SAT Math Practice Test Three

SAT 数学模拟试题三

Practice Test III

Practice Test IIIA: 25 Minutes, 20 Multiple-Choice Questions

Practice Test IIIB: 25 Minutes, 18 Questions (8 Multiple-Choice and 10 Grid-in)

Practice Test IIIC: 20 Minutes, 16 Multiple-Choice Questions

Practice Test IIIA

Time: 25 minutes

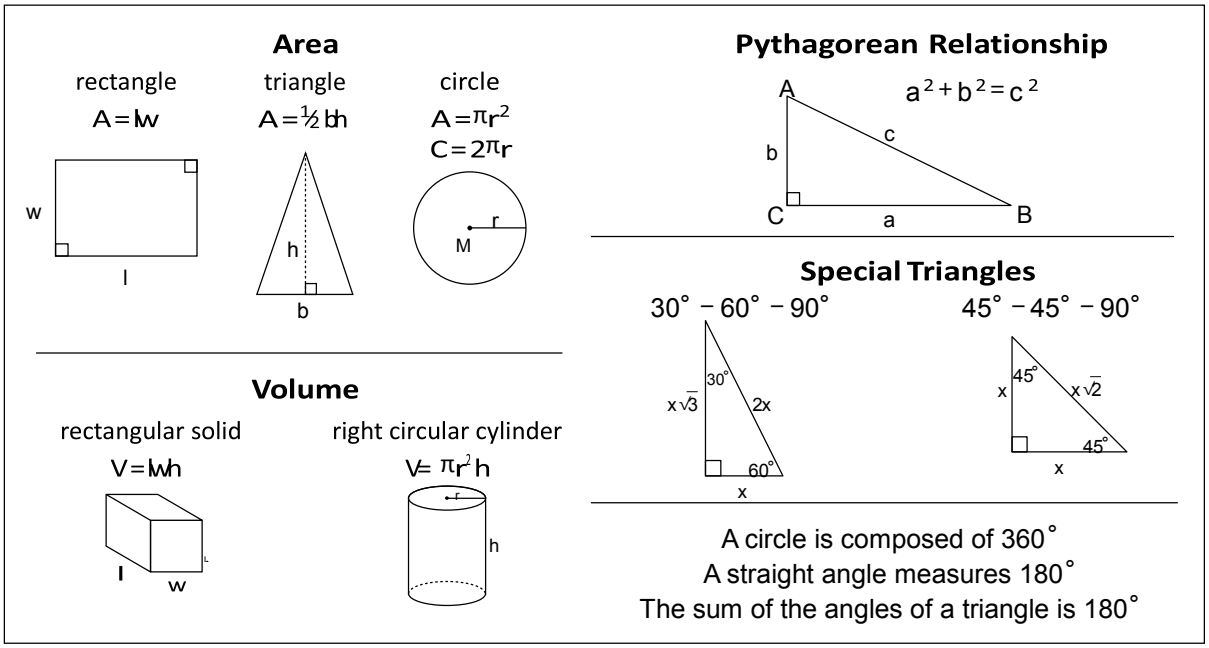
20 multiple-choice questions

Directions: Select the one correct answer of the five choices given and mark the corresponding circle on your answer sheet. Your scratch work should be done on any available space in the section.

Notes

1. All numbers used are real numbers.
2. Calculators may be used.
3. Some problems may be accompanied by figures or diagrams. These figures are drawn as accurately as possible EXCEPT when it is stated in a specific problem that a figure is not drawn to scale. The figures and diagrams are meant to provide information useful in solving the problem or problems. Unless otherwise stated, all figures and diagrams lie in a plane.

Data That Can Be Used for Reference



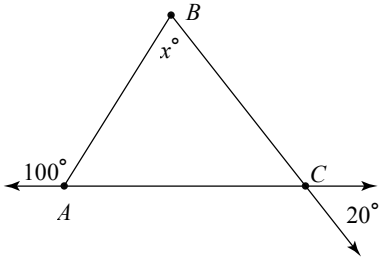
1. If $3x - 5 = 16$, then $x =$

A. –7

5.

B. $\frac{11}{3}$

$\frac{1}{2}$



C. 4
D. 7
E. 18

$\frac{x+4}{} = \frac{9}{}$, what is the value of *x?*

2. If x 7

A. 3

B. 7
C. 14
D. 21
E. 35

Note: Figure not drawn to scale.

3. In the figure above, what is the value of *x?*

A. 20
B. 50
C. 60
D. 80
E. 140

7. 4. At a flooring center, you can purchase carpet in one of five styles and in one of 10 colors. How many different style-color combinations are possible at this flooring center?

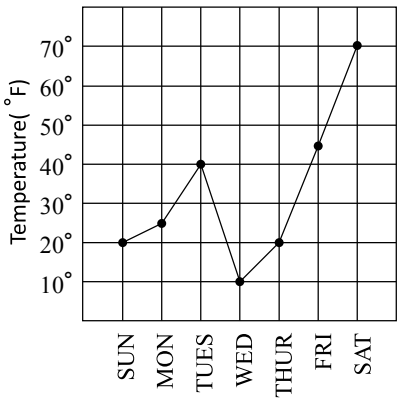
A. 15
B. 36
C. 40
D. 45
E. 50

In the *xy*-plane, a circle has its center at point *C* (0, 0) and contains the point *P* (–3, 4). Under the translation that moves point *C* to (–2, 3), where will point *P* be located after this translation?

A. (–1, 1)
B. (1, –1)
C. (–3, 2)
D. (–4, 5)
E. (–5, 7)

If $f\,x\text{^ h= }\underline{\text{^}}2 - x\,x\underline{h}^2 + \frac{3}{}5$, what is the value of $f(5)$?

A. 0
B. $1\frac{1}{5}$
6. **C.** $2\frac{2}{5}$
D. $3\frac{3}{5}$
E. 4



According to the data in the graph above, between which two consecutive days of the week was the percent increase in temperature the greatest?

A. Sunday to Monday **B.** Monday to Tuesday
C. Wednesday to Thursday
D. Thursday to Friday
E. Friday to Saturday

8. An employee had to take a pay cut of 20%. A while later, she

received a pay raise of 25%. Her new salary after the pay raise was what percent of her salary before the pay cut?

A. 45%
B. 55%
C. 80%
D. 95%
E. 100%

9. If the average (arithmetic mean) of x, 6, 10, 12, $5x$, and 10 is equal to $3x$, what is the value of x?

A. 2
B. 3
C. 4
D. 5
E. 6

10. $3x - 2y = -12$ and $x + 3y = 7$

For what values of x and y are the equations above both true?

A. $x = -6, y = -3$ **B.** $x = 4, y = 1$
C. $x = -1, y = \frac{9}{2}$
D. $x = -2, y = 3$
E. $x = 10, y = -1$

11. It takes Lisa h hours to walk a distance of m miles. At this same rate, how many hours will it take her to walk a distance of d miles? $\frac{dm}{h}$

A. $\frac{h}{dh}$
B. $\frac{m}{mh}$
C. $\frac{d}{d}$ **D.** $\frac{mh}{m}$
E. hd

12. If the ratio of the number of boys to the number of girls in a class is $\frac{3}{4}$, which of the following could NOT be the number of students in this class?

A. 21
B. 28
C. 33
D. 42
E. 49

13. The ratio of the length of a rectangle to its width is 5:3. If the length is 10, what is the area of the rectangle?

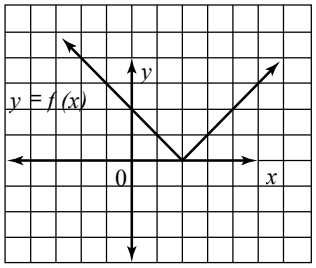
A. 6
B. 15
C. 16
D. 32
E. 60

14. If $x = \frac{-+b\sqrt{c}}{m}$, what is c in terms of x, b, and m?

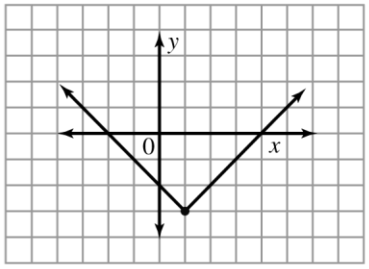
A. $m^2x^2 - b^2$ **B.** $(x - m + b)^2$
C. $\sqrt{xm + b}$
D. $(mx + b)^2$
E. $\frac{\wedge x - mh^2}{{}_2 b}$

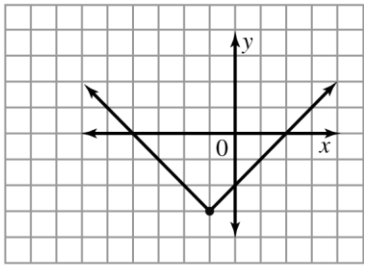
15. The minimum speed on a given stretch of freeway is 45 mph, and the maximum speed is 65 mph. Which of the following inequalities could be used to decided if a motorist driving at a rate of r mph is within legal limits?

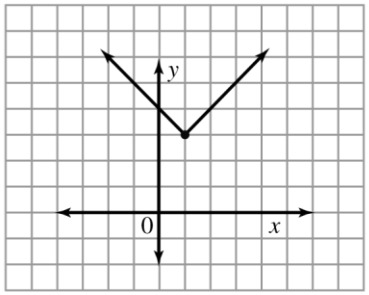
A. $|r - 45| \# 10$
B. $|r - 55| \# 10$
C. $|r - 65| \# 10$
D. $|r - 55| < 10$ **E.** $r - 10 \# 55$

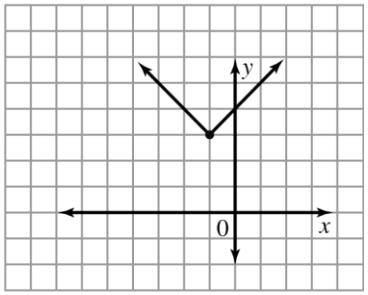


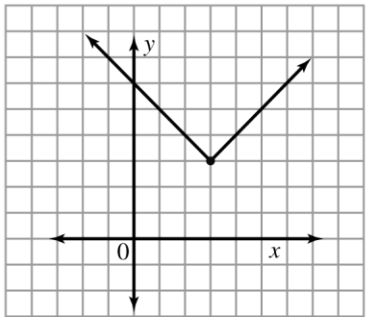
16. Above is the graph of $y = f(x)$. Which of the graphs below is that of $y = f(x + 1) + 3$?

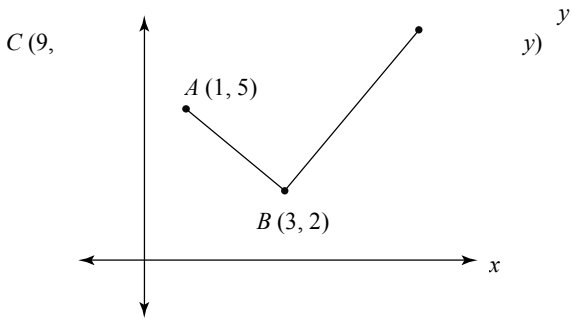
A.


B.


C.


D.


E.




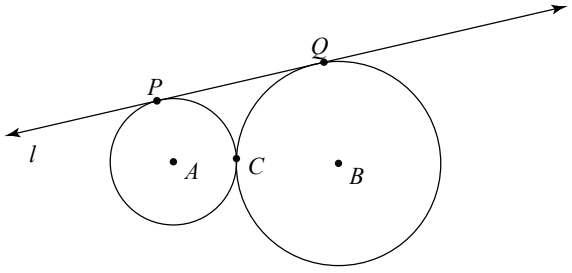
Note: Figure not drawn to scale.

17. In the figure above, $AB = BC$. What is the value of y?

A. $\frac{-3}{2}$
B. $\frac{2}{3}$
C. 2
D. 6
E. 12

18. If $8^{2x} = 4^{4x-3}$, what is the value of x?

A. $\frac{1}{4}$
B. 1
C. 3
D. 4
E. 6



Note: Figure not drawn to scale.

19. In the figure above, circles A and B are tangent at C, and line l is tangent to circles A and B at points P and Q respectively. If the radius of circle A is 2 and the radius of circle B is 6, what is the length of $\overline{PQ}$?

A. 6 **B.** 4 3
C. 6 $\sqrt{\sqrt{\ }}$ 2
D. 8
E. 1 0

20. A small rocket is fired into the air from the top of a tower. Its height h, in feet, after t seconds, is given by: $h(t) = -16t^2 + 64t + 32$. The rocket is 80 feet above the ground twice—once on the way up and then again on the way down. How many seconds pass between these two times?

A. 1
B. 2
C. 3
D. 4
E. 5

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT WORK ON ANY OTHER SECTION IN THE TEST.

Practice Test IIIB

Time: 25 minutes

18 questions (8 multiple-choice and 10 grid-in)

Directions: This section is composed of two types of questions. Use the 25 minutes allotted to answer both question types. For Questions 1–8, select the one correct answer of the five choices given and mark the corresponding circle on your answer sheet. Your scratch work should be done on any available space in the section.

Notes

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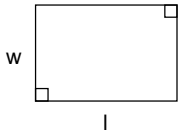
GO ON TO THE NEXT PAGE

Area

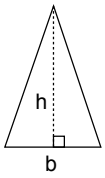
rectangle

$A = lw$



triangle

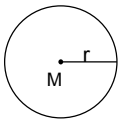
$A = \frac{1}{2}bh$



circle

$A = \pi r^2$

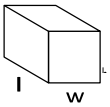
$C = 2\pi r$



Volume

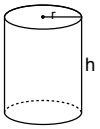
rectangular solid

$V = lwh$



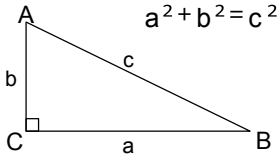
right circular cylinder

$V = \pi r^2 h$



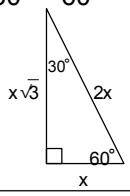
Pythagorean Relationship

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

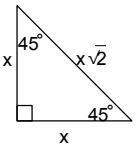


Special Triangles

$30^\circ - 60^\circ - 90^\circ$



$45^\circ - 45^\circ - 90^\circ$



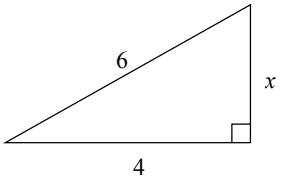
A circle is composed of 360°

A straight angle measures 180°

The sum of the angles of a triangle is 180°

1. What is the average (arithmetic mean) of the

$\frac{1}{3}$



numbers $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{6}$? **A.** $\frac{1}{22}$

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

C.

5. **D.** $\frac{1}{2}$ **E.** $\frac{5}{12}$

2. $\sqrt{12} + 7\sqrt{3} =$

A. $8\sqrt{3}$ **B.** $7\sqrt{6}$

C. $7\sqrt{3}$ **D.** $10\sqrt{3}$

E. $29\sqrt{3}$

3. If n represents an even integer, which of the following represents an odd integer?

A. $3n + 2$

B. $n^2 + 3$

C. $(n + 4)^2$

D. $5n - 4$

E. $7n + n^2$

Note: Figure not drawn to scale.

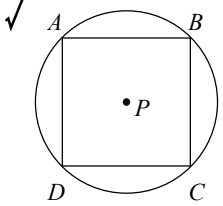
4. In the right triangle above, what is the value of x?

A. 2

B. $2\sqrt{5}$ (approximately 4.47)

C. 5

D. $5\sqrt{2}$ (approximately 7.07) **E.** $2\sqrt{13}$ (approximately 7.21)



In the figure above, square $ABCD$ is inscribed within circle P. If the area of the circle is 8π, what is the area of the square?

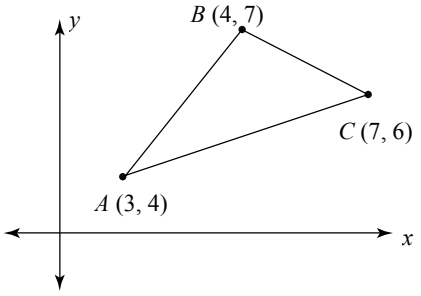
A. 2

B. 8

C. 16

D. 16

E. 32



Note: Figure not drawn to scale.

6. In ABC above, $\overline{AB} = \overline{BC}$. What is the product of the slopes of the sides of ABC?

A. –2

B. –1

C. $\frac{-1}{2}$

D. 1

E. 2

7. If $(x + m)(x + n) = x^2 - 5x - 36$, what is the value of $\frac{m + n}{mn}$?

A. $\frac{-4}{9}$

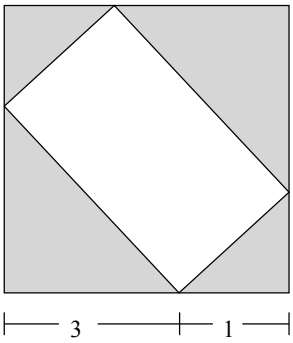
B. $\frac{5}{36}$

C. $\frac{9}{4}$

D. $\frac{36}{5}$

E. It cannot be determined from the given information.

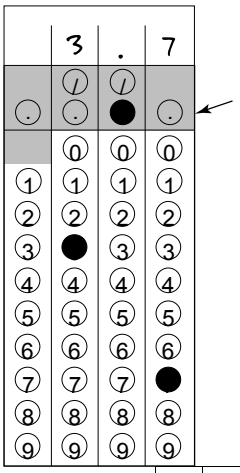
8. In the figure above, a rectangle is inscribed within a square of side length 4. What is the area of the shaded region?



A. 16
B. 10
C. 6
D. $\sqrt{3}$ 2
E. $\sqrt{2}$

Directions for Student-Produced Response Questions (Grid-ins): Questions 9–18 require you to solve the problem and enter your answer by carefully marking the circles on the special grid. Examples of the appropriate way to mark the grid follow.

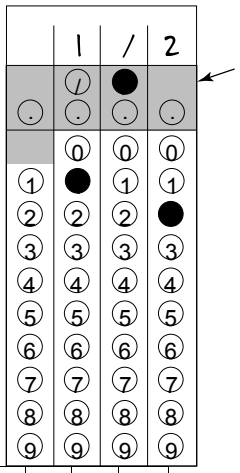
Answer: 3.7

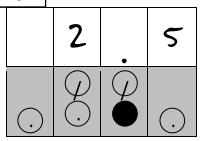


Answer 2 1/2

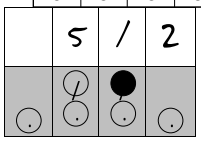
Do not grid-in mixed numbers in the form of mixed numbers. Always change mixed numbers to improper fractions or decimals.

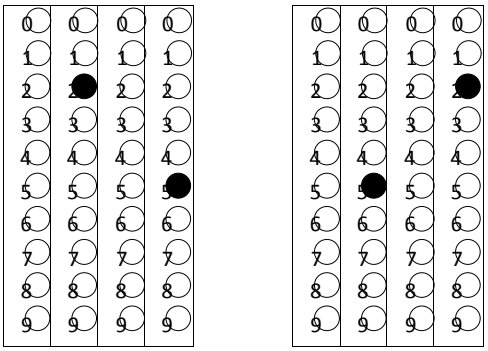
Answer 1/2





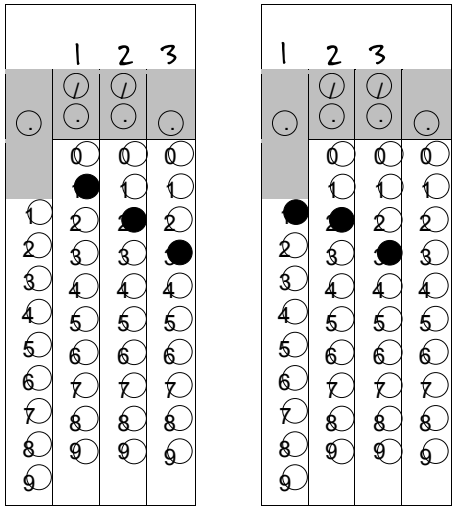
or





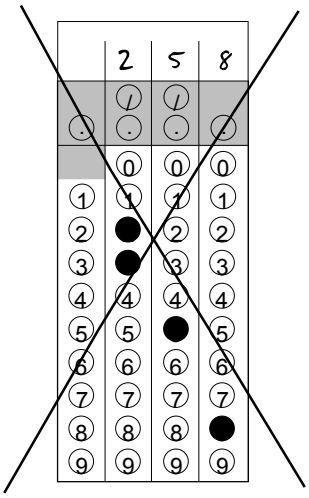
Answer 123

Space permitting, answers may start in any column. Each grid-in answer below is correct.



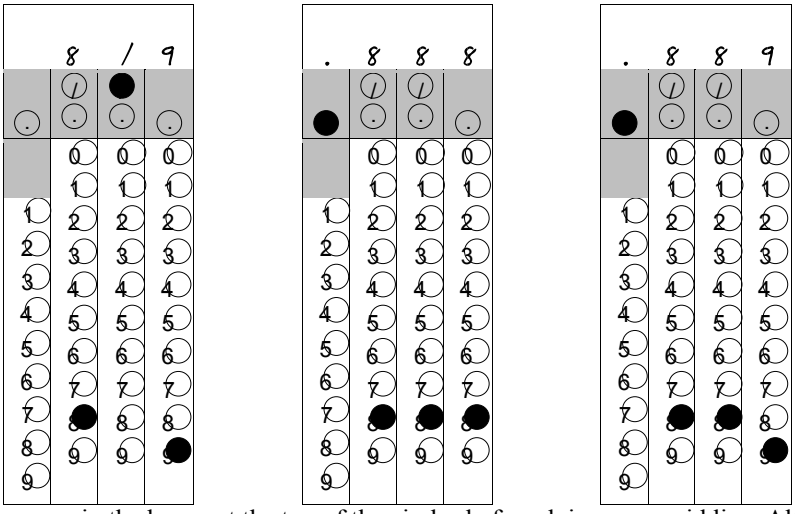
Answer 258 (no credit)

Note: Circles must be filled in correctly to receive credit. Mark only one circle in each column. No credit will be given if more than one circle in a column is marked. Example:



Answer 8/9

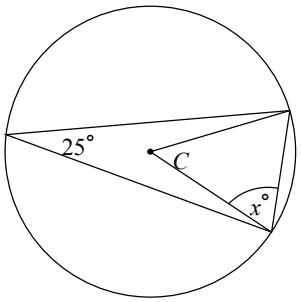
Accuracy of decimals: Always enter the most accurate decimal value that the grid will accommodate. For example: An answer such as .8888 . . . can be gridded as .888 or .889. Gridding this value as .8, .88, or .89 is considered inaccurate and therefore not acceptable. The acceptable grid-ins of 8/9 are:



Be sure to write your answers in the boxes at the top of the circles before doing your gridding. Although writing out the answers above the columns is not required, it is very important to ensure accuracy. Even though some problems may have more than one correct answer, grid only one answer. Grid-in questions contain no negative answers.

9. The length of a rectangle is decreased by 25% while its width is decreased by 20%. The area of the new rectangle is what fraction of the area of the original rectangle?

10. If $x = 4$, what is the value of $\frac{3xy^2}{x^2y - 5y}$?



Note: Figure to scale. not drawn

11. In the figure above, point C is the center of the circle. What is the value of x?

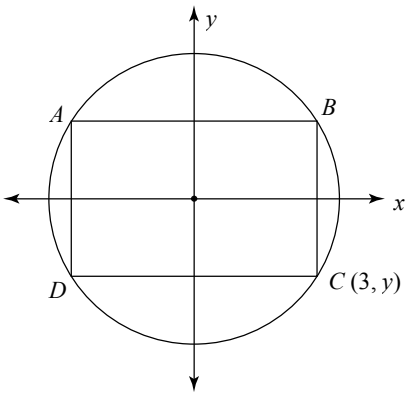
12. If $\frac{10x + 15m}{x + m} = 12$, what is the value of $\frac{m}{x}$?

13. If $12(m + n)(c - r) = 72$ and $3(m + n) = 9$, what is the value of $c - r$?

14. The population of bacteria in a culture doubles every 10 minutes. If the current bacteria population is 1,024, how many minutes ago was the bacteria population only 32?

15. If the median of a list of seven consecutive odd integers is 23, what is the difference between the largest and smallest of these integers?

16. The digits 2, 3, 4, 5, and 6 are used to create fivedigit numbers that begin and end with an even digit. If each digit can be used only once in each of the numbers, how many of these five-digit numbers can be created?



Note: Figure not drawn to scale.

17. In the figure above, rectangle $ABCD$ is inscribed in the circle with center at the origin in the xyplane. Point C with coordinates $(3, y)$ is located on this circle. If the radius of the circle is 5, what is the area of rectangle $ABCD$?

18. If the average (arithmetic mean) of five different two-digit positive integers is 20, what is the greatest possible difference between the largest and the smallest of these five integers?

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT WORK ON ANY OTHER SECTION IN THE TEST.

Practice Test IIIC

Time: 20 minutes

16 multiple-choice questions

Directions: Select the one correct answer of the five choices given and mark the corresponding circle on your answer sheet. Your scratch work should be done on any available space in the section.

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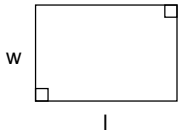
Data That Can Be Used for Reference

GO ON TO THE NEXT PAGE

Area

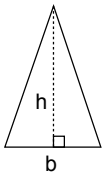
rectangle

$A = lw$



triangle

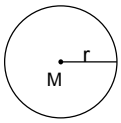
$A = \frac{1}{2}bh$



circle

$A = \pi r^2$

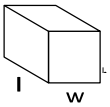
$C = 2\pi r$



Volume

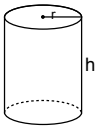
rectangular solid

$V = lwh$



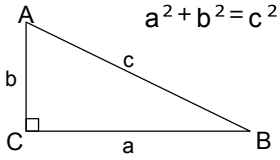
right circular cylinder

$V = \pi r^2 h$



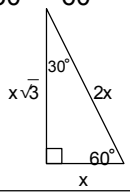
Pythagorean Relationship

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

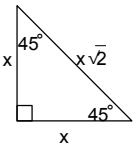


Special Triangles

$30^\circ - 60^\circ - 90^\circ$



$45^\circ - 45^\circ - 90^\circ$

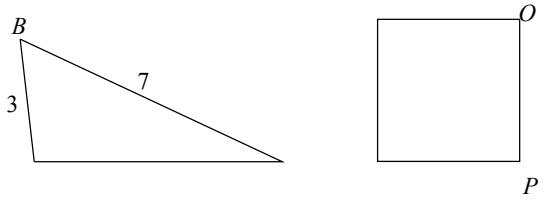


A circle is composed of 360°

A straight angle measures 180°

The sum of the angles of a triangle is 180°

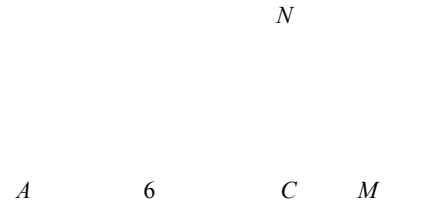
1. If $m - n = 11$, what is the value of $2m - 2n - 7$?



A. 4
B. $7\frac{1}{2}$
C. 15
D. 22
E. 29

$\frac{2}{3}mr = \frac{8}{5}$, what is the value of mr? 2. If

A. $\frac{5}{12}$
B. $\frac{5}{8}$ **C.** $\frac{12}{5}$ **D.** $\frac{5}{8}$ **E.** $\frac{3}{2}$



Note: Figures not drawn to scale.

3. In the figures above, ABC and square $MNOP$ have equal perimeters. What is the length of MP?

A. 2
B. 4
C. 5
D. 8
E. 16

4. The quantity $5x - 7$ is how much larger than the quantity $-10 + 5x$?

A. –17
B. –3
C. 3
D. 7
E. 17

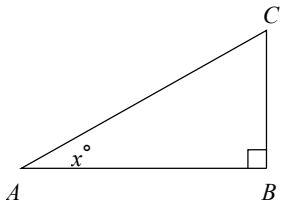
5. If $0 < x < y < 1$, which of the following must be positive?

A. $x - y$ **B.** $x^2 - y^2$

C. $\frac{1}{x} - \frac{1}{y}$ **D.** $-(y - x)$ **E.** $-3y$

$\overline{2x}$

6. When a given number is decreased by 5 and this result is tripled, the number obtained is 24. What is the given number? **A.** $\frac{11}{3}$ **B.** $\frac{29}{3}$
C. 7
D. 12
E. 13



Note: Figure not drawn to scale.

7. In ABC above, $\overline{AB} = \overline{BC}$, $x = 30$, and the length of $\overline{AC}$ is $8\sqrt{3}$. What is the area of ABC?

A. 16
B. $24\sqrt{2}$
C. $24\sqrt{3}$
D. $48\sqrt{3}$
E. 144

8. If the area of a circle is $\frac{9\pi}{4}$, what is its circumference? **A.** $\frac{81\pi}{256}$
B. $\frac{81\pi}{16}$
C. $\frac{3}{2}$
D. $\frac{3\pi}{2}$
E. 3π

9. In the *xy*-plane, a given circle with center at the origin contains the point (–3, 4). Which of the following points is NOT on the given circle?

A. (3, –4)
B. (0, –5)
C. (3, 4) **D.** (0, 7)
E. None of the above points are on the given circle.

10. If $0 < x < 1$, which of the following gives the correct order of $\sqrt[3]{x}$, $\sqrt{x}$, and $\frac{1}{x}$?

$\frac{1}{x} < \sqrt{x} < \sqrt[3]{x}$
$\sqrt[3]{x} < \frac{1}{x} < \sqrt{x}$
$\sqrt{x} < \sqrt[3]{x} < \frac{1}{x}$
$\sqrt[3]{x} < \sqrt{x} < \frac{1}{x}$
$\frac{1}{x} < \sqrt[3]{x} < \sqrt{x}$

11. In the *xy*-plane, $(\sqrt{7}, 5)$ is a point on the graph of

A.
B.
C.
D.
E.

the equation $y = x^2 + k$. For what positive value of x will $y = 7$?

A. 2
B. 3
C. 4
D. 5
E. 6

12. If $x^{3/4} = y^{3/8}$, what is x in terms of y?

A. $\frac{1}{y}$
B. $\sqrt{y}$
C. y^2
D. y^3
E. y^6

13. If $\sqrt{xy} = 6$, which of the following could NOT be the value of $x + y$?

A. 37
B. 20
C. 18
D. 15
E. 13

14. In the *xy*-plane, the set of points 5 units from the point *A* (6, 3) lie on a circle with center *A* and radius 5. What are all the possible points on this circle having an *x*-coordinate of 9?

A. (9, 8) only
B. (9, 7) and (9, –1)
C. (9, 8) and (9, –2)
D. (9, –2) only **E.** (9, 7) only

15. Rachelle invested $1,000 in an IRA paying 6% per year. The accumulated value of her investment *t* years later is given by the function *A*, where $A(t) = 1{,}000(1.06)^t$. In how many years will Rachelle's investment be worth $1,191.02?

A. 1
B. 2
C. 3
D. 4
E. 5

16. The length of the longer leg of a right triangle is one less than twice the length of the shorter leg, and the length of the hypotenuse is one more than twice the length of the shorter leg. If the length of the shorter leg is *x*, which of the following equations could be used to find the value of *x*?

A. $x + (2x - 1) = 2x + 1$
B. $x^2 + (2x - 1)^2 = (2x - 1)^2$
C. $x^2 = (2x - 1)^2 + (2x + 1)^2$

D. $x^2 + (2x - 1)^2 = (2x + 1)^2$

E. $x(2x - 1) = 2x + 1$

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS SECTION ONLY. DO NOT WORK ON ANY OTHER SECTION IN THE TEST.

Scoring Practice Test III

Answer Key for Practice Test III

Practice Test IIIA

1. D
2. C
3. D
4. E
5. E
6. C
7. D
8. E
9. C
10. D
11. B
12. C
13. E
14. D
15. B
16. C
17. D
18. C
19. B
20. B

Practice Test IIIB

1. C
2. C
3. B
8. B
9. $\frac{3}{5}$
10. or 1.09 $\frac{12}{11}$
14. 50
15. 12
16. 36

4. B17. 48
5. C18. 44
6. C
7. B 13. 2

11. 65

12.or .666 $\frac{2}{3}$ or .667

Practice Test IIIC

1. C 7. C 13. C
2. A 8. E 14. B
3. B 9. D 15. C
4. C 10. C 16. D
5. C 11. B
6. E 12. B

Analyzing Your Test Results

The charts on the following pages should be used to carefully analyze your results and spot your strengths and weaknesses. The complete process of analyzing each subject area and each individual problem should be completed for each practice test. These results should then be reexamined for trends in types of errors (repeated errors) or poor results in specific subject areas. This reexamination and analysis is of tremendous importance to you in ensuring maximum test preparation benefit.

Mathematics Analysis Sheet

Section A	*Possible*	*Completed*	*Right*	*Wrong*

Multiple Choice	20			
Subtotal	20			
Section B	*Possible*	*Completed*	*Right*	*Wrong*
Multiple Choice	8			
Grid-Ins	10			
Subtotal	18			
Section C	*Possible*	*Completed*	*Right*	*Wrong*
Multiple Choice	16			
Subtotal	16			
Overall Math Totals	54			

Analysis/Tally Sheet for Problems Missed

One of the most important parts of test preparation is analyzing why you missed a problem so that you can reduce the number of mistakes. Now that you have taken the practice test and checked your answers, carefully tally your mistakes by marking them in the proper column.

	Reason for Mistakes				
	Total Missed	*Simple Mistake*	*Misread Problem*	*Lack of Knowledge*	*Lack of Time*
Section A : Math					
Section B : Math					
Section C : Math					
Total Math					

Reviewing the preceding data should help you determine why you are missing certain problems. Now that you've pinpointed the type of error, compare it to other practice tests to spot other common mistakes.

Complete Answers and Explanations for Practice Test III

Practice Test IIIA Explanations

1. **D.** To solve the equation:

$3x - 5 = 16$

$3x - 5 + 5 = 16 + 5$ Add 5 to each side to isolate the variable term.

$3x = 21$

$\frac{3x}{3} = \frac{21}{3}$ =Divide each side by 3. 3 x

$= 7$

2. **C.** To solve this equation:

$$\frac{x + 4}{7} = \frac{9}{x}$$

$7(x + 4) = 9x$ Cross multiply to solve the proportion.

$7x + 28 = 9x$ Distribute the 7 on the left side.

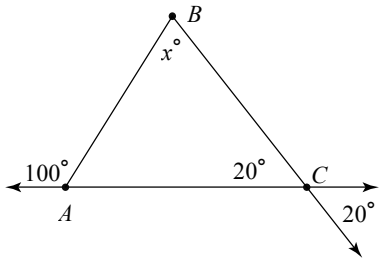
$7x + 28 - 7x = 9x - 7x$ Subtract $7x$ from each side to the variable on just one side. 28

$= 2x$

$\frac{28}{2} = \frac{2x}{2}$ Divide both sides by 2.

$14 = x$

3. **D.**



In the figure above, the two angles marked 20° are equal because they are vertical angles.

Then you know that $100 = 20 + x$, since the measure of an exterior angle of a triangle equals the sum of the measures of the two nonadjacent interior angles. So by simple subtraction, you see that $x = 80$.

4. **E.** You are making two types of choices: style and color of carpet. Using blanks to help solve this problem, you have:

$\underline{\quad}$ $\underline{\quad}$

style color

Since you have five styles and 10 colors from which to choose, you can make a style-color choice in the following manner:

$\underline{5}$: $\underline{10}$ Your answer is just the product of 5 and 10, which is 50.

style color

5. **E.** The translation that moves point C from (0, 0) to (–2, 3) moves the point 2 units left (0 – 2 = –2, the new x-coordinate), and then 3 units up (0 + 3 = 3, the new y-coordinate.). So the point P (–3, 4), after being moved 2 units left (–3 + –2 = –5), and then 3 units up (4 + 3 = 7) will end up at the point (–5, 7).
6. **C.** To find the value of $f(5)$, you need to substitute 5 for x in the $f(x)$ formula:

$f\,x\text{^ h= }\underline{\text{^}}2 - x\,x\underline{\text{h}}_2 + \frac{3}{5}$

so f ^5h= ^2 - 5h2 + = ^-3h2 $\frac{3}{5}$ 2. $+\frac{3}{5}=\frac{9}{5}+\frac{3}{5}=\frac{12}{5}=\frac{2}{5}$

55

7. **D.** You need to compare the temperature change between the two days to the temperature on the first day of the two-day pair.

   A. Sunday to Monday: $\frac{5}{20}$

   B. Monday to Tuesday: $\frac{15}{25}$

   C. Wednesday to Thursday: $\frac{10}{10}$

   D. Thursday to Friday: $\frac{25}{20}$

   E. Friday to Saturday: $\frac{25}{45}$

   Notice that the fractions for choices **A, B, C,** and **E** are all less than or equal to 1, but greater than 1 for Choice **D.** Therefore Choice **D** will have the greatest percent increase in temperature.

8. **E.** Suppose that the employee was originally paid P dollars.

   After a 20% (or $\frac{1}{5}$) pay cut, she will make just $\frac{4}{5}P$ dollars.

   After the next 25% $\frac{1}{4}$ (or) pay raise, she will make 5c $\frac{4}{}$ *P*m= *P* dollars.

   4 5

   Therefore, her new salary after the pay cut and then the pay raise will be exactly what is was before the cut and raise. So she will have 100% of her original salary.

   Another way to do the problem is to pick a salary, say $100.

Original salary	100
–20% pay cut	–20
New salary	80
+ 25% pay raise	+20
	100

   Final salary, $100, is the same as the original, so it's 100% of original.

9. **C.** Writing the average of the numbers equals $3x$, you have:

$$\frac{x + + + + +6\ 10 \quad 12 \quad 5x \quad 20}{6} = 3x$$

$$6c\frac{x+6+10+12+5x+20}{6}\text{m= 6 3^ }x\text{h}$$ Multiply both sides by 6.

$$x + 6 + 10 + 12 + 5x + 20 = 18x$$

$$6x + 48 = 18x$$ Combine like terms on the left side.

$$6x + 48 - 6x = 18x - 6x$$ Subtract $6x$ to get all the variables on one side.

$$48 = 12x$$

$$\frac{48}{12}=\frac{12x}{12}$$

$$4 = x$$

10. **D.** To solve the system of linear equations, you must first try to eliminate one of the variables, as follows:

$$3x - 2y = -12$$

$x + 3y = 7$ You will multiply the bottom equation by –3 to make the coefficients of x opposites in the top and bottom equations.

$3x - 2y = -12$

$-3(x + 3y) = -3(7)$

$3x - =-2y \ \ 12$

$-3x - 9y = -21$ Distribute the –3 through the bottom equation.

$-11y = -33$ This is the sum of the pair of equations in previous step. Notice that the x's cancelled out ($3x + -3x = 0$).

$\frac{-11y}{\quad} = \frac{-33}{-11}$ Divide both sides by –11. $-11\ y =$

3

To find the corresponding value of x, substitute $y = 3$ into either of the original equations, and then solve that for x. The original second equation looks like less work:

$x + 3y = 7$

$x + 3(3) = 7$ Put 3 in place of y.

$x + 9 = 7$

$x = -$

2

Therefore the point of intersection is (–2, 3).

11. **B.** Lisa walked a distance of m miles in a time of h hours. So her rate was:

$\frac{m}{h}$ hours$\frac{\text{miles}}{\text{hours}}$. To find how many hours it took her to walk a distance of d miles, use the formula $t = \frac{d}{r}$ to get the following:

$t = \frac{md \text{ miles}}{\text{miles}} = ^{\wedge} d$ milesh # $m\frac{h \text{ hours}}{\text{miles}} =$

$\frac{dh}{m}$ hours h hours

Notice in the work in the line above that the "miles" labels will cancel out just like numbers, leaving you with just an "hours" label for the final answer.

12. **C.** Since the ratio of boys to girls is $\frac{3}{4}$, you must have:
3 parts girls + 4 parts boys = 7 parts total. So the number of students in the class must be a multiple of 7. Choice **C,** 33, is NOT a multiple of 7.

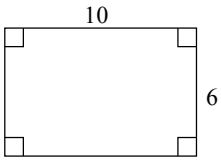
13. **E.** With a length to width ratio of 5:3 and a length of 10, you can set up and solve the following proportion:

$\frac{3}{5} = \frac{10}{w}$

$5w = 30$ Cross-multiply to solve the proportion. w

$= 6$

Your rectangle now looks like the figure below.



The area of the rectangle above is now $6 \times 10 = 60$

14. **D.** You solve the following equation for *c,* in terms of *x, b,* and *m.*

$$x = \frac{-b \sqrt{c}}{m}$$

$$mx = m : \frac{-b \sqrt{c}}{m}$$ p Multiply both sides of the equation by *m.*

$$mx = -b + \sqrt{c}$$
$$+b \quad b$$ Add *b* to both sides to isolate the *c* term.

$$mx + b \quad \sqrt{c}$$
$$mx + b \quad \sqrt{c}$$ Square both sides to get rid of the radical.

$$(mx + b)^2 = c$$

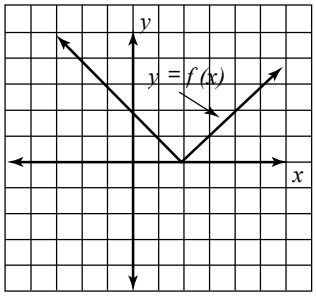
15. **B.** With a minimum speed of 45 mph and a maximum speed of 65 mph, you can write an inequality that represents the range of legal speed limits *r:*

$45 \le r \le 65$. Notice that half-way between these two numbers is 55.

So each of these rates, 45 and 65, is just 10 units either left of right of 55.

This relationship can be expressed with an absolute value inequality: $|r - 55| \le 10$, which can be translated as: "the distance between *r* and 55 is less than or equal to 10."

16. **C.**



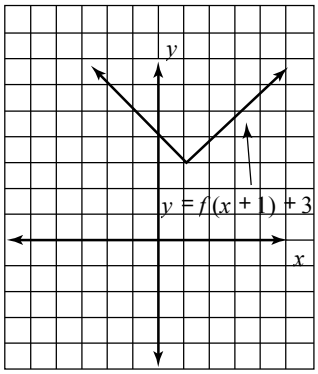
Above is the graph of $y = f(x)$. You want to find the graph of $y = f(x+1) + 3$.

In general, the graphs of any equation $y = f(x)$ and $y = f(x+h) + k$, where *h* and *k* are constants, have exactly the same shape. The only difference is where they are located in the *xy*-plane. The constants *h* and *k* affect the graph of $y = f(x)$ as follows:

i. If $h < 0$, move graph of $y = f(x)$ RIGHT *h* units; if $h > 0$, move graph of $y = f(x)$ LEFT *h* units. **ii.**

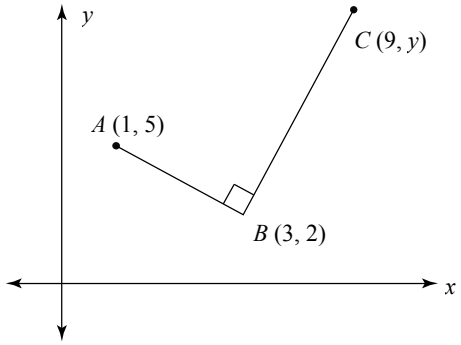
If $k < 0$, move graph of $y = f(x)$ DOWN *k* units; if $k > 0$, move graph of $y = f(x)$ UP *k* units.

So with $y = f(x + 1) + 3$, you move the graph of $y = f(x)$ 1 unit LEFT and 3 units UP to arrive at the graph below.



Note that an easy check is to see that the "vertex" was moved left 1 and then up 3 with the graph in the same vertical orientation.

17. **D.**



Since $\overline{AB} = \overline{BC}$, you know that their slopes are just opposite reciprocals. First, find the slope of $\overline{AB}$ and use that to help you find the value of y.

Slope of $\overline{AB} = \frac{2-5}{3-1} = \frac{-3}{2}$

Then the slope of BC has to be $\frac{2}{3}$ (the opposite reciprocal of $\frac{-3}{2}$).

Next, find the slope of BC in terms of y, set it equal to $\frac{2}{3}$, and then solve for y.

Slope of $\overline{BC} = \frac{y-2}{9-3} = \frac{2}{3}$

$$\frac{y-2}{6} = \frac{2}{3}$$

$3(y-2) = 12$ Cross-multiply to solve the proportion.

$3y - 6 = 12$ Distribute the 3 on the left side.

$3y - 6 + 6 = 12 + 6$ Add 6 to each side to isolate the variable.

$3y = 18$

$\frac{3y}{3} = \frac{18}{3}$

$y = 6$

18. **C.** To solve the equation $8^{2x} = 4^{4x-3}$, notice that both bases, 8 and 4, are powers of 2. So you will first change both sides of the equation to the same base, and then solve the resulting equation.

$8_{2x} = 4x_{4x-3}$

$(2^3)^{2x} = (2^2)^{4x-3}$ Replace 8 with 2^3 and 4 with 2^2.

$2^{6x} = 2^{8x-6}$ On each side, multiply the exponents.

$6x = 8x - 6$ In the line above, since the bases are equal, the exponents are equal.

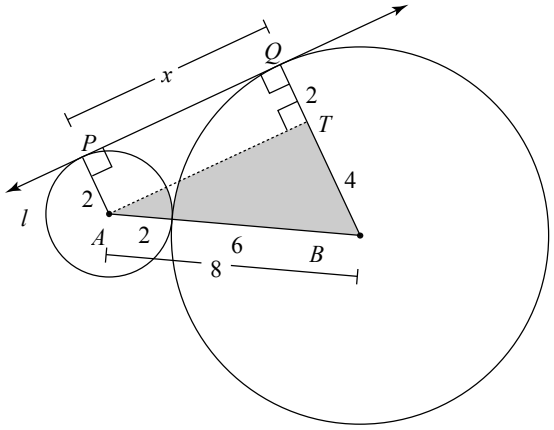
$6x - 8x = 8x - 6 - 8x$ Subtract $8x$ from each side to get variables on just one side.

$-2x = -6$

$\frac{-2x}{-2} = \frac{-6}{-2}$ =Divide both sides by –2. -2

$x = 3$

19. **B.**



In the figure above, radii $\underline{AP}$ and $\underline{QB}$ have been drawn. Each of these is perpendicular to line l since line l is tangent to the circle at points P and Q. Notice that the length of AB is 8, just the sum of the two radii 2 and 6. AT has been drawn perpendicular to radius QB to form a rectangle $PATQ$ and a right triangle ATB. The distance, x, you are looking for is the same as side AT in the right triangle. So using the Pythagorean theorem, you have:

in right ATB: $x^2 + 4^2 = 8^2$

$x^2 + 16 = 64$

$\sqrt{48}$

$\sqrt{16 \# 3} = 4\sqrt{3}$

$x^2 + 16 - 16 = 64 - 16$ Subtract 16 from each side of the equation.

$x^2 = 48$

x =Take the square root of both sides. x =

20. **B.** To find the times at which the rocket is 80 feet above the ground, you set $h(t) = 80$ and solve for t.

$80 = -16t^2 + 64t + 32$

$80 - 80 = -16t^2 + 64t + 32 - 80$ Subtract 80 from both sides to get 0 one side.

$0 = -16t^2 + 64t - 48$

$0 = -16(t^2 - 4t + 3)$ Take out common factor of –16.

$0 = -16(t - 3)(t - 1)$ Factor $t^2 - 4t + 3$ into $(t - 3)(t - 1)$

$t - 3 = 0$ $t - 1 = 0$ Set each factor equal to 0.

$t = 3$, t = 1

So the rocket is 80 feet above the ground at 1 second, and then again at 3 seconds. The difference between these times is 3 – 1 = 2.

Practice Test IIIB Explanations

1. **C.** $\sqrt{12} + \sqrt{75} = \sqrt{4 \cdot 3} + \sqrt{25 \cdot 3} = 2\sqrt{3} + 5\sqrt{3} = 7\sqrt{3}$

$$\frac{\frac{1}{6}}{\frac{6}{3}} = \frac{6}{6} \cdot \frac{1}{3} = \frac{1}{3}$$

$$\frac{\frac{1}{3} + \frac{1}{6}}{\frac{1}{3} + \frac{2}{3}} = \frac{\frac{1}{6}}{\frac{6}{3}}$$

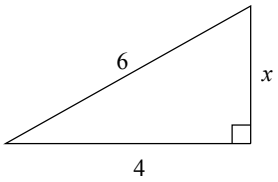
2. **C.** $x =$

3. **B.** Trying the choices one at a time, with n being even, you have:

   (A) $3n + 2 = 3(\text{even}) + 2 = \text{even} + 2 = \text{even}$, so Choice **A** is not correct.

   (B) $n^2 + 3 = (\text{even})^2 + 3 = \text{even} + 3 = \text{odd}$, so Choice **B** IS correct.

4. **B.**



In the right triangle above, the Pythagorean theorem gives us:

$x^2 + 4^2 = 6^2$

$x^2 + 16 = 36$

$x^2 + 16 - 16 = 36 - 16$ Subtract 16 from each side of the equation.

$x^2 = 20$

$x = \sqrt{20}$ =Take the square root of each side.

$x = \sqrt{4 \cdot 5} = 2\sqrt{5}$ =5, or approximately 4.47

5. **C.** The area of the circle is given as 8π .

Therefore $8\pi = \pi r^2$ Area of a circle is found by the formula πr^2.

$\frac{8}{\pi} = \frac{\pi r^2}{\pi}$ Divide both sides of equation by π.

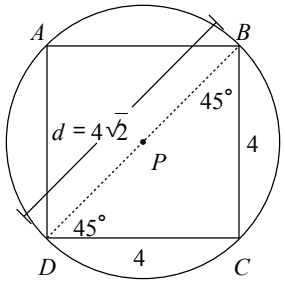
$8 = r^2$

$\sqrt{8} = r$ Take square root of both sides.

$\sqrt{2} = r$

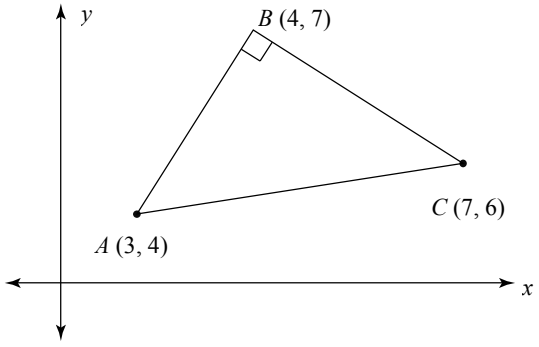
Simplified $\sqrt{8} = \sqrt{4 \# 2} = 2\sqrt{2}$

Since the radius of the circle is $2\sqrt{2}$, its diameter is twice this, or $4\sqrt{2}$.



As you can see in the figure above, *DBC* is an isosceles right triangle (45°-45°-90°) with a hypotenuse of $4\sqrt{2}$. So with your *x x x*, $\sqrt{\ }$ 2 pattern, you know that each side of the square is now just 4. Thus the area of the square is $4 \times 4 = 16$.

6. **C.**



Since $\overline{AB} = \overline{BC}$, you know that the product of their slopes is just –1. So all you have to do is find the slope of $\overline{AC}$, multiply that by –1, and this will give you the product of all three slopes of the sides of *ABC*.

Slope of $\overline{AC} = \frac{6-4}{7-3} = \frac{2}{4} = \frac{1}{2}$. So the product of all 3 slopes is just $-1 \# \frac{1}{2} = \frac{-1}{2}$.

7. **B.**

i. Longer Method: $(x + m)(x + n) = x^2 - 5x - 36$

$x^2 + nx + mx + mn = x^2 - 5x - 36$ Expand left side (FOIL).

$x^2 + (n + m)x + mn = x^2 - 5x - 36$ Factor 2 middle terms on left.

$x^2 + \underline{n + m}\, x + \underline{mn} = x^2 - \underline{5x} - \underline{36}$ Add underlining for next step.

Since the two polynomial are equal, their respective terms must be equal; specifically, the coefficient of the *x* terms on the left and right sides of the equation must be equal, and the last constant terms on the left and right sides of the equation must be equal. So you have:

$n + m = -5$ and $mn = -36$ $\underline{m + n} = -\frac{5}{}$

$= \frac{5}{}$.

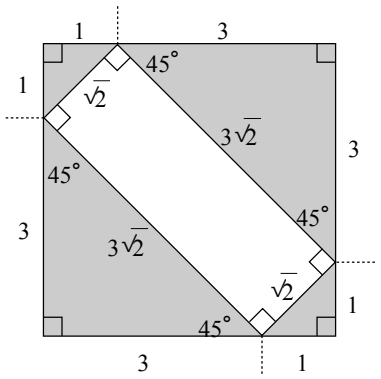
Thus the ratio is *mn* -36 36

ii. Shorter Method: If $(x + m)(x + n) = x^2 - 5x - 36$, then you know that $m + n = -5$, and $mn = -36$, since that's how factoring works.

$\underline{m + n} = -\frac{5}{} = \frac{5}{}$

So the ratio is *mn* -36 36

8. **B.**



In the figure above, each triangle at each corner of the figure is an isosceles right triangle.

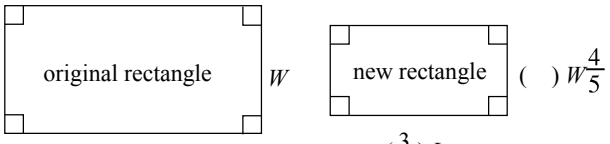
So using your *x x x*, $\sqrt{}$, 2 pattern, you find the width of the rectangle is 2 and the length of the $\sqrt{2}$ rectangle is 3 as shown in the figure.

Then you have $\text{Area}_{\text{shaded}} = \text{Area}_{\text{square}} - \text{Area}_{\text{rect.}} = 4 \# 4 - 2 \# 3 \sqrt{2} = - = 16 \quad 6 \quad 10$

9. **$\frac{3}{5}$.**

Let the length of the original rectangle be *L*. If you decrease this by 25% (or by $\frac{1}{4}$ of *L*), you have only $\frac{3}{4}$ remaining.

Let the width of the original rectangle be *W*. If you decrease this by 20% (or by $\frac{1}{5}$ of *W*), you have only $\frac{4}{5}$ remaining.



Then you have: $\text{Area}_{\text{original}} = LW$ and $AREA_{new} = c\frac{3}{4}$

$L\text{mc}\frac{4}{5}\,W\text{m} = \frac{3}{5}\,LW$

So the area of the new rectangle is just $\frac{3}{5}$ of the area of the original rectangle.

10. **$\frac{12}{11}$ or 1.09**

At first glance, it appears that you need to know the value of both *x* and *y* to find the value of the expression $\frac{3xy^2}{\quad^2}$ ^{2}. But if you do some factoring first, you find that all of the *y*'s will cancel out, as follows:

$x\,y - 5y^2$

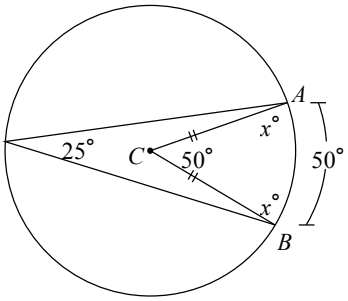
_____ _____ 2 3 2 x y 2 2 =

2 y _ 2 x ^ 2 3 - x h 5 i = x 2 3 - x 5 x y - 5 y y

As you can now see, you only need to know that $x = 4$ in order to find the value of this last expression.

2 3 x = 3 2 # 4 = 12 = 12 or 1.09 x - 5 4 -
5 16 - 5 11

11. **65.**



Since the 25° angle is an inscribed angle, its associated arc, $AB\$$ is twice that, or 50°.

Since $\angle ACB$ is a central angle, its measure is the same as that of arc $AB\$$, which is 50°.

Notice that since C is the center of the circle, segments $\overline{CA}$ and $\overline{CB}$ are both radii of the circle, so their lengths are equal, as marked in the figure. So the angles opposite these two radii are equal, thus the two angles are marked x° in the figure. Then, we have in *ACB:*

$x + x + 50 = 180$ The sum of the measure of the angles of a triangle is 180.

$2x + 50 = 180$

$2x + 50 - 50 = 180 - 50$ Subtract 50 from each side of the equation.

$2x = 130$

$\frac{2x}{2} = \frac{130}{2}$ =Divide both sides by 2.

2 x =
65

12. **$\frac{2}{3}$ or .666 or .667**

m

You are asked to find the value of x from the following equation:

10 x x + + 15 m m = 12

$^{c}(x + m)^{h} \frac{10x + 15m}{x + m} = 12(x + m)$ Multiply both sides by $(x + m)$.

$$10x + 15m = 12x + 12m$$

$10x + 15m - 10x = 12x + 12m - 10x$ Subtract $10x$ from each side.

$$15m = 2x + 12m$$

$15m - 12m = 2x + 12m - 12m$ Subtract $12m$ from both sides.

$$3m = 2x$$

$\frac{3m}{m} = \frac{2x}{m}$

Divide both sides by x; we want to get x on one side.

$\frac{3m}{x} = 2$

$\frac{1}{3}(3m) = \frac{1}{3}(2x)$

$m = 2 \# \frac{1}{3}$ Multiply both sides by $\frac{1}{3}$.

$$mx = 23$$

13. **2.** Your goal is to find the value of $c - r$ from the equation below.

$12(m + n)(c - r) = 72$

$3 \times 4(m + n)(c - r) = 72$

$3(m + n) \times 4(c - r) = 72$ Factor the expression on the left this way so you get one factor as $3(m + n)$, whose value you are given.

$9 \times 4(c - r) = 72$ In place of the $3(m + n)$ above, you put a 9.

$36 \times (c - r) = 72$

$\frac{36 \# (c - r)}{36} = \frac{72}{36}$ Divide both sides by 36.

$c - r = 2$

14. **50.** Current population is 1,024.

10 minutes ago, the population was $\frac{1024}{2} = 512$. Doubles every 10 minutes into the future.

20 minutes ago, the population was $\frac{512}{2} = 256$.

30 minutes ago, the population was $\frac{256}{2} = 128$.

40 minutes ago, the population was $\frac{128}{2} = 64$.

50 minutes ago, the population was $\frac{64}{2} = 32$.

15. **12.** There are a couple of ways to approach this problem—one shorter and one a bit longer.

i. Shorter Method: For any problem with consecutive integers and consecutive odd/even integers, having an odd number of integers (as in this case, seven integers), the median is always the middle number in the list of the consecutive integers. In your case, with 23 being the median, the list of consecutive odd integers is: 17, 19, 21, 23, 25, 27, and 29. So the difference between the largest and smallest of these is 29 – 17 = 12.

ii. Longer Method: Let n = first odd integer; then the next 6 consecutive odd integers after this will be $n + 2$, $n + 4$, $n + 6$, $n + 8$, $n + 10$, and $n + 12$. Since the median of the list of the seven terms is $n + 6$ and you are told that this is 23, you have $n + 6 = 23$, so $n = 17$. Then your seven consecutive odd integers are 17, 19, 21, 23, 25, 27, and 29. The difference between the largest and smallest is $29 - 17 = 12$.

16. **36.** You are using the five digits 2, 3, 4, 5, and 6 to create five-digit numbers beginning and ending with an even digit. So the first and last digits must be with a 2, 4, or a 6. If you use a series of blanks to indicate the choices to

$$\underline{\quad}\underline{\quad}\underline{\quad}\underline{\quad}\underline{\quad}$$

creating your five-digit numbers, you have even even.

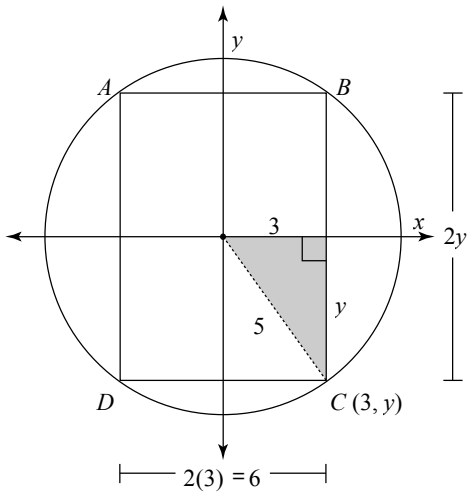
You can choose the first digit in any one of three ways, (2, 4, 6), and once you choose one of these even numbers, you can choose the last digit in only one of two ways—the other two remaining even digits.

The digits in the middle can then be any one of three remaining digits (since you have already picked two), then two of the remaining digits, then the one and only one remaining digit.

$$\underline{3}\quad\underline{3}\quad\underline{2}\quad\underline{1}\quad\underline{2}$$
even even

Our answer is just the product of these numbers in the blanks, so $3 \times 3 \times 2 \times 1 \times 2 = 36$ different five-digit numbers.

17. **48.**



Since the circle has a radius of 5, the length of the hypotenuse of the shaded right triangle in the figure above is labeled as 5. Point C has coordinates $(3, y)$, so the horizontal leg of the right triangle is 3 and its vertical leg y. This is just a 3-4-5 right triangle, so the y must be 4. Notice from the figure that the base of rectangle $ABCD$ is just 6; its height is $2y$, and since $y = 4$, the height is 8. Therefore the area of the rectangle is $6 \times 8 = 48$.

18. **44.** The average of the five different two-digit positive integers is 20. If your integers are $a, b, c, d,$ and $e,$ then you can write:

$$\frac{a + + + + b \qquad c \;\; d \qquad e}{5} = 20$$

$$5c\frac{a + b + c + d + e}{5}m = 5 \# 20 \qquad \text{Multiply both sides by 5.}$$

$$a + b + c + d + e = 100$$

If $a = 10$, $b = 11$, $c = 12$, and $d = 13$ were the values of the 4 smallest two-digit positive integers, you would then have:

$10 + 11 + 12 + 13 + e = 100$

$46 + e = 100$

$e = 54$

The difference between the largest and the smallest would be $54 - 10 = 44$

Practice Test IIIC Explanations

1. **C.** You can write the expression $2m - 2n - 7$ as $2(m - n) - 7$ by factoring a 2 out of the first 2 terms.

   Then, $2(m - n) - 7$

   $= 2(11) - 7$ You were told that $m - n = 11$ in the problem.

   $= 22 - 7$

   $= 15$

2. **A.** To solve the proportion:

   $$\frac{2m}{3r} = \frac{8}{5}$$

   $2^{3}_{\#}\frac{2}{3}\frac{m}{r} = 2^{3}_{\#}\frac{8}{5}$ Multiply by 2^{3}(the reciprocal of $\frac{2}{3}$) to get $\frac{m}{r}$ by itself.

   $\frac{m}{10} = \frac{12}{5}$ On the right, reduce the product $\frac{24}{r}$ to $\frac{12}{5}$.

   $m = 12\frac{5}{r}$ Take the reciprocal of both sides of the equation.

3. **B.** The perimeter of ABC is $3 + 6 + 7 = 16$. Since the triangle and square have equal perimeters, the perimeter of square $MNOP$ is also 16. So the length of side $\overline{MP}$ is $\frac{16}{4} = 4$.

4. **C.** To find how much larger one quantity is than another, you just find their difference. So $(5x - 7) - (-10 + 5x) = 5x - 7 + 10 - 5x = 3$.

5. **C.** Since $0 < x < y < 1$, use some convenient fractions for x and y (they are both between 0 and 1). So suppose you let $x = \frac{1}{4}$ and $y = \frac{1}{2}$. Then trying each of the choices, you have: **A.** $x - = -y$ $\frac{1}{4}$ $\frac{1}{2}$, which is negative since $\frac{1}{2}$ is greater than $\frac{1}{4}$.

   B. $x^{2} - = y$ $\frac{1}{4}$ ^{2}c m c m^{2} - $\frac{1}{2}$ $\frac{1}{4}$ ^{2} = -$\frac{1}{16}$, which is also $\frac{1}{4}$ negative $\frac{1}{16}$ since greater than .

   C. $\frac{1}{\frac{1}{4}}x - = - = - = -\frac{1}{\frac{1}{2}}y$ $\frac{1}{4}$ $\frac{1}{2}$ 4 2 2, which is positive, so Choice **C** is correct.

6. **E.** If you let the number be n, you have: a given number decreased by 5 → $n - 5$ the result is tripled → $3(n - 5)$

   the number obtained is $24 \rightarrow 3(n - 5) = 24$

   $3n - 15 = 24$ Distribute 3 on left.

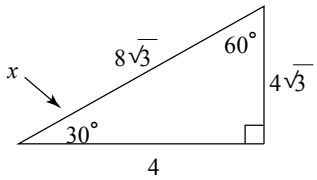
   $3n - 15 + 15 = 24 + 15$ Add 15 to each side.

   $3n = 39$

   $\frac{3n}{3} = \frac{39}{3}$ =Divide by 3.

3 *n* =
13

7. **C.**



Since $\overline{AB} = \overline{BC}$ and $x = 30°$, you know that ABC is a 30°-60°-90° triangle. With $AC = 8$ 3 and using your x x, $\sqrt{3}$ 2, x pattern, you can find that $BC = 4$ $\sqrt{3}$. Then $AB = 4$ 3j # 3 = 12.

The area is $\Delta ABC = \frac{1}{2} bh = \frac{1}{2} \# 12 \# 4$ 3 = 24 3.

8. **E.** Knowing the area, you can find the radius of the circle; from that you can find the circumference. Area = πr^2

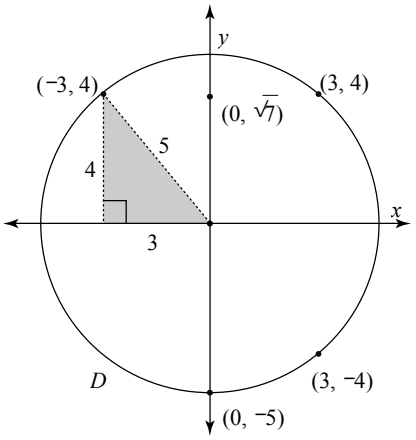
$\frac{9}{4}\pi = \pi r^2$ 4 π 1 c 4 m = π 1 _ πr^2 i Multiply both sides by π 1.

$\frac{9}{4} = r^2$

$\frac{3}{2} = r$ Find the square root of both sides.

The circumference = $2\pi r = 2\pi \# \frac{3}{2} = 3\pi$.

9. **D.**



In the figure above, the circle with center at the origin contains the point (–3, 4). Using your 3-4-5 right triangle pattern, you can see that the circle's radius is just 5. From the symmetry of the circle, you can tell that the points (3, –4) and (3, 4) are also on the same circle. Since the circle's radius is 5, point (0, –5) is on the circle also. But point (0, $\sqrt{7}$) is between 2 and 3 units from the circle's center, so this point is not on the circle.

10. **C.** Since $0 < x < 1$, select a convenient value of for x, say $x = \frac{1}{64}$, since you can easily find both its cube and square roots.

Then you have: $\sqrt[3]{x} = \sqrt[3]{\frac{1}{64}} = \frac{1}{4}$

$\sqrt{\quad} \sqrt{\frac{1}{64}}$

$x =$ $= \frac{1}{8}$, and then, $\frac{1}{x} = \frac{1}{} = 64$.

$$\frac{1}{64}$$

$$\frac{1}{\sqrt[3]{x}} \quad \frac{1}{\sqrt{x}} \quad \frac{1}{x}$$

Since $8 < 4 < 64$, the correct order is Choice **C:** $\frac{1}{\sqrt[3]{x}} < \frac{1}{\sqrt{x}} < \frac{1}{x}$

11. **B.** Since the point $(\sqrt{7}, 5)$ is on the graph of $y = x^2 + k$, you should get a true statement when substituting the point into the equation:

$y = x^2 + k$

$5 = (\sqrt{7})^2 + k$ Replace y with 5 and x with $\sqrt{7}$.

$5 = 7 + k$

$-2 = k$

Therefore, $y = x^2 - 2$

$7 = x^2 - 2$ Replace y with 7.

$9 = x^2$ Add 2 to both sides of the equation.

$3 = x$ Take the square root of both sides.

12. **B.** To solve the equation for x, you have:

$x^{3/4} = y^{3/8}$

$(x^{3/4})^{4/3} = (y^{3/8})^{4/3}$ Take the $\frac{4}{3}$ power of both sides to get x to just the first power.

$x = y^{1/2} \sqrt{y}$ Multiply the powers on each side, and then simplify.

13. **C.** If $\sqrt{xy} = 6$, then by squaring each side, you get $xy = 36$.

So you are looking for factors of 36 (their product is 36) whose sum CANNOT be one of the numbers in choices **A** through **E.**

The factor pairs of 36 and their respective sums are as follows:

1, 36: $1 + 36 = 37$

2, 18: $2 + 18 = 20$

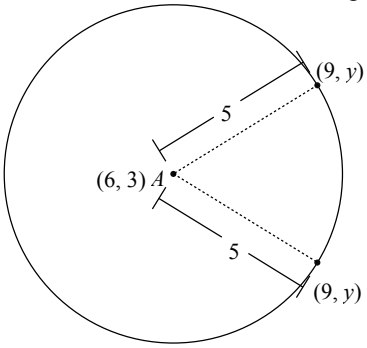
3, 12: $3 + 12 = 15$

4, 9: $4 + 9 = 13$

6, 6: $6 + 6 = 12$

So the sum you CANNOT have is 18, Choice **C.**

14. **B.** In the xy-plane, there are two points that could be 5 units from the point A (6, 3) and have x-coordinate 9.



If you let your desired point be *P,* it would then have coordinates (9, *y*). Using the distance formula, you have:

$AP = \sqrt{(9-6)^2 + (y-3)^2}$ Find the distance between (9, *y*) and (6, 3).

$5 = \sqrt{(9-6)^2 + (y-3)^2}$

$25 = 9 + (y-3)^2$ Square both sides of the previous equation.

$25 = 9 + y^2 - 6y + 9$ Expand $(y-3)^2 = (y-3)(y-3)$, and then use FOIL.

$25 = y^2 - 6y + 18$ Add the 9 + 9 on the right.

$25 - 25 = y^2 - 6y + 18 - 25$ Subtract 25 from both sides to set the equation equal to 0.

$0 = y^2 - 6y - 7$

$0 = (y-7)(y+1)$ Factor the right-hand side.

$y - 7 = 0, y + 1 = 0$ Set each factor equal to 0.

$y = 7, y = -1$

Therefore, the points are (9, 7) and (9, –1).

15. **C.** Using the given equation, substitute values of *t* until you arrive at the desired amount of money.

$A(t) = 1{,}000(1.06)^t$

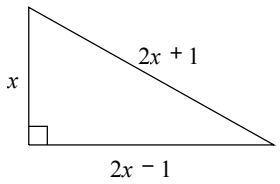
A. $t = 1$: $A(1) = 1{,}000(1.06) = 1{,}060$

B. $t = 2$: $A(1) = 1{,}000(1.06)^2 = 1{,}123.60$

C. $t = 3$: $A(1) = 1{,}000(1.06)^3 = 1{,}191.02$, so Choice **C** is correct.

NOTE: This is one of the few problems where you really need to have a calculator to do the problem quickly.

16. **D.** With *x* = length of short leg of right triangle, then $2x - 1$ = length of longer leg and $2x + 1$ = length of hypotenuse.



Referring to the figure above, you can then use the Pythagorean theorem to create the equation:

(short leg)^2 + (long leg)^2 = (hypotenuse)^2

Substituting the appropriate pieces in terms of the variable *x*, you have:

$x^2 + (2x-1)^2 = (2x+1)^2$, which is Choice **D.**

SAT I Score Range Approximator

The following charts are designed to give you only a very approximate score range, not an exact score. When you take the actual new SAT I, you will see questions similar to those in this book; however, some questions may be slightly easier or more difficult. Needless to say, this may affect your scoring range.

How to Approximate Your Score in Mathematics

1. Add the total number of correct responses for the three Mathematics sections.
2. Add the total number of incorrect responses for the multiple-choice questions only.
3. The total number of incorrect responses for the multiple-choice questions should be divided by 4, giving you an adjustment factor (round off to the nearest whole number).
4. Subtract this adjustment factor from the total number of correct responses to obtain a raw score.
5. This raw score is then scaled to a range from 200 to 800.

   Example:

   If the total number of correct answers is 30 out of a possible 45
   and 16 multiple-choice problems were attempted but missed,
   dividing 16 by 4 gives an adjustment factor of 4.
   Subtracting this adjustment factor of 4 from the original 30 correct gives a raw score of 24.
   This raw score is then scaled to a range from 200 to 800.

   Note: No deduction is made for incorrect grid-in responses.
6. Using your scores:

   _____ – _____ = _____
   total correct answers wrong answers on multiple choice ÷ 4 raw score
7. Use the following table to match your raw score for Mathematics and the corresponding approximate score range:

Raw Score	*Approximate Score Range*
49–55	710–800
41–49	640–700
26–40	500–630
11–25	380–490
5–10	310–370
1–4	240–300

4–0	200–230

Keep in mind that this is only an *approximate* score range.