Math Test
No Calculator Answers

1	D	11	C
2	A	12	D
3	B	13	B
4	C	14	C
5	D	15	D
6	A	16	4
7	C	17	6/5, 1.2
8	A	18	21/4, 5.25
9	A	19	2
10	B	20	97

MATH TEST
NO CALCULATOR
RAW SCORE
(NUMBER OF
CORRECT ANSWERS)

Math Test
Calculator Answers

1	D	11	A	21	A	31	1492
2	C	12	D	22	C	32	29/3, 9.66, 9.67
3	A	13	D	23	D	33	7
4	B	14	A	24	B	34	9
5	C	15	A	25	D	35	13
6	B	16	D	26	B	36	80
7	A	17	D	27	C	37	43, 43.5, 44, 87/2
8	C	18	C	28	C	38	6
9	B	19	B	29	B		
10	A	20	D	30	B		

MATH TEST
CALCULATOR
RAW SCORE
(NUMBER OF
CORRECT ANSWERS)

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SAT Practice Test #5: Worksheets

RAW SCORE CONVERSION TABLE 1 **SECTION AND TEST SCORES**

Raw Score (# of correct answers)	Math Section Score	Reading Test Score	Writing and Language Test Score	Raw Score (# of correct answers)	Math Section Score	Reading Test Score	Writing and Language Test Score
0	200	10	10	30	540	26	30
1	200	10	10	31	540	27	30
2	210	10	10	32	550	28	31
3	230	10	10	33	560	28	32
4	250	11	11	34	570	29	32
5	260	11	12	35	580	29	33
6	270	12	13	36	590	29	34
7	290	13	13	37	600	30	34
8	300	14	14	38	600	30	35
9	320	14	15	39	610	31	36
10	330	15	16	40	620	31	37
11	340	16	16	41	630	32	38
12	360	16	17	42	640	32	39
13	370	17	18	43	650	33	40
14	390	17	18	44	660	33	40
15	400	18	19	45	660	34	
16	410	18	20	46	670	35	
17	420	19	20	47	680	35	
18	430	20	21	48	690	36	
19	440	20	22	49	700	37	
20	450	21	23	50	710	37	
21	460	21	23	51	710	39	
22	470	22	24	52	720	40	
23	480	23	25	53	730		
24	490	23	25	54	750		
25	500	24	26	55	760		
26	510	24	27	56	770		
27	510	25	28	57	790		
28	520	25	28	58	800		
29	530	26	29				

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4

Which of the following is an example of a function whose graph in the xy-plane has no x-intercepts?

A) A linear function whose rate of change is not zero

B) A quadratic function with real zeros

C) A quadratic function with no real zeros

D) A cubic polynomial with at least one real zero

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9

$$y = x^2$$
$$2y + 6 = 2(x + 3)$$

If (x, y) is a solution of the system of equations above and $x > 0$, what is the value of xy ?

A) 1

B) 2

C) 3

D) 9

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11

The volume of right circular cylinder A is 22 cubic centimeters. What is the volume, in cubic centimeters, of a right circular cylinder with twice the radius and half the height of cylinder A?

A) 11
B) 22
C) 44
D) 66

12

Which of the following is equivalent to $9^{\frac{3}{4}}$?

A) $\sqrt[3]{9}$
B) $\sqrt[4]{9}$
C) $\sqrt{3}$
D) $3\sqrt{3}$

13

At a restaurant, n cups of tea are made by adding t tea bags to hot water. If $t = n + 2$, how many additional tea bags are needed to make each additional cup of tea?

A) None
B) One
C) Two
D) Three

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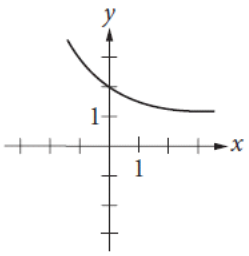
14

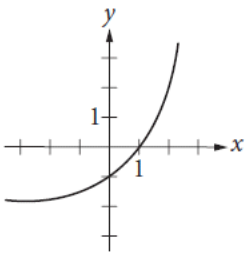
$$f(x) = 2^x + 1$$

The function f is defined by the equation above. Which of the following is the graph of $y = -f(x)$ in the xy-plane?

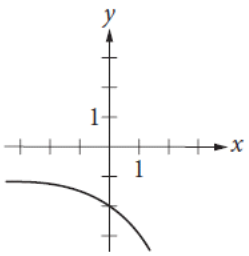
A)



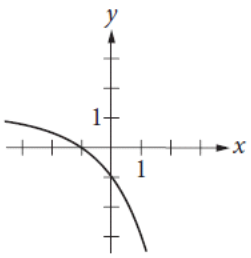
B)



C)



D)



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15

Alan drives an average of 100 miles each week. His car can travel an average of 25 miles per gallon of gasoline. Alan would like to reduce his weekly expenditure on gasoline by $5. Assuming gasoline costs $4 per gallon, which equation can Alan use to determine how many fewer average miles, m, he should drive each week?

A) $\frac{25}{4}m = 95$

B) $\frac{25}{4}m = 5$

C) $\frac{4}{25}m = 95$

D) $\frac{4}{25}m = 5$

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19

$$\frac{2x+6}{(x+2)^2}-\frac{2}{x+2}$$

The expression above is equivalent to $\frac{a}{(x+2)^2}$, where a is a positive constant and $x \neq -2$.

What is the value of a ?

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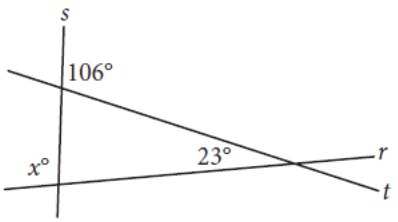
20

Intersecting lines r, s, and t are shown below.



What is the value of x ?

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Calculator Section

Tuesday, September 11, 2018 11:32 PM

11

$$-2x + 3y = 6$$

In the xy-plane, the graph of which of the following equations is perpendicular to the graph of the equation above?

A) $3x + 2y = 6$

B) $3x + 4y = 6$

C) $2x + 4y = 6$

D) $2x + 6y = 3$

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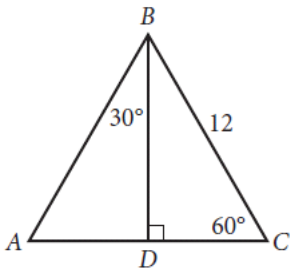
19



In $\triangle ABC$ above, what is the length of $\overline{AD}$?

A) 4

B) 6

C) $6\sqrt{2}$

D) $6\sqrt{3}$

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26

The surface area of a cube is $6\left(\frac{a}{4}\right)^2$, where a is a positive constant. Which of the following gives the perimeter of one face of the cube?

A) $\frac{a}{4}$

B) a

C) $4a$

D) $6a$

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29

$$x^2 + 20x + y^2 + 16y = -20$$

The equation above defines a circle in the xy-plane. What are the coordinates of the center of the circle?

A) $(-20, -16)$

B) $(-10, -8)$

C) $(10, 8)$

D) $(20, 16)$

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30

$$y = x^2 - a$$

In the equation above, a is a positive constant and the graph of the equation in the xy-plane is a parabola. Which of the following is an equivalent form of the equation?

A) $y = (x + a)(x - a)$

B) $y = (x + \sqrt{a})(x - \sqrt{a})$

C) $y = \left(x + \frac{a}{2}\right)\left(x - \frac{a}{2}\right)$

D) $y = (x + a)^2$

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Tuesday, September 11, 2018 11:34 PM

34

In the xy-plane, the point $(2, 5)$ lies on the graph of the function f. If $f(x) = k - x^2$, where k is a constant, what is the value of k ?

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T.8 Imaginary Numbers

1. For the complex number i, defined as the square root of -1, which of the following is equal to 1?
   A. i^2
   B. i^3
   C. i^4
   D. i^5
   E. i^6

2. Express $(2 + i)^2$ in simplest form
   A. 3
   B. $4 + i$
   C. $4 - i$
   D. $3 + 4i$
   E. $5 + 4i$

3. Which of the following is equivalent to $2i^5(3i^3 - i)$?
   A. 8
   B. $6 - i$
   C. $6 - 2i$
   D. 4
   E. 3

4. Express $\frac{5}{3-i}$ in simplest form
   A. $\frac{1}{2}$
   B. $\frac{3}{2}+\frac{1}{2}i$
   C. $\frac{3}{2}-\frac{1}{2}i$
   D. $\frac{15}{8}+\frac{5}{8}i$
   E. $\frac{15}{8}-\frac{5}{8}i$

5. Given that $i=\sqrt{-1}$, which of the following is equal to $(3-2i)-(6+i)$?
   A. -1
   B. -5
   C. $-3-i$
   D. $3+3i$
   E. $-3-3i$

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11

Which of the following complex numbers is equivalent to $\frac{3-5i}{8+2i}$? (Note: $i = \sqrt{-1}$)

A) $\frac{3}{8} - \frac{5i}{2}$

B) $\frac{3}{8} + \frac{5i}{2}$

C) $\frac{7}{34} - \frac{23i}{34}$

D) $\frac{7}{34} + \frac{23i}{34}$

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2

For $i = \sqrt{-1}$, what is the sum $(7 + 3i) + (-8 + 9i)$?

A) $-1 + 12i$

B) $-1 - 6i$

C) $15 + 12i$

D) $15 - 6i$

3

14

$$\frac{8-i}{3-2i}$$

If the expression above is rewritten in the form $a+bi$, where a and b are real numbers, what is the value of a ? (Note: $i=\sqrt{-1}$)

A) 2

B) $\frac{8}{3}$

C) 3

D) $\frac{11}{3}$

3

What is the sum of the complex numbers $2+3i$ and $4+8i$, where $i=\sqrt{-1}$?

A) 17

B) $17i$

C) $6+11i$

D) $8+24i$

4

Which of the following complex numbers is equal to $(5+12i)-(9i^2-6i)$, for $i=\sqrt{-1}$?

A) $-14-18i$

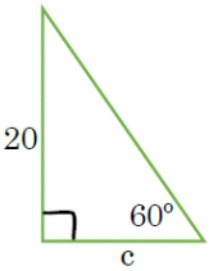
B) $-4-6i$

C) $4+6i$

D) $14+18i$

T.1 Sin/Cos/Tan Right Angle Trigonometry

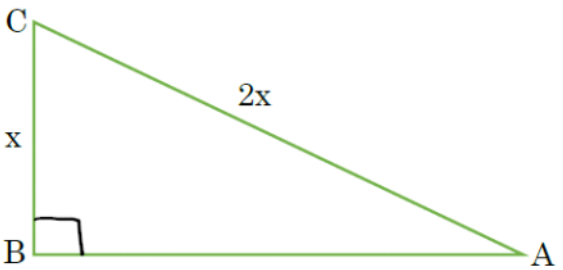
1. In the right triangle shown below, c =



A. $20\sin(60°)$
B. $20\tan(60°)$
C. $\frac{20}{\tan(60°)}$
D. $\frac{20}{\sin(60°)}$
E. $\frac{20}{\tan(30°)}$

2. A 12 foot ladder is placed against a wall such that the ladder forms a 57° angle with the ground. How far from the base of the wall is the foot of the ladder?
   A. 6.5 feet
   B. 10.0 feet
   C. 10.8 feet
   D. 18.5 feet
   E. 22.0 feet

3. In the right triangle ABC shown below, what is the degree measure of angle A?
   A. 15°
   B. 30°
   C. 45°
   D. 60°
   E. 90°



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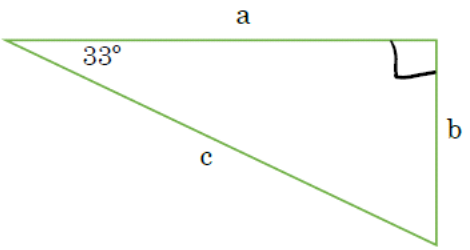
4. Based on the right triangle shown below, what is sin(33°) in terms of a, b, and c?

A. $\frac{a}{c}$
B. $\frac{b}{c}$
C. $\frac{a}{b}$
D. $\frac{b}{a}$
E. $\frac{c}{b}$



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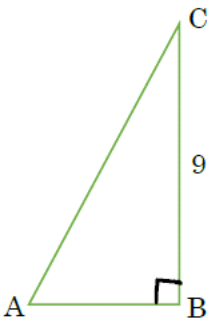
5. In the right triangle ABC below, $\sin(A) = \frac{5}{6}$ and BC = 9. Find the length of AC.

A. 0.1
B. 7.5
C. 10.8
D. 12.2
E. 618.8

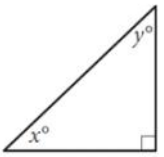


19

In a right triangle, one angle measures $x°$, where $\sin x° = \frac{4}{5}$. What is $\cos(90° - x°)$?

3

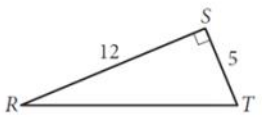
17



In the triangle above, the sine of $x°$ is 0.6. What is the cosine of $y°$?

4

36



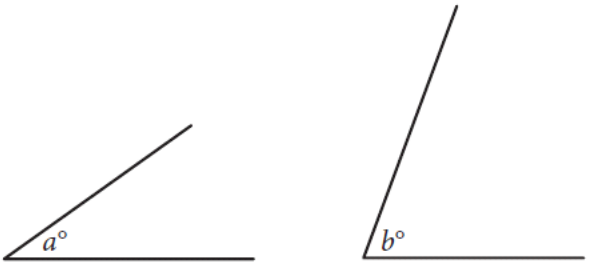
In triangle RST above, point W (not shown) lies on $\overline{RT}$. What is the value of $\cos(\angle RSW) - \sin(\angle WST)$?

3

20

In triangle ABC, the measure of $\angle B$ is 90°, $BC = 16$, and $AC = 20$. Triangle DEF is similar to triangle ABC, where vertices D, E, and F correspond to vertices A, B, and C, respectively, and each side of triangle DEF is $\frac{1}{3}$ the length of the corresponding side of triangle ABC. What is the value of $\sin F$?

23



Note: Figures not drawn to scale.

The angles shown above are acute and $\sin(a°) = \cos(b°)$. If $a = 4k - 22$ and $b = 6k - 13$, what is the value of k ?

A) 4.5

B) 5.5

C) 12.5

D) 21.5

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Practice Test #6

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Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

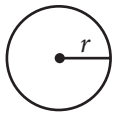
DIRECTIONS

For questions 1-15, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 16-20**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

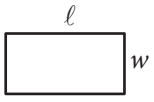
NOTES

1. The use of a calculator **is not permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

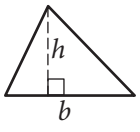
REFERENCE



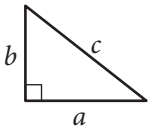
$A = \pi r^2$
$C = 2\pi r$



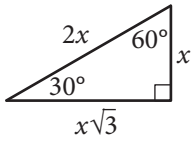
$A = \ell w$

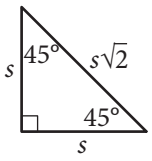


$A = \frac{1}{2}bh$

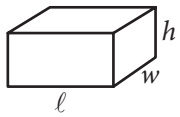


$c^2 = a^2 + b^2$

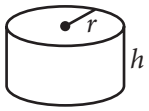




Special Right Triangles

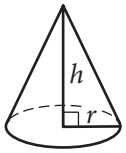


$V = \ell wh$

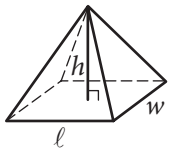


$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$



$V = \frac{1}{3}\pi r^2 h$



$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

CONTINUE

1

Salim wants to purchase tickets from a vendor to watch a tennis match. The vendor charges a one-time service fee for processing the purchase of the tickets. The equation $T = 15n + 12$ represents the total amount T, in dollars, Salim will pay for n tickets. What does 12 represent in the equation?

A) The price of one ticket, in dollars

B) The amount of the service fee, in dollars

C) The total amount, in dollars, Salim will pay for one ticket

D) The total amount, in dollars, Salim will pay for any number of tickets

2

A gardener buys two kinds of fertilizer. Fertilizer A contains 60% filler materials by weight and Fertilizer B contains 40% filler materials by weight. Together, the fertilizers bought by the gardener contain a total of 240 pounds of filler materials. Which equation models this relationship, where x is the number of pounds of Fertilizer A and y is the number of pounds of Fertilizer B?

A) $0.4x + 0.6y = 240$

B) $0.6x + 0.4y = 240$

C) $40x + 60y = 240$

D) $60x + 40y = 240$

3

What is the sum of the complex numbers $2 + 3i$ and $4 + 8i$, where $i = \sqrt{-1}$?

A) 17

B) $17i$

C) $6 + 11i$

D) $8 + 24i$

4

$$4x^2 - 9 = (px + t)(px - t)$$

In the equation above, p and t are constants. Which of the following could be the value of p ?

A) 2

B) 3

C) 4

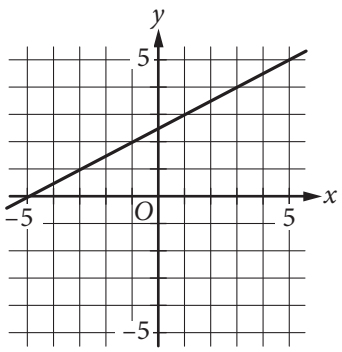
D) 9

CONTINUE

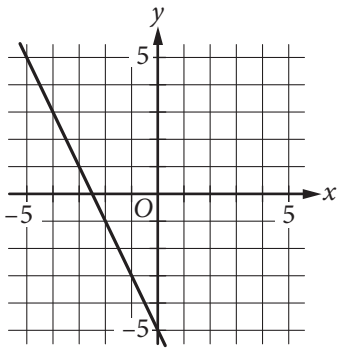
5

Which of the following is the graph of the equation $y = 2x - 5$ in the xy-plane?

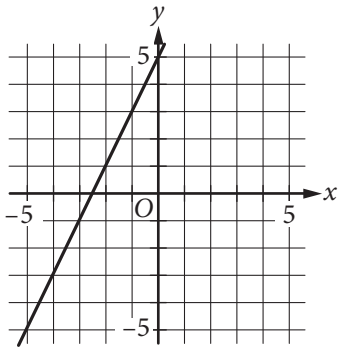
A)



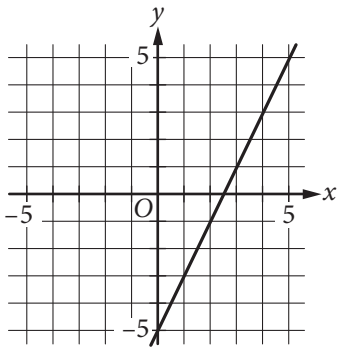
B)



C)



D)



CONTINUE

6

If $x = \frac{2}{3}y$ and $y = 18$, what is the value of $2x - 3$?

A) 21

B) 15

C) 12

D) 10

7

A bricklayer uses the formula $n = 7\ell h$ to estimate the number of bricks, n, needed to build a wall that is ℓ feet long and h feet high. Which of the following correctly expresses ℓ in terms of n and h ?

A) $\ell = \frac{7}{nh}$

B) $\ell = \frac{h}{7n}$

C) $\ell = \frac{n}{7h}$

D) $\ell = \frac{n}{7 + h}$

8

x	$w(x)$	$t(x)$
1	–1	–3
2	3	–1
3	4	1
4	3	3
5	–1	5

The table above shows some values of the functions w and t. For which value of x is $w(x) + t(x) = x$?

A) 1

B) 2

C) 3

D) 4

9

If $\sqrt{x} + \sqrt{9} = \sqrt{64}$, what is the value of x ?

A) $\sqrt{5}$

B) 5

C) 25

D) 55

CONTINUE

10

Jaime is preparing for a bicycle race. His goal is to bicycle an average of at least 280 miles per week for 4 weeks. He bicycled 240 miles the first week, 310 miles the second week, and 320 miles the third week. Which inequality can be used to represent the number of miles, x, Jaime could bicycle on the 4th week to meet his goal?

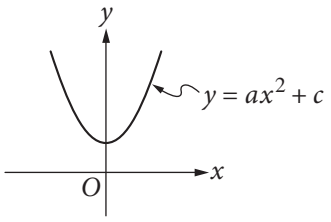
A) $\frac{240 + 310 + 320}{3} + x \geq 280$

B) $240 + 310 + 320 \geq x(280)$

C) $\frac{240}{4} + \frac{310}{4} + \frac{320}{4} + x \geq 280$

D) $240 + 310 + 320 + x \geq 4(280)$

11



The vertex of the parabola in the xy-plane above is $(0, c)$. Which of the following is true about the parabola with the equation $y = -a(x - b)^2 + c$?

A) The vertex is (b, c) and the graph opens upward.

B) The vertex is (b, c) and the graph opens downward.

C) The vertex is $(-b, c)$ and the graph opens upward.

D) The vertex is $(-b, c)$ and the graph opens downward.

12

Which of the following is equivalent to $\frac{4x^2 + 6x}{4x + 2}$?

A) x

B) $x + 4$

C) $x - \frac{2}{4x + 2}$

D) $x + 1 - \frac{2}{4x + 2}$

13

$$2x^2 - 4x = t$$

In the equation above, t is a constant. If the equation has no real solutions, which of the following could be the value of t ?

A) -3

B) -1

C) 1

D) 3

CONTINUE

14

A laundry service is buying detergent and fabric softener from its supplier. The supplier will deliver no more than 300 pounds in a shipment. Each container of detergent weighs 7.35 pounds, and each container of fabric softener weighs 6.2 pounds. The service wants to buy at least twice as many containers of detergent as containers of fabric softener. Let d represent the number of containers of detergent, and let s represent the number of containers of fabric softener, where d and s are nonnegative integers. Which of the following systems of inequalities best represents this situation?

A) $7.35d + 6.2s \leq 300$
$d \geq 2s$

B) $7.35d + 6.2s \leq 300$
$2d \geq s$

C) $14.7d + 6.2s \leq 300$
$d \geq 2s$

D) $14.7d + 6.2s \leq 300$
$2d \geq s$

15

Which of the following is equivalent to $\left(a + \frac{b}{2}\right)^2$?

A) $a^2 + \frac{b^2}{2}$

B) $a^2 + \frac{b^2}{4}$

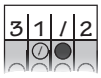
C) $a^2 + \frac{ab}{2} + \frac{b^2}{2}$

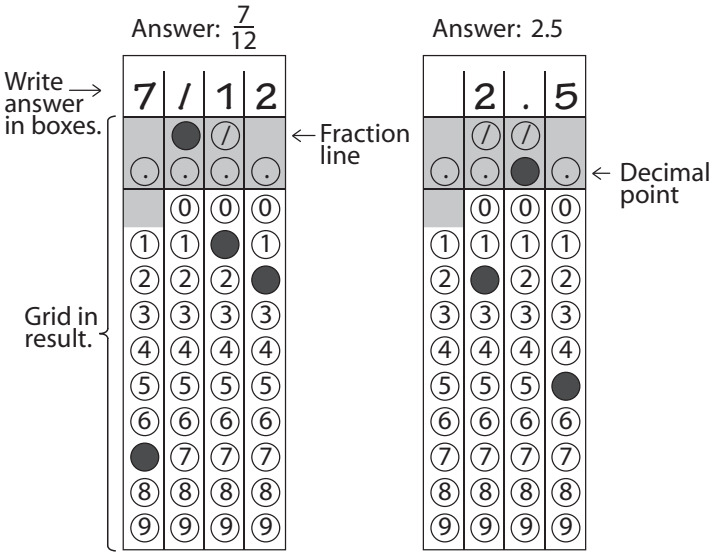
D) $a^2 + ab + \frac{b^2}{4}$

CONTINUE

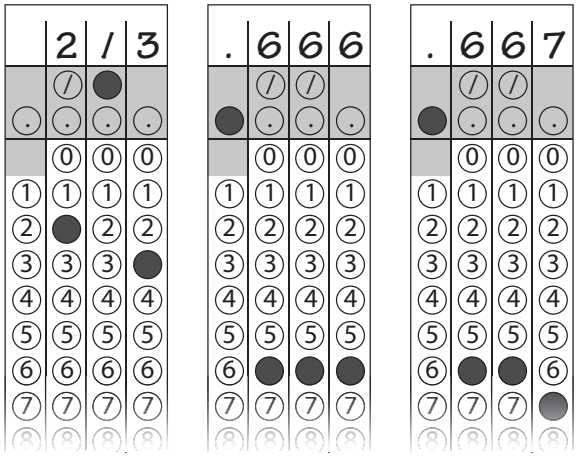
DIRECTIONS

For questions 16-20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

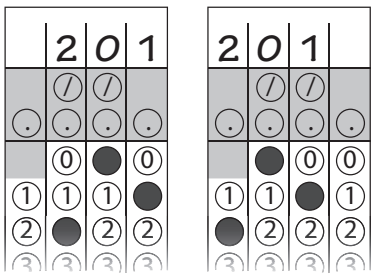
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

16

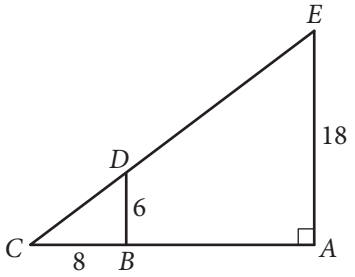
If $a^{\frac{b}{4}} = 16$ for positive integers a and b, what is one possible value of b ?

17

$$\frac{2}{3}t = \frac{5}{2}$$

What value of t is the solution of the equation above?

18



In the figure above, $\overline{BD}$ is parallel to $\overline{AE}$. What is the length of $\overline{CE}$?

CONTINUE

19

How many liters of a 25% saline solution must be added to 3 liters of a 10% saline solution to obtain a 15% saline solution?

20

Points A and B lie on a circle with radius 1, and arc $\overset{\frown}{AB}$ has length $\frac{\pi}{3}$. What fraction of the circumference of the circle is the length of arc $\overset{\frown}{AB}$?

STOP

If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.

No Test Material On This Page

Math Test – Calculator

55 MINUTES, 38 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

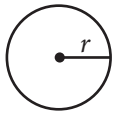
DIRECTIONS

For questions 1-30, solve each problem, choose the best answer from the choices provided, and fill in the corresponding circle on your answer sheet. **For questions 31-38**, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 31 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

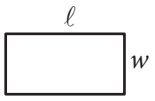
NOTES

1. The use of a calculator **is permitted**.
2. All variables and expressions used represent real numbers unless otherwise indicated.
3. Figures provided in this test are drawn to scale unless otherwise indicated.
4. All figures lie in a plane unless otherwise indicated.
5. Unless otherwise indicated, the domain of a given function f is the set of all real numbers x for which $f(x)$ is a real number.

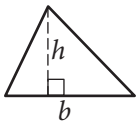
REFERENCE



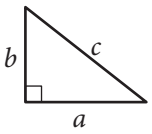
$A = \pi r^2$
$C = 2\pi r$



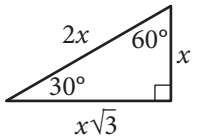
$A = \ell w$

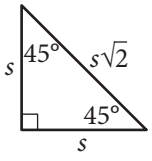


$A = \frac{1}{2}bh$

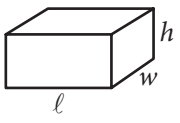


$c^2 = a^2 + b^2$

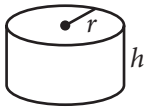




Special Right Triangles

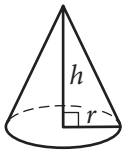


$V = \ell wh$

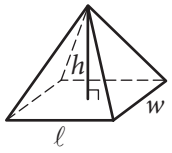


$V = \pi r^2 h$

$V = \frac{4}{3}\pi r^3$



$V = \frac{1}{3}\pi r^2 h$



$V = \frac{1}{3}\ell wh$

The number of degrees of arc in a circle is 360.
The number of radians of arc in a circle is 2π.
The sum of the measures in degrees of the angles of a triangle is 180.

CONTINUE

1

Which expression is equivalent to $(2x^2 - 4) - (-3x^2 + 2x - 7)$?

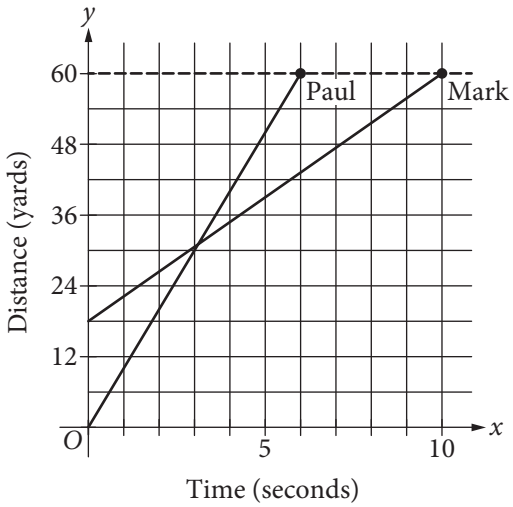
A) $5x^2 - 2x + 3$

B) $5x^2 + 2x - 3$

C) $-x^2 - 2x - 11$

D) $-x^2 + 2x - 11$

2



The graph above shows the positions of Paul and Mark during a race. Paul and Mark each ran at a constant rate, and Mark was given a head start to shorten the distance he needed to run. Paul finished the race in 6 seconds, and Mark finished the race in 10 seconds. According to the graph, Mark was given a head start of how many yards?

A) 3

B) 12

C) 18

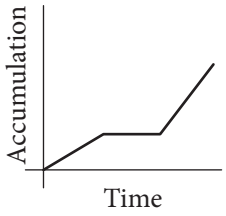
D) 24

CONTINUE

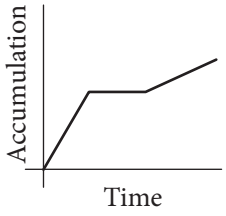
3

Snow fell and then stopped for a time. When the snow began to fall again, it fell at a faster rate than it had initially. Assuming that none of the snow melted during the time indicated, which of the following graphs could model the total accumulation of snow versus time?

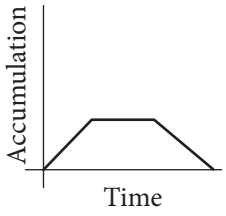
A)



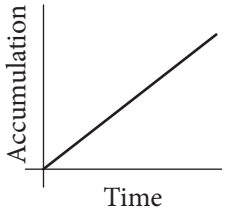
B)



C)



D)



4

A website-hosting service charges businesses a onetime setup fee of $350 plus d dollars for each month. If a business owner paid $1,010 for the first 12 months, including the setup fee, what is the value of d ?

A) 25

B) 35

C) 45

D) 55

5

$$6x - 9y > 12$$

Which of the following inequalities is equivalent to the inequality above?

A) $x - y > 2$

B) $2x - 3y > 4$

C) $3x - 2y > 4$

D) $3y - 2x > 2$

CONTINUE

6

Where Do People Get Most of Their Medical Information?

Source	Percent of those surveyed
Doctor	63%
Internet	13%
Magazines/brochures	9%
Pharmacy	6%
Television	2%
Other/none of the above	7%

The table above shows a summary of 1,200 responses to a survey question. Based on the table, how many of those surveyed get most of their medical information from either a doctor or the Internet?

A) 865

B) 887

C) 912

D) 926

7

The members of a city council wanted to assess the opinions of all city residents about converting an open field into a dog park. The council surveyed a sample of 500 city residents who own dogs. The survey showed that the majority of those sampled were in favor of the dog park. Which of the following is true about the city council's survey?

A) It shows that the majority of city residents are in favor of the dog park.

B) The survey sample should have included more residents who are dog owners.

C) The survey sample should have consisted entirely of residents who do not own dogs.

D) The survey sample is biased because it is not representative of all city residents.

CONTINUE

8

Ice Cream and Topping Selections

		Flavor	
		Vanilla	Chocolate
Topping	Hot fudge	8	6
	Caramel	5	6

The table above shows the flavors of ice cream and the toppings chosen by the people at a party. Each person chose one flavor of ice cream and one topping. Of the people who chose vanilla ice cream, what fraction chose hot fudge as a topping?

A) $\frac{8}{25}$

B) $\frac{5}{13}$

C) $\frac{13}{25}$

D) $\frac{8}{13}$

9

The total area of a coastal city is 92.1 square miles, of which 11.3 square miles is water. If the city had a population of 621,000 people in the year 2010, which of the following is closest to the population density, in people per square mile of land area, of the city at that time?

A) 6,740

B) 7,690

C) 55,000

D) 76,000

CONTINUE

10

Between 1497 and 1500, Amerigo Vespucci embarked on two voyages to the New World. According to Vespucci's letters, the first voyage lasted 43 days longer than the second voyage, and the two voyages combined lasted a total of 1,003 days. How many days did the second voyage last?

A) 460

B) 480

C) 520

D) 540

11

$$7x + 3y = 8$$
$$6x - 3y = 5$$

For the solution (x, y) to the system of equations above, what is the value of $x - y$?

A) $-\frac{4}{3}$

B) $\frac{2}{3}$

C) $\frac{4}{3}$

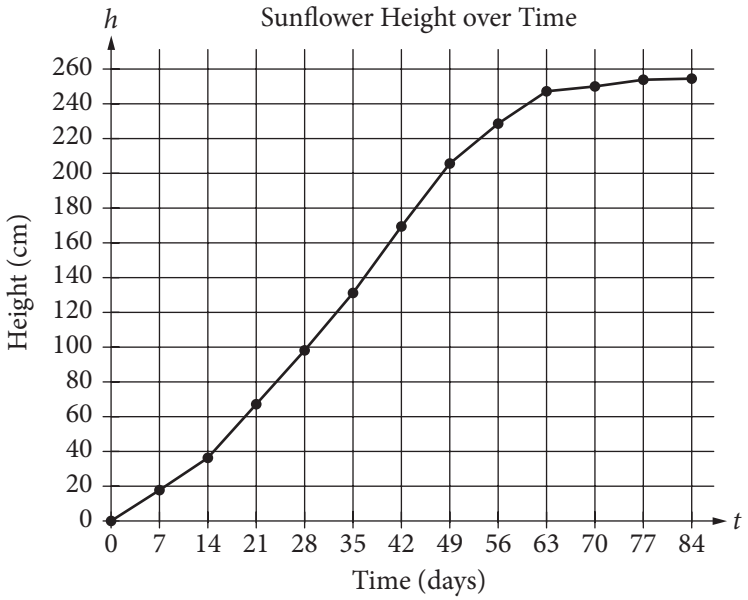
D) $\frac{22}{3}$

CONTINUE

Questions 12-14 refer to the following information.

Sunflower Growth

Day	Height (cm)
0	0.00
7	17.93
14	36.36
21	67.76
28	98.10
35	131.00
42	169.50
49	205.50
56	228.30
63	247.10
70	250.50
77	253.80
84	254.50



In 1919, H. S. Reed and R. H. Holland published a paper on the growth of sunflowers. Included in the paper were the table and graph above, which show the height h, in centimeters, of a sunflower t days after the sunflower begins to grow.

12

Over which of the following time periods is the average growth rate of the sunflower least?

A) Day 0 to Day 21

B) Day 21 to Day 42

C) Day 42 to Day 63

D) Day 63 to Day 84

13

The function h, defined by $h(t) = at + b$, where a and b are constants, models the height, in centimeters, of the sunflower after t days of growth during a time period in which the growth is approximately linear. What does a represent?

A) The predicted number of centimeters the sunflower grows each day during the period

B) The predicted height, in centimeters, of the sunflower at the beginning of the period

C) The predicted height, in centimeters, of the sunflower at the end of the period

D) The predicted total increase in the height of the sunflower, in centimeters, during the period

CONTINUE

14

The growth rate of the sunflower from day 14 to day 35 is nearly constant. On this interval, which of the following equations best models the height h, in centimeters, of the sunflower t days after it begins to grow?

A) $h = 2.1t - 15$

B) $h = 4.5t - 27$

C) $h = 6.8t - 12$

D) $h = 13.2t - 18$

15

x	1	2	3	4	5
y	$\frac{11}{4}$	$\frac{25}{4}$	$\frac{39}{4}$	$\frac{53}{4}$	$\frac{67}{4}$

Which of the following equations relates y to x for the values in the table above?

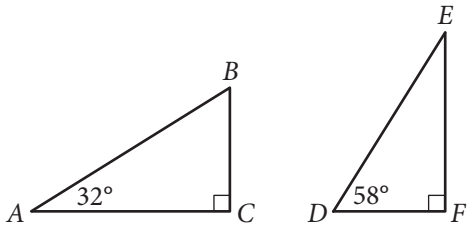
A) $y = \frac{1}{2} \cdot \left(\frac{5}{2}\right)^x$

B) $y = 2 \cdot \left(\frac{3}{4}\right)^x$

C) $y = \frac{3}{4}x + 2$

D) $y = \frac{7}{2}x - \frac{3}{4}$

16



Triangles ABC and DEF are shown above. Which of the following is equal to the ratio $\frac{BC}{AB}$?

A) $\frac{DE}{DF}$

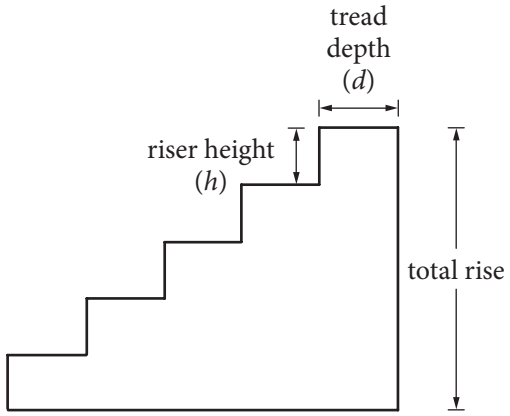
B) $\frac{DF}{DE}$

C) $\frac{DF}{EF}$

D) $\frac{EF}{DE}$

CONTINUE

Questions 17-19 refer to the following information.



Note: Figure not drawn to scale.

When designing a stairway, an architect can use the riser-tread formula $2h + d = 25$, where h is the riser height, in inches, and d is the tread depth, in inches. For any given stairway, the riser heights are the same and the tread depths are the same for all steps in that stairway.

The number of steps in a stairway is the number of its risers. For example, there are 5 steps in the stairway in the figure above. The total rise of a stairway is the sum of the riser heights as shown in the figure.

17

Which of the following expresses the riser height in terms of the tread depth?

A) $h = \frac{1}{2}(25 + d)$

B) $h = \frac{1}{2}(25 - d)$

C) $h = -\frac{1}{2}(25 + d)$

D) $h = -\frac{1}{2}(25 - d)$

18

Some building codes require that, for indoor stairways, the tread depth must be at least 9 inches and the riser height must be at least 5 inches. According to the riser-tread formula, which of the following inequalities represents the set of all possible values for the riser height that meets this code requirement?

A) $0 \le h \le 5$

B) $h \ge 5$

C) $5 \le h \le 8$

D) $8 \le h \le 16$

19

An architect wants to use the riser-tread formula to design a stairway with a total rise of 9 feet, a riser height between 7 and 8 inches, and an odd number of steps. With the architect's constraints, which of the following must be the tread depth, in inches, of the stairway? (1 foot = 12 inches)

A) 7.2

B) 9.5

C) 10.6

D) 15

CONTINUE

20

What is the sum of the solutions to $(x-6)(x+0.7)=0$?

A) -6.7

B) -5.3

C) 5.3

D) 6.7

21

A study was done on the weights of different types of fish in a pond. A random sample of fish were caught and marked in order to ensure that none were weighed more than once. The sample contained 150 largemouth bass, of which 30% weighed more than 2 pounds. Which of the following conclusions is best supported by the sample data?

A) The majority of all fish in the pond weigh less than 2 pounds.

B) The average weight of all fish in the pond is approximately 2 pounds.

C) Approximately 30% of all fish in the pond weigh more than 2 pounds.

D) Approximately 30% of all largemouth bass in the pond weigh more than 2 pounds.

22

Number of States with 10 or More Electoral Votes in 2008

Electoral votes	Frequency
10	4
11	4
12	1
13	1
15	3
17	1
20	1
21	2
27	1
31	1
34	1
55	1

In 2008, there were 21 states with 10 or more electoral votes, as shown in the table above. Based on the table, what was the median number of electoral votes for the 21 states?

A) 13

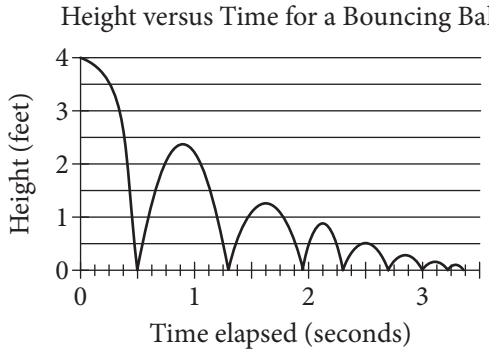
B) 15

C) 17

D) 20

CONTINUE

23



As part of an experiment, a ball was dropped and allowed to bounce repeatedly off the ground until it came to rest. The graph above represents the relationship between the time elapsed after the ball was dropped and the height of the ball above the ground. After it was dropped, how many times was the ball at a height of 2 feet?

A) One
B) Two
C) Three
D) Four

24

A customer's monthly water bill was $75.74. Due to a rate increase, her monthly bill is now $79.86. To the nearest tenth of a percent, by what percent did the amount of the customer's water bill increase?

A) 4.1%
B) 5.1%
C) 5.2%
D) 5.4%

25

x	$f(x)$
0	–2
2	4
6	16

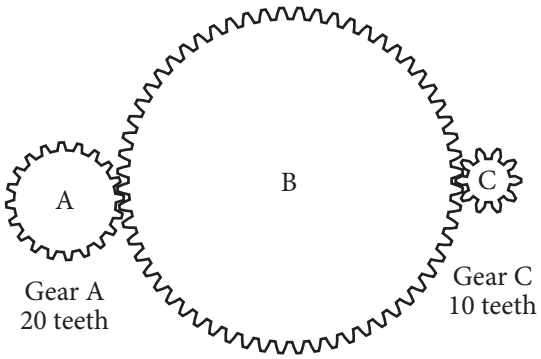
Some values of the linear function f are shown in the table above. What is the value of $f(3)$?

A) 6
B) 7
C) 8
D) 9

CONTINUE

26

A gear ratio r:s is the ratio of the number of teeth of two connected gears. The ratio of the number of revolutions per minute (rpm) of two gear wheels is s:r. In the diagram below, Gear A is turned by a motor. The turning of Gear A causes Gears B and C to turn as well.



If Gear A is rotated by the motor at a rate of 100 rpm, what is the number of revolutions per minute for Gear C?

A) 50

B) 110

C) 200

D) 1,000

27

In the xy-plane, the graph of $2x^2 - 6x + 2y^2 + 2y = 45$ is a circle. What is the radius of the circle?

A) 5

B) 6.5

C) $\sqrt{40}$

D) $\sqrt{50}$

28

Two different points on a number line are both 3 units from the point with coordinate -4. The solution to which of the following equations gives the coordinates of both points?

A) $|x + 4| = 3$

B) $|x - 4| = 3$

C) $|x + 3| = 4$

D) $|x - 3| = 4$

CONTINUE

29

A motor powers a model car so that after starting from rest, the car travels s inches in t seconds, where $s = 16t\sqrt{t}$. Which of the following gives the average speed of the car, in inches per second, over the first t seconds after it starts?

A) $4\sqrt{t}$

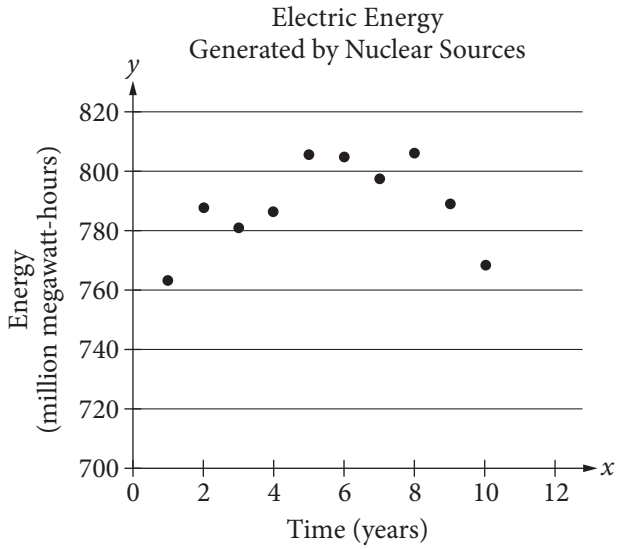
B) $16\sqrt{t}$

C) $\frac{16}{\sqrt{t}}$

D) $16t$

30

The scatterplot below shows the amount of electric energy generated, in millions of megawatt-hours, by nuclear sources over a 10-year period.



Of the following equations, which best models the data in the scatterplot?

A) $y = 1.674x^2 + 19.76x - 745.73$

B) $y = -1.674x^2 - 19.76x - 745.73$

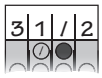
C) $y = 1.674x^2 + 19.76x + 745.73$

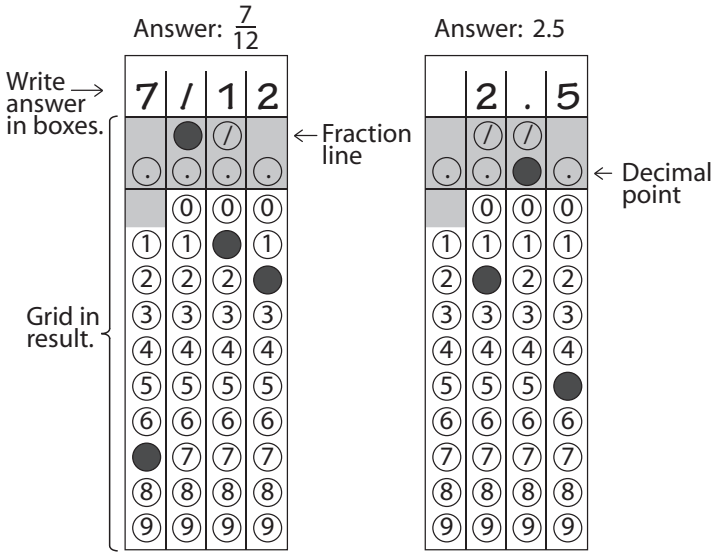
D) $y = -1.674x^2 + 19.76x + 745.73$

CONTINUE

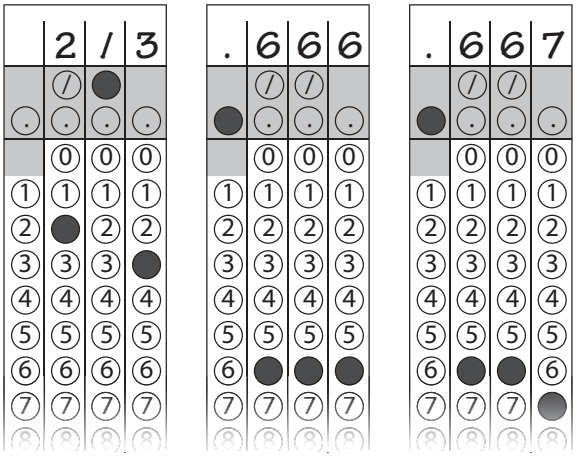
DIRECTIONS

For questions 31-38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

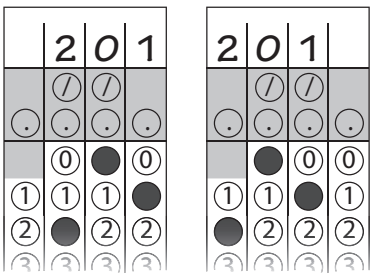
1. Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately. You will receive credit only if the circles are filled in correctly.
2. Mark no more than one circle in any column.
3. No question has a negative answer.
4. Some problems may have more than one correct answer. In such cases, grid only one answer.
5. **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or 7/2. (If  is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
6. **Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.



Acceptable ways to grid $\frac{2}{3}$ are:



Answer: 201 – either position is correct



NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

CONTINUE

31

A group of friends decided to divide the $800 cost of a trip equally among themselves. When two of the friends decided not to go on the trip, those remaining still divided the $800 cost equally, but each friend's share of the cost increased by $20. How many friends were in the group originally?

32

$$2(5x - 20) - (15 + 8x) = 7$$

What value of x satisfies the equation above?

CONTINUE

33

A laboratory supply company produces graduated cylinders, each with an internal radius of 2 inches and an internal height between 7.75 inches and 8 inches. What is one possible volume, rounded to the nearest cubic inch, of a graduated cylinder produced by this company?

34

In the xy-plane, the graph of $y = 3x^2 - 14x$ intersects the graph of $y = x$ at the points $(0, 0)$ and (a, a). What is the value of a ?

CONTINUE

35

The line with the equation $\frac{4}{5}x + \frac{1}{3}y = 1$ is graphed in the xy-plane. What is the x-coordinate of the x-intercept of the line?

36

	Masses (kilograms)					
Andrew	2.4	2.5	3.6	3.1	2.5	2.7
Maria	x	3.1	2.7	2.9	3.3	2.8

Andrew and Maria each collected six rocks, and the masses of the rocks are shown in the table above. The mean of the masses of the rocks Maria collected is 0.1 kilogram greater than the mean of the masses of the rocks Andrew collected. What is the value of x ?

CONTINUE

37

Jeremy deposited x dollars in his investment account on January 1, 2001. The amount of money in the account doubled each year until Jeremy had 480 dollars in his investment account on January 1, 2005. What is the value of x ?

38

A school district is forming a committee to discuss plans for the construction of a new high school. Of those invited to join the committee, 15% are parents of students, 45% are teachers from the current high school, 25% are school and district administrators, and the remaining 6 individuals are students. How many more teachers were invited to join the committee than school and district administrators?

STOP

If you finish before time is called, you may check your work on this section only. Do not turn to any other section.