

- Canary Yellow
- Cranberry Red
- Forest Green
- Jet Black
- Midnight Blue
- Pearl White

How many combinations of 1 interior, 1 rim style, and 1 color are there for Danny to choose from if he uses this list of options?
A. 3
B. 11
C. 18
D. 36


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