real sat math B2 Page5.jpg real sat math B2_Page6.jpg real sat math B2_Page7.jpg real sat math B2_Page8.jpg real sat math B2_Page9.jpg real sat math B2_Page10.jpg real sat math B2_Page11.jpg real sat math B2_Page12.jpg real sat math B2_Page13.jpg real sat math B2_Page14.jpg real sat math B2_Page15.jpg real sat math B2_Page16.jpg real sat math B2_Page17.jpg real sat math B2_Page18.jpg real sat math B2_Page19.jpg real sat math B2_Page20.jpg real sat math B2_Page21.jpg real sat math B2_Page22.jpg real sat math B2_Page23.jpg real sat math B2_Page24.jpg real sat math B2_Page25.jpg

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International

SAT Test MARCH 2018





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.

 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



 $V = \ell wh$



 $V = \pi r^2 h$



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



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



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

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



What is the slope of the line with equation 4x - 2y = 11?

- A) -2
- B) $-\frac{1}{2}$
- C) $\frac{1}{2}$
- D) 2

2

Kelly is a salesperson at a car dealership. Each month, her total earnings include a base salary of \$2,500 plus a bonus for each car she sells. Which of the following equations can be used to determine Kelly's per-car bonus b, in dollars, for a month in which her total earnings were \$6,000 and she sold 20 cars?

A)
$$2,500 + 20 + b = 6,000$$

B)
$$2,500 + 20b = 6,000$$

C)
$$6,000 + 20b = 2,500$$

D)
$$6,000 + 20 + b = 2,500$$

3

$$6wy - 2wz + 3xy - xz$$

The expression above can be written in the form (aw + x)(by - z), where a and b are constants. What is the value of a + b?

- A) 1
- B) 3
- C) 5
- D) 9

-4

$$x + y = 7$$
$$2x + y = 2$$

The ordered pair (x, y) satisfies the system of equations above. What is the value of x?

- A) -5
- B) 3
- C) 5
- D) 9

5

If 5k + 15 = 35, what is the value of 10k?

- A) 4
- B) 10
- C) 40
- D) 100

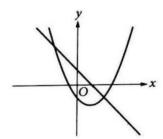


$$(5-2i)(1-i)$$

Which of the following is equivalent to the complex number expression above? (Note: $i = \sqrt{-1}$)

- A) 3 7i
- B) 5 5i
- C) 5 + 9i
- D) 7 + 3i

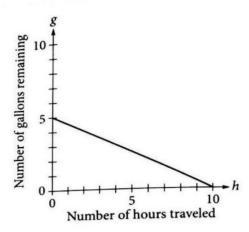
7



A system of one linear and one quadratic equation is graphed in the *xy*-plane above. How many solutions does the system of equations have?

- A) None
- B) One
- C) Two
- D) More than two

8



The graph above models the number of gallons, g, of gasoline remaining in the gas tank of a golf cart after traveling h hours. Which of the following is an equation of this graph?

A)
$$g = 5h + 10$$

B)
$$g = -10h + 5$$

C)
$$g = -5h$$

D)
$$g = -\frac{1}{2}h + 5$$

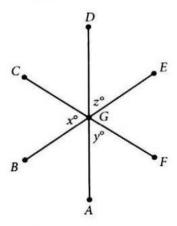


$$\left|\frac{1}{2}x+4\right|=2$$

Which of the following values of x satisfies the equation above?

- 1. -12
- II. -4
- III.
- A) II only
- B) III only
- C) I and II only
- D) II and III only

10



Note: Figure not drawn to scale.

In the figure above, \overline{AD} , \overline{BE} , and \overline{CF} all intersect at point G. Which of the following must be equivalent to z?

- A) x + y
- B) 180 (x + y)
- C) 180 x
- D) 180 y

11

$$(3x+2)^2 - (6x^2 + 5x)$$

Which of the following is equivalent to the expression above?

A)
$$15x^2 + 17x + 4$$

B)
$$15x^2 + 7x + 4$$

C)
$$3x^2 + 17x + 4$$

D)
$$3x^2 + 7x + 4$$

$$4x^2 + 3x - 1 = 0$$

What are the solutions to the equation above?

A)
$$x = \frac{-3 \pm 5}{8}$$

B)
$$x = \frac{3 \pm 5}{8}$$

C)
$$x = \frac{-3 \pm 5}{4}$$

D)
$$x = \frac{-3 \pm \sqrt{13}}{8}$$

13

$$y = (x - a)(x - b)$$

In the equation above, a and b are constants and $a \ne b$. The graph of the equation in the xy-plane is a parabola. What must $\frac{a+b}{2}$ represent?

- A) The x-coordinate of the vertex of the parabola
- B) The y-coordinate of the vertex of the parabola
- The x-coordinate of one of the roots of the equation
- The y-coordinate of one of the roots of the equation

14

$$3x + 5y = 10$$
$$cx + 10y = 12$$

In the system of equations above, c is a constant. If the system has no solution, what is the value of c?

- A) -2
- B) 2
- C) 4
- D) 6

15

Before its launch, the first stage of the Saturn V rocket held about 540,000 gallons of fuel. The number of gallons of fuel F(t) remaining t minutes after its launch can be modeled by the function $F(t) = 540,000 \left(\frac{19}{21}\right)^{20t}, \text{ where } t \le 6. \text{ Which of the}$

following describes the meaning of the fraction $\frac{19}{21}$ in

the context described?

- A) The fraction of the 540,000 gallons of fuel the rocket had at its launch
- B) The fraction of the 540,000 gallons of fuel the rocket had 3 seconds after its launch
- C) The fraction of the 540,000 gallons of fuel the rocket had 20 seconds after its launch
- D) The fraction of the 540,000 gallons of fuel the rocket had 1,200 seconds after its launch



DIRECTIONS

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

- 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.
- 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 3|1/2| is entered into the grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)
- 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.

	An	swe	r: 1	2		An	swe	r: 2	.5	1
Write	7	1	1	2			2		5	
in boxes.	0	0	00	0	← Fraction line	0	Θ	0	0	← Decima point
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Grid in result.	345	9496	(A) (A) (B) (B) (B) (B) (B) (B) (B) (B) (B) (B	999		(4) (5) (6)	49	(4) (5) (6)	4 6	
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	2	1	3		6	6	6		6	6	7
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(H)		8	8	0	0	8	8	0	0	0	(2
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<u>(4)</u>	(4)	(4)	(4)	<u>(4)</u>	(4)	(4)	<u>(4)</u>	<u>(4)</u>	4	4	4
3	(3)	(3)	(3)	(5)	(3)	(3)	(3)	(3)	(3)	(3)	(5
6	6	6	0	6	•	•		6			6

Answer: 201 - either position is correct

1	2	0	1	2	0	1	
0	00	000	0	0	00	000	0
①	(D)	1	(O)	1	1	(i)	(1)
2	0	2	2	0	2	@	2

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

CONTINUE



$$x - 4 = \sqrt{x + 2}$$

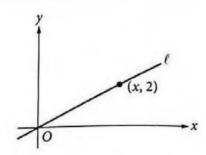
What value of x satisfies the equation above?

17

$$C(x) = 850 + 5(x - 500)$$

The total cost C(x), in dollars, to produce x units of a certain product can be estimated using the equation above, where $500 \le x \le 2000$. According to the equation, what is the estimated total cost, in dollars, to produce 600 units of this product? (Disregard the \$ sign when gridding your answer. For example, if your answer is \$987.00, grid 987)

18



In the xy-plane above, line ℓ passes through the origin and has a slope of $\frac{1}{2}$. What is the value of x?

19

The measure, in degrees, of an angle is 135°. The measure, in radians, of the angle is $a\pi$. What is the value of a?

20

When 2(9x + 5y)(-11x + 3y) is rewritten in the form $ax^2 - bxy + cy^2$, what is the value of b?

STOP

If you finish before time is called, you may check your work on this section only.

Do not turn to any other section.



4

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

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- 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



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



 $A = \ell w$



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

 $\frac{2x}{30^{\circ}}$

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

s 45° s

Special Right Triangles



 $V = \ell wh$



 $V = \pi r^2 h$



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



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



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



If $\frac{1}{2}x = 13$, what is the value of x - 1?

- A) 5
- B) 10
- C) 15
- D) 25

2

Which of the following expressions is equivalent to

$$6\left(\frac{3x}{y}\right) + 12\left(\frac{3x}{y}\right)$$
?

- A) $12\left(\frac{6x}{y}\right)$
- B) $18\left(\frac{3x}{y}\right)$
- C) $54\left(\frac{3x}{y}\right)$
- D) $72\left(\frac{9x}{y}\right)$

3

If a + 8 = 11, what is the value of 8a?

- A) 3
- B) 8
- C) 11
- D) 24

4

A researcher randomly selected 36 second-grade boys from Wilson Elementary School to participate in a study about the effects of exercise on memory. At the end of the study, the researcher concluded that regular participation in moderate-level exercise has a positive effect on memory. The results of the study can be generalized to which of the following populations?

- A) All boys at Wilson Elementary School
- B) All students at Wilson Elementary School
- C) All second-grade boys at Wilson Elementary School
- D) All second-grade students at Wilson Elementary School



$$V_f = V_i + at$$

For an object accelerating at a constant rate, the formula above relates the final velocity V_f , in feet per second (ft/s), of the object with its initial velocity V_i , in ft/s, its acceleration a, in ft/s², and time t, in seconds, since it began accelerating. Which of the following equations gives the acceleration of the object in terms of V_f , V_i , and t?

A)
$$a = \frac{V_f}{t} - V_i$$

B)
$$a = \frac{V_f - V_i}{t}$$

C)
$$a = V_f - V_i - t$$

$$D) \ a = V_f + V_i - t$$

6

In pea plants, flowering time can be described as early, intermediate, or late. A cross of an early-flowering plant and a late-flowering plant results in a set of offspring having a 1:2:1 ratio of early-, intermediate-, and late-flowering plants, respectively. If 371 offspring are produced from a cross of an early-flowering plant and a late-flowering plant, the expected number of intermediate-flowering offspring would be closest to which of the following?

- A) 93
- B) 186
- C) 247
- D) 278



In the xy-plane, the graph of the linear function f contains the points (2,4) and (4,12). Which of the following defines f?

$$A) \quad f(x) = 4x - 4$$

B)
$$f(x) = 4x + 3.5$$

C)
$$f(x) = \frac{1}{4}x - 4$$

D)
$$f(x) = \frac{1}{4}x + 3.5$$

8

At the end of its mission, the cosmic dust collector from NASA's *Stardust* probe was parachuted back to Earth for examination. Scientists searching for interstellar dust particles in the collector cataloged the following results.

Description of dust particle	Number of dust particles
Orientation inconsistent with interstellar dust trajectories	46
Fragment from dust collector cover	9
Could not be analyzed	1
Set aside for future study	12
Possibility of interstellar origin	3
Total	71

Which of the following is closest to the percent of the total number of dust particles that either had orientations inconsistent with interstellar dust trajectories or were fragments from the dust collector cover?

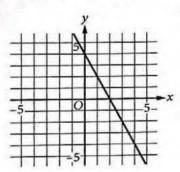
- A) 13%
- B) 55%
- C) 65%
- D) 77%



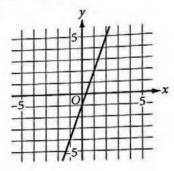
x	y
1	2
2	5
3	8
4	11

Each row of the table above gives a pair of values for the variables x and y. There is a linear relationship between x and y. Which of the following graphs could represent the relationship?

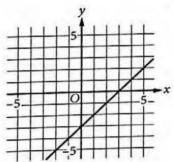
A)



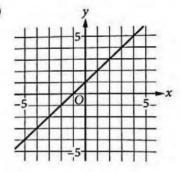
B)



C)



D)





For the function g defined by $g(x) = x^2 + 2x + b$, what must b represent?

- A) The minimum value of g
- B) The maximum value of g
- C) The x-intercept of the graph of g in the xy-plane
- D) The y-intercept of the graph of g in the xy-plane



Questions 11-13 refer to the following information.

Material	Maintenance cost per day	Cost to produce each figurine	Selling price per figurine
Softwood	\$5	\$4	\$10
Hardwood	\$10	\$5	\$12
Clay	\$20	\$3	\$9

The table above shows the costs for a sculptor to make figurines out of various materials. The maintenance cost is the cost to keep the tools needed to work with the corresponding material in good condition. The sculptor makes figurines from only one material each day to keep this cost low. The profit from selling the figurines is equal to the total selling price for the figurines minus both the cost to produce them and the maintenance cost.

11

The sculptor makes and sells f softwood figurines in a single day. On that day, what is the profit p, in dollars, in terms of f?

- A) p = 5 + 4f
- B) p = 6f 5
- C) p = 10f
- D) p = 14f + 5

12

The sculptor also makes stone carvings. The profit, p, from making and selling c stone carvings in one day is given by the equation p = 7c - 40. Which of the following is the best interpretation of 7 in the context of the problem?

- A) The amount of increased profit for every carving sold
- B) The number of carvings that need to be sold to have a 40-dollar profit
- The cost per day to maintain the stone-carving tools
- The number of carvings that need to be sold to increase profit by one dollar

13

Next week, the sculptor wants to have a profit of at least \$125, and she will spend 5 days making only clay figurines. Assuming all the figurines that are made will be sold, what is the minimum number of clay figurines the sculptor should make to reach this goal?

- A) 14 figurines
- B) 21 figurines
- C) 38 figurines
- D) 75 figurines

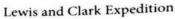


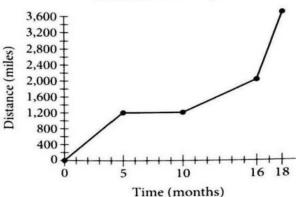
$$2x - 3 = \sqrt{14 - 4x}$$

The equation above is satisfied by which of the following values of x?

- 1. $-\frac{1}{2}$
- II. 0
- III. $\frac{5}{2}$
- A) I only
- B) II only
- C) III only
- D) I and III only

15





Lewis and Clark's expedition to the Pacific Ocean from Missouri began in May of 1804. The graph above shows their distance traveled, in miles, for 18 months. Assuming a constant rate of travel between each consecutive pair of the five specific points shown, consisting of their starting point and four other points, which of the following statements is NOT consistent with the graph?

- A) Lewis and Clark stopped for a period of 5 months.
- B) At the end of every 2-month period, Lewis and Clark had increased their distance from the prior 2-month period's stopping point.
- C) Of all 2-month periods, Lewis and Clark traveled the fastest in the last 2 months.
- D) In the first 6 months of their expedition, Lewis and Clark traveled less than 1,600 miles.



If Eli bikes at a constant speed of 15 feet per second, which of the following is closest to how many <u>miles</u> he will bike in 2 <u>hours?</u> (1 mile = 5,280 feet; 1 hour = 60 minutes; 1 minute = 60 seconds)

- A) 0.3
- B) 10.2
- C) 11.0
- D) 20.5

17

A room in the shape of a right rectangular prism is 3 meters high and 1.5 times as long as it is wide. If the volume of the room is $4.5x^2$ cubic meters, what could x represent?

- A) The length of the room, in meters
- B) The width of the room, in meters
- C) The perimeter of the room's floor, in meters
- D) The area of the room's floor, in square meters



Questions 18-21 refer to the following information.

Class size	Number of classes
23	1
28	2
29	6
30	6
31	5

The table above shows the distribution of class sizes for the 20 math classes at a high school.

18

What is the mean math class size?

- A) 28.2
- B) 28.5
- C) 29.4
- D) 30.0

19

The math department chairperson wants to show the principal of the school the number of math classes by size as a percentage of the total number of math classes. Which type of graph is most useful for this purpose?

- A) Scatterplot
- B) Box plot
- C) Line graph
- D) Circle graph

20

What effect would removing the outlier have on the mean math class size and the median math class size?

- A) The mean would increase, and the median would stay the same.
- B) The mean would increase, and the median would increase
- C) The mean would stay the same, and the median would stay the same.
- D) The mean would stay the same, and the median would increase.

21

If a new student is randomly placed into one of the 20 math classes, what is the probability that the student will be in a math class that already has 30 or more students?

- A) $\frac{1}{4}$
- B) $\frac{3}{10}$
- C) $\frac{9}{20}$
- D) $\frac{11}{20}$



Columbia River Bridge Daily Crossings, 1971-2010

Years	Average number of vehicles per day
1971-1975	90,175
1976-1980	120,250
1981-1985	151,200
1986-1990	182,000
1991-1995	212,900
1996-2000	242,800
2001-2005	272,000
2006-2010	302,000

The table above shows the average number of vehicles, y, that crossed the Columbia River Bridge daily in 5-year intervals from 1971 to 2010. Let x be the number of intervals after 1971–1975. For example, 1971–1975 corresponds to x = 0, 1976–1980 corresponds to x = 1, and so on. Of the following, which best models the relationship between y and x?

A)
$$y = \frac{1}{30,000}x + 90,175$$

B)
$$y = 30,000x + 90,175$$

C)
$$y = 90,175(0.75)^x$$

D)
$$y = 90,175(1.33)^x$$

23

A circle in the xy-plane has a center of (-6, -8), and the origin lies on the circle. Which of the following is an equation for the circle?

A)
$$(x+6)^2 + (y+8)^2 = 100$$

B)
$$(x+6)^2 + (y+8)^2 = 10$$

C)
$$(x-6)^2 + (y-8)^2 = 100$$

D)
$$(x-6)^2 + (y-8)^2 = 10$$

24

The volume of water in a reservoir at the start of a construction project is V_0 . For every 10-day period, the volume of water in the reservoir will decrease by 3% of the volume from 10 days before. Which of the following equations represents the amount of water left in the reservoir, V_t , after t days?

A)
$$V_t = V_0(0.97)^{10t}$$

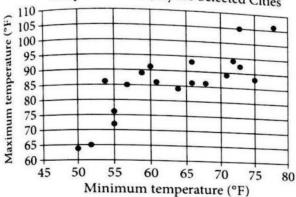
B)
$$V_t = V_0(0.97)^{\frac{t}{10}}$$

C)
$$V_t = V_0(0.03)^{10t}$$

D)
$$V_t = \frac{t}{10}(0.97V_0)$$



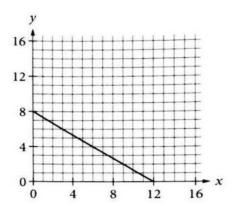
Minimum and Maximum Temperatures in July for Selected Cities



The scatterplot above shows the minimum and maximum temperatures in July for 19 selected cities in the United States. For the cities shown, which of the following is closest to the maximum temperature for the city with the median minimum temperature?

- A) 64°F
- B) 66°F
- C) 84°F
- D) 86°F

26



The graph of the line in the xy-plane above shows the relationship between the quantities x and y. Which of the following equations represents x in terms of y?

A)
$$x = 12 - \frac{3}{2}y$$

B)
$$x = 12 - \frac{2}{3}y$$

C)
$$x = 8 - \frac{3}{2}y$$

D)
$$x = 8 - \frac{2}{3}y$$



A boy who is currently 51 inches tall was 45 inches tall 2 years ago. Of the following, which best approximates the percent increase in the boy's height over the 2-year period?

- A) 3.0%
- B) 6.7%
- C) 11.7%
- D) 13.3%

28

In the xy-plane, the four x-intercepts of the graph of the polynomial function f are -2, 3, 0, and 1. Which of the following is a factor of f?

- A) $x^2 x$
- B) $x^2 x 2$
- C) $x^2 x + 6$
- D) $x^2 4x 3$

29

Which of the following systems of equations has infinitely many solutions?

- $\begin{array}{cc} A) & 2x y = 4 \\ 2x + y = 4 \end{array}$
- B) x 2y = 02x y = 0
- C) x 3y = 12x - 6y = -2
- D) 3x 4y = 2-9x + 12y = -6

30

The expression (x + a)(x + b) can be rewritten as $x^2 + cx - 12$, where a, b, and c are integers. What is the greatest possible value of a - b?

- A) 13
- B) 11
- C) 8
- D) 7



At sea level, the pressure exerted by the atmosphere is 14.7 pounds per square inch. What is the force, in pounds, exerted by the atmosphere on a surface of area 30.0 square inches at sea level?

32

A pool in the shape of a right rectangular prism has a length of 75 feet, a width of 20 feet, and a depth of 5 feet. What is the volume, in cubic feet, of the pool?

33

16, 19, 26, 7, 5, 10, 19, 17, 18

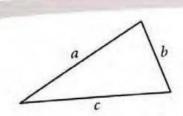
The list above shows the low temperatures, in degrees Fahrenheit, for 9 days in December in a certain city. What is the median low temperature, in degrees Fahrenheit, for the 9 days?

34

A store sells both large and small packages of pencils. The large package contains 50 pencils, which is 6 less than 7 times the number of pencils in the small package. How many pencils are in the small package?



Acertain car travels at a constant speed of 40 miles Acertain car travels at a constant speed of 40 miles per hour. At this speed, the car can travel a distance per hour. At this speed, the car can travel a distance per hour. At this speed for 75 minutes?



Note: Figure not drawn to scale.

In the figure above, the side with length c is the longest side of the triangle. If b=6 and c=13, what is one possible integer value for a?

Questions 37 and 38 refer to the following information.

Number	Homeroom teacher			
of pets	Ms. Wilcox	Mr. Xiong		
None	2	3		
One	10	8		
Two	8	4		
Three	7	6		
Four or more	3	0		

Teachers in two homerooms of 30 students each surveyed their students to find out the number of pets the students have. The results of the survey are shown in the table above.

37

What fraction of the 60 students indicated having four or more pets?

38

If a student in Ms. Wilcox's homeroom who indicated having one or more pets is selected at random, what is the probability that the selected student indicated having exactly three pets?