Practice Test 1
Section 2 – 20 questions

1) If $x = 3$ and $5x = 3x + y$, then $y =$

A) 1.5

B) 2

C) 3

D) 4

E) 6

Difficulty Level 1

2) A store sells a package of 6 batteries for $4 and a package of 24 of the same batteries for $12. If you need to buy 48 of these batteries, how much money will you save by buying them in packages of 24 rather than packages of 6?

A) $4

B) $8

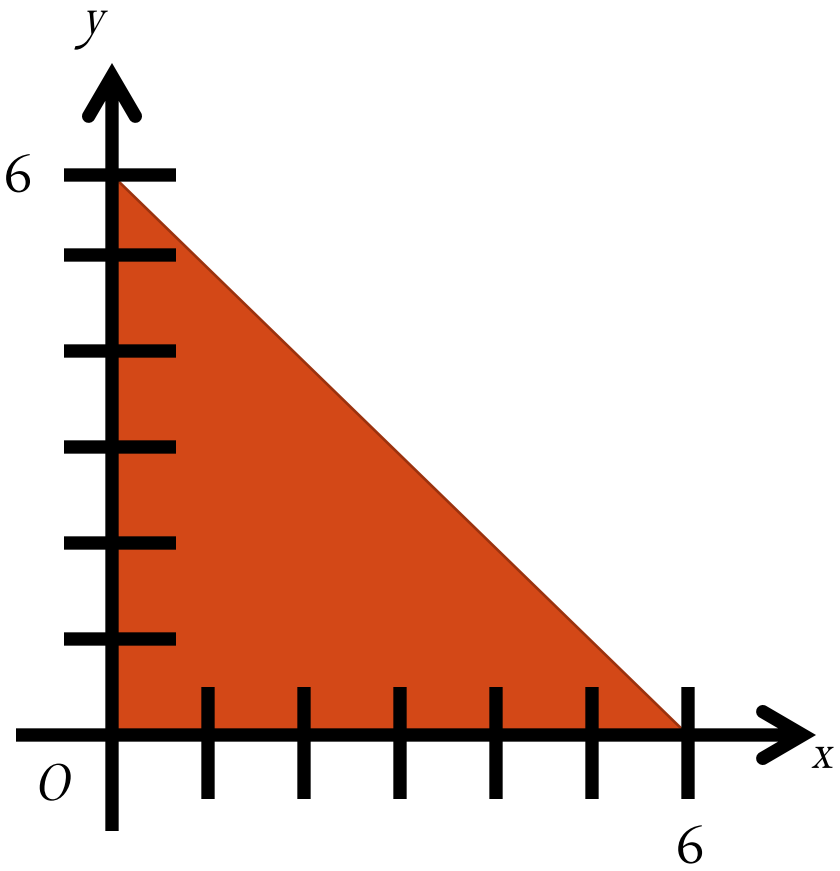
C) $12

D) $16

E) $20

Difficulty Level 2

3) Which of the following points does NOT lie in the shaded region?



A) (1, 1)

B) (1, 4)

C) (2, 3)

D) (4, 1)

E) (5, 5)

Difficulty Level 2

4) If $\frac{1}{3}$ of 2x is 5, what is $\frac{2}{3}$ of 4x?

A) 5

B) 10

C) 14

D) 20

E) 25

Difficulty Level 2

5) If n is a positive integer that is divisible by 12 and 16, then n must also be divisible by

A) 28

B) 32

C) 48

D) 96

E) 192

Difficulty Level 3

6) In the figure, if $a - b = 10$, then $a =$

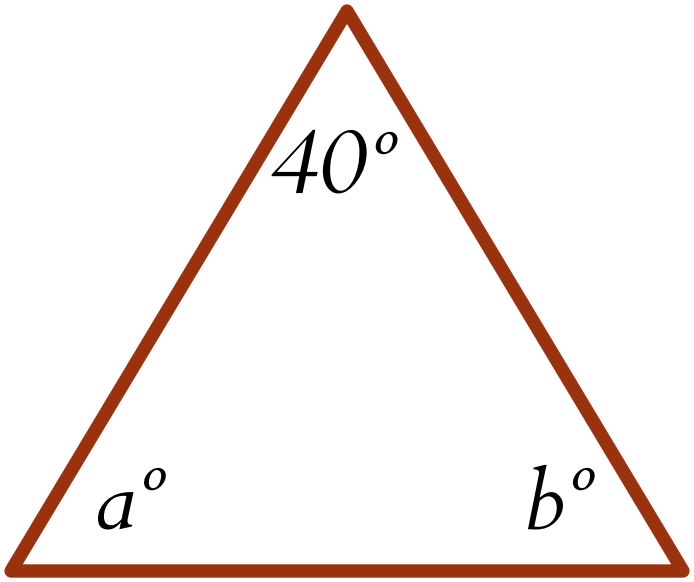
A) 60

B) 65

C) 70

D) 75

E) 80



Note: Figure not drawn to scale.

Difficulty Level 2

7) If n is an integer, which of the following must be an even integer?

A) $\frac{n}{2}$

B) $n + 2$

C) $2n + 1$

D) n^2

E) $n^2 + n$

Difficulty Level 3

8) Mike sold a total of 48 sodas at a snack stand. If he sold twice as many colas as root beers, how many root beers did he sell?

A) 32

B) 24

C) 18

D) 16

E) 8

Difficulty Level 3

9) If m and n are both squares of integers, which of the following is NOT necessarily the square of an integer?

A) $9m$

B) mn

C) m^2

D) $9mn$

E) $9m - 9n$

Difficulty Level 3

10) If $a + b = 9$, $a - c = 14$, and $a = 10$, then $c - b =$

A) -5

B) -3

C) 3

D) 5

E) 23

Difficulty Level 3

11) If the average (arithmetic mean) of a, b, 4, and 10 is 8, what is the value of $a + b$?

A) 4

B) 6

C) 9

D) 15

E) 18

Difficulty Level 3

12) With the exception of the shaded squares, every square in the figure contains the sum of the number in the square directly above it and the number in the square directly to its left. For example, the number 4 in the unshaded square above is the sum of the 2 in the square above it and the 2 in the square directly to its left. What is the value of x?

A) 6
B) 7
C) 8
D) 15
E) 30

0	1	2	3	4	5
1	2	4			
2					
3			x		
4					
5					

Difficulty Level 3

13) If a, b, and c are positive even integers such that $a < b < c$ and $a + b + c = 60$, then the greatest possible value of c is

A) 36

B) 40

C) 42

D) 54

E) 57

Difficulty Level 3

14) The population of Bumpton increased by 10% from 1980 to 1990 and decreased by 10% from 1990 to 2000. What is the net percent change in the population of Bumpton from 1980 to 2000?

A) -9%

B) -1%

C) +0%

D) +1%

E) +9%

Difficulty Level 3

15) Several values of the function f are shown below. The function g is defined by $g(x) = 2f(x) - 1$. What is the value of $g(3)$?

x	$f(x)$
-2	-29
-1	-21
0	-13
1	-5
2	3
3	11
4	

A) -21

B) -13

C) 3

D) 11

E) 21

Difficulty Level 4

16) If $x > 0$ and $x = 5y$, then

$$\sqrt{x^2 - 2xy + y^2} =$$

A) $2y$

B) $y\sqrt{6}$

C) $4y$

D) $16y$

E) $24y$

Difficulty Level 3

17) If $x > x^2$, which of the following must be true?

I. $x < 1$

II. $x > 0$

III. $x^2 > 1$

A) I only

B) II only

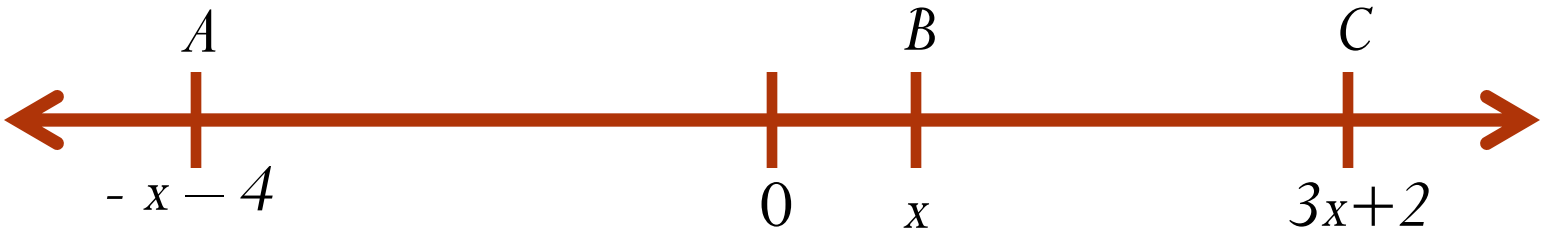
C) I and II only

D) I and III only

E) I, II, and III

Difficulty Level 4

18) Which of the following represents the distance from the midpoint of $\overline{AB}$ to the midpoint of $\overline{BC}$ on the number line below?



A) $\frac{3x+2}{2}$

B) $2x - 1$

C) $2x + 3$

D) $3x + 1$

E) $4x$

Difficulty Level 4

19) P is the center of the circle below and $PQ = QR$. If ΔPQR has an area of $9\sqrt{3}$, what is the area of the shaded region?

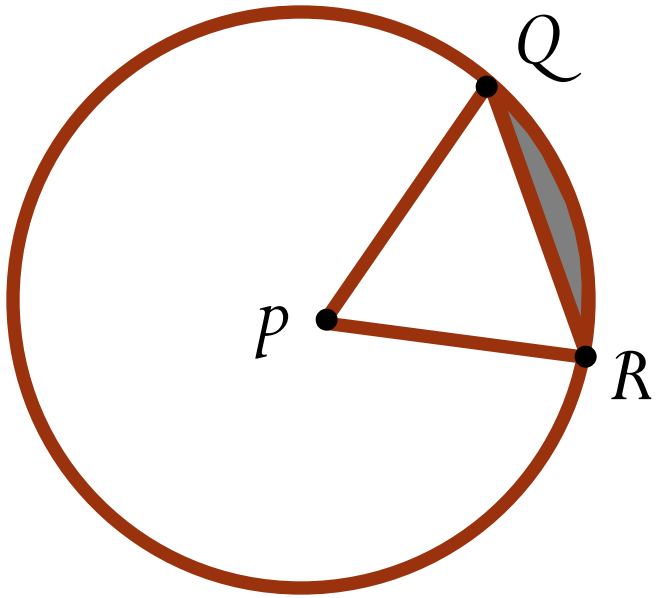
A) $36\pi - 9\sqrt{3}$

B) $24\pi - 9\sqrt{3}$

C) $18\pi - 9\sqrt{3}$

D) $9\pi - 9\sqrt{3}$

E) $6\pi - 9\sqrt{3}$



Difficulty Level 5

20) In a class of 160 seniors, the ratio of boys to girls is 3 to 5. In the junior class, the ratio of boys to girls is 3 to 2. When the two classes are combined, the ratio of boys to girls is 1 to 1. How many students are in the junior class?

A) 400

B) 360

C) 200

D) 180

E) 160

Difficulty Level 5

Practice Test 1
Section 5 – 18 questions

21) If $2x = 10$ and $3y = 12$, then $4x + 6y =$

A) 10

B) 12

C) 22

D) 32

E) 44

Difficulty Level 1

22) The average (arithmetic mean) of three numbers is 5. If one of the numbers is 4, what is the sum of the other two numbers?

A) 8

B) 9

C) 10

D) 11

E) 12

Difficulty Level 2

23) The figure below shows a rectangle intersected by a line. If $b = 2a$, then $d + e + g + h =$

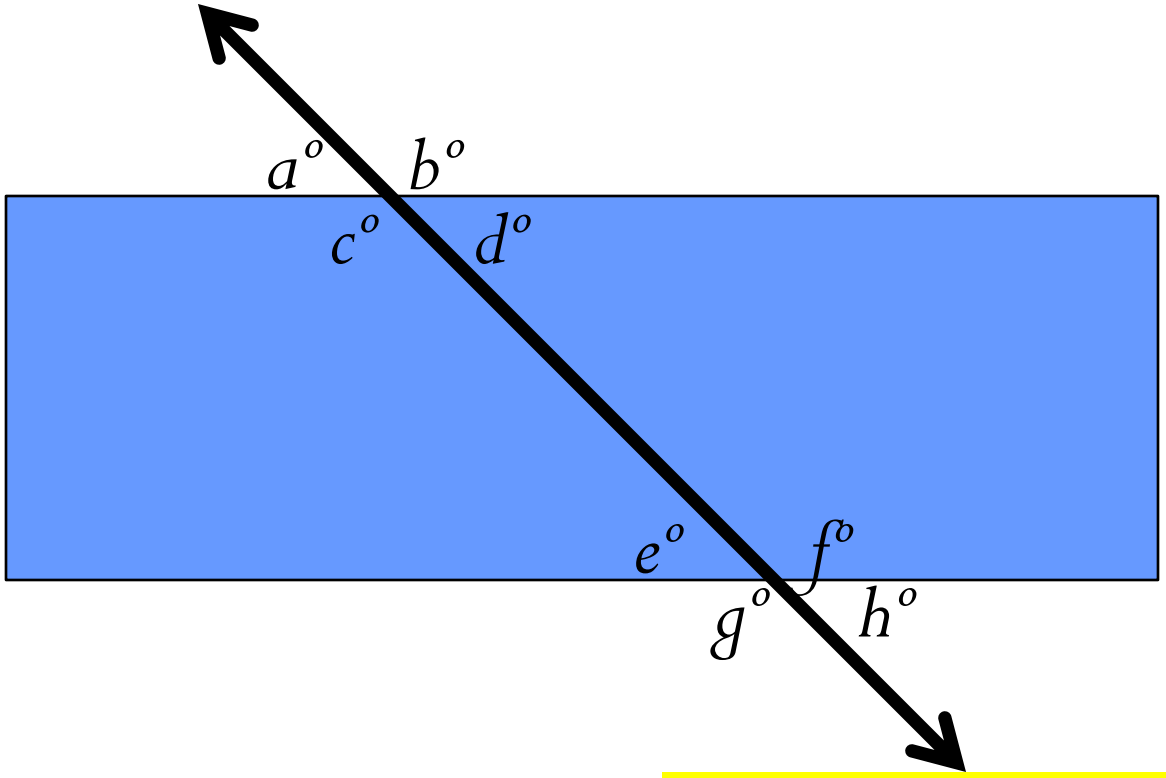
A) 120

B) 240

C) 300

D) 320

E) 360



Difficulty Level 3

24) For all real numbers x where $x \geq 1$, let $f(x) = \sqrt{\sqrt{x} - 1}$. What is the value of $f(100)$?

A) 3

B) 9

C) 10

D) 27

E) 100

Difficulty Level 4

25) If $3^{k+m} = 243$ and $2^m = 8$, then what is the value of 2^k?

A) 2

B) 4

C) 6

D) 8

E) 10

Difficulty Level 3

26) If b varies inversely as the square of c, and if $b = 8$ when $c = 3$, then what could be the value of c when $b = 2$?

A) 2

B) 5

C) 6

D) 25

E) 36

Difficulty Level 3

27) In a certain soccer league, each of the five teams plays every other team in the league exactly three times each season. How many games are played in total in one season?

A) 15

B) 24

C) 30

D) 60

E) 120

Difficulty Level 4

28) Pump A, working alone, can fill a tank in 3 hours, and pump B can fill the same tank in 2 hours. If the tank is empty to start and pump A is switched on for one hour, after which pump B is also switched on and the two work together, how many *minutes* will pump B have been working by the time the tank is filled?

A) 48

B) 50

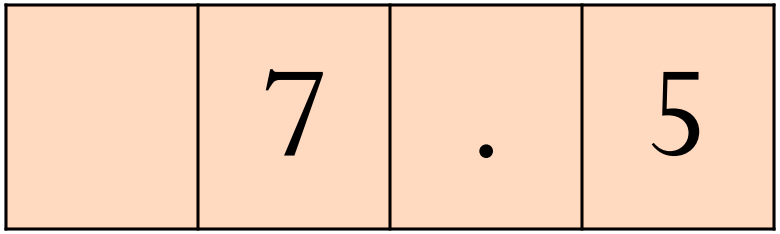
C) 54

D) 60

E) 64

Difficulty Level 5

29) If four times a certain number is decreased by 5, the result is 25. What is the number?



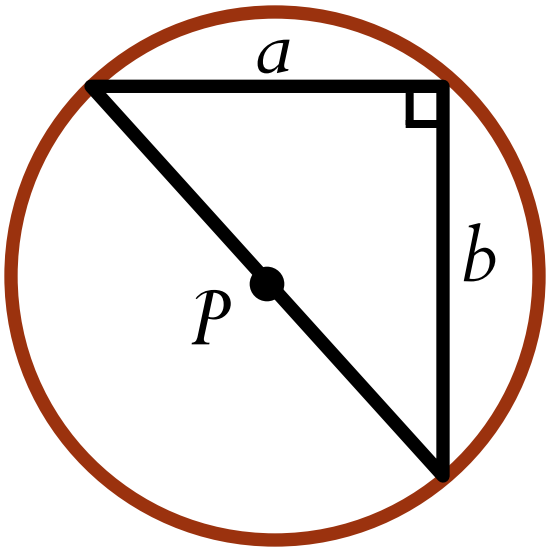
Difficulty Level 1

30) For every integer m greater than 1, let $<<m>>$ be defined as the sum of the integers from 1 to m, inclusive. For instance $<<4>> = 1 + 2 + 3 + 4 = 10$. What is the value of $<<7>> - <<5>>$?

		1	3

Difficulty Level 2

31) If the circumference of the circle below is 10π, what is the value of $a^2 + b^2$?

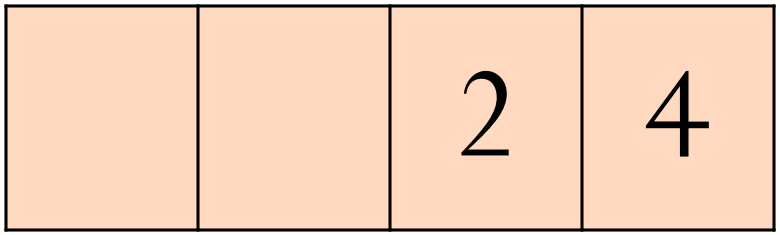


	1	0	0

Difficulty Level 3

A, B, C, D

32) How many different three-letter arrangements of the letters above are possible if no letter may be repeated? (An arrangement like *ABC* is distinct from an arrangement like *BCA*.)



Difficulty Level 3

33) If $96{,}878 \times x^2 = 10{,}200$, then $\dfrac{10{,}200}{5x^2 \times 96{,}878} =$

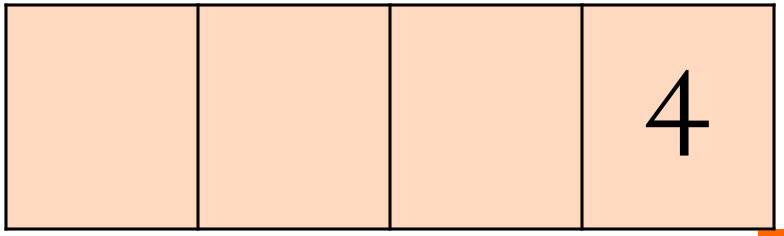
	1	/	5

or

	0	.	2

Difficulty Level 3

34) Every term in a certain sequence is one less than three times the previous term. If the fourth term of this sequence is 95, what is the first term of the sequence?



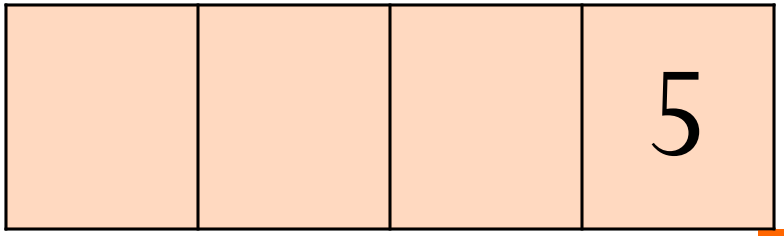
Difficulty Level 4

35) If $4+\sqrt{b}=7.2$, what is the value of $4-\sqrt{b}$?

	0	.	8

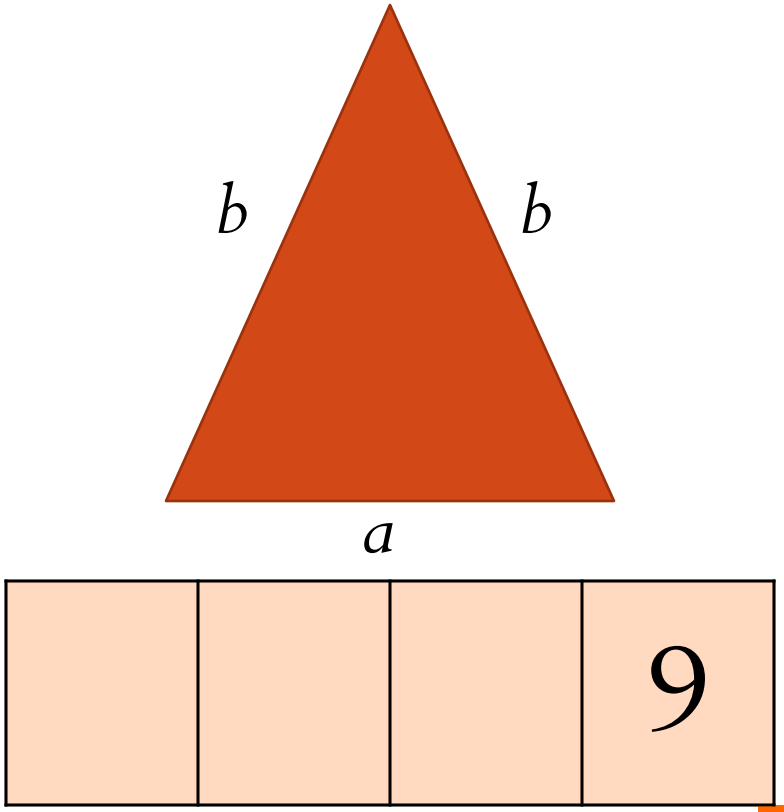
Difficulty Level 3

36) Admission to a museum is $10 for each adult and $5 for each child. If a group of 30 people pays a total of $175 in admission, how many adults are in the group?



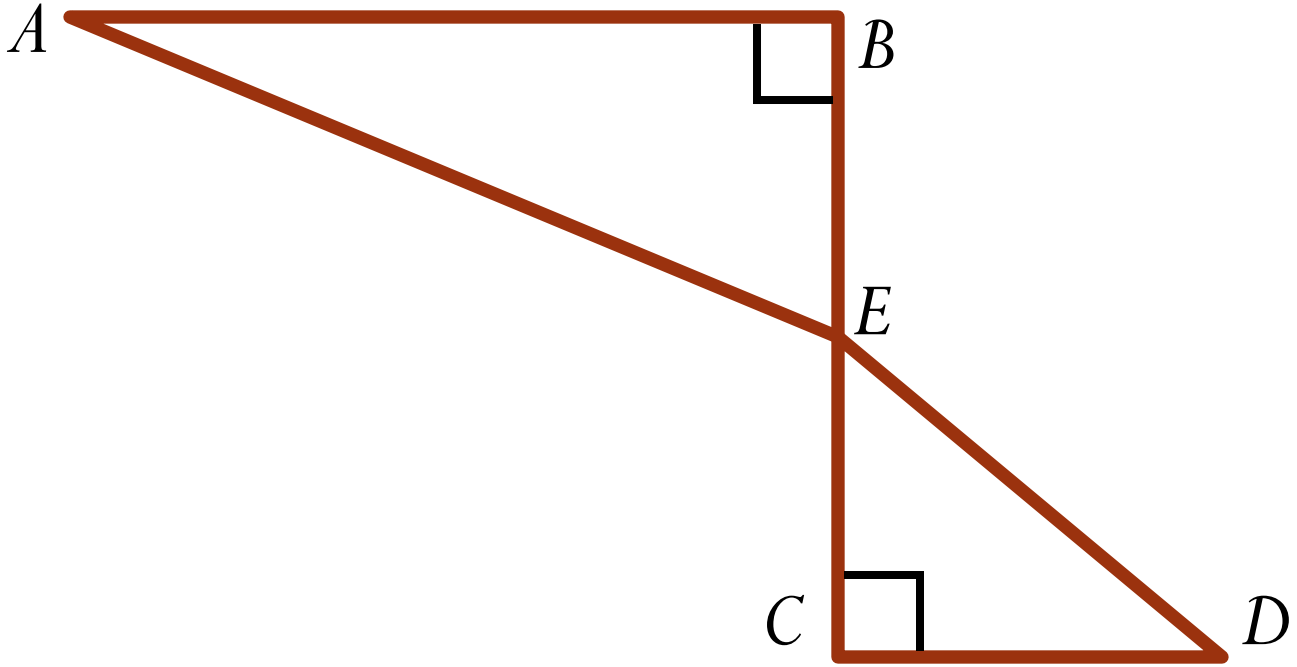
Difficulty Level 4

37) The perimeter of the isosceles triangle below is 24. If the ratio of *a* to *b* is 2 to 3, what is the value of *b*?



Difficulty Level 4

38) In the figure below, $AB = 6$, $BC = 6$, and $CD = 2$. What is AD?



		1	0

Difficulty Level 5

Practice Test 1
Section 7 – 16 questions

39) Which of the following integers is 2 greater than a multiple of 7?

A) 14

B) 15

C) 16

D) 17

E) 18

Difficulty Level 1

40) A store sells oranges for 20 cents each, but for every four oranges you buy, you may buy a fifth for only 5 cents. How many oranges can you buy from this store for $3.40?

A) 14

B) 17

C) 18

D) 19

E) 20

Difficulty Level 2

41) If r is a positive number and s is a negative number, all of the following must represent positive numbers EXCEPT

A) $-r + s$

B) $r - s$

C) $\frac{r}{s^2}$

D) rs^2

E) $(rs)^2$

Difficulty Level 2

42) Which of the following expresses the number that is 12 less than the product of 3 and $x + 1$?

A) $x - 8$

B) $x + 37$

C) $3x - 11$

D) $3x - 9$

E) $3x + 15$

Difficulty Level 2

43) One bag of grass seed covers 5,000 square feet. If each bag costs $25, how much will it cost to buy enough grass seed to cover a square area that is 200 feet by 200 feet?

A) $25

B) $100

C) $200

D) $1,000

E) $2,000

Difficulty Level 2

44) In the right triangle below, what is the value of *w*?

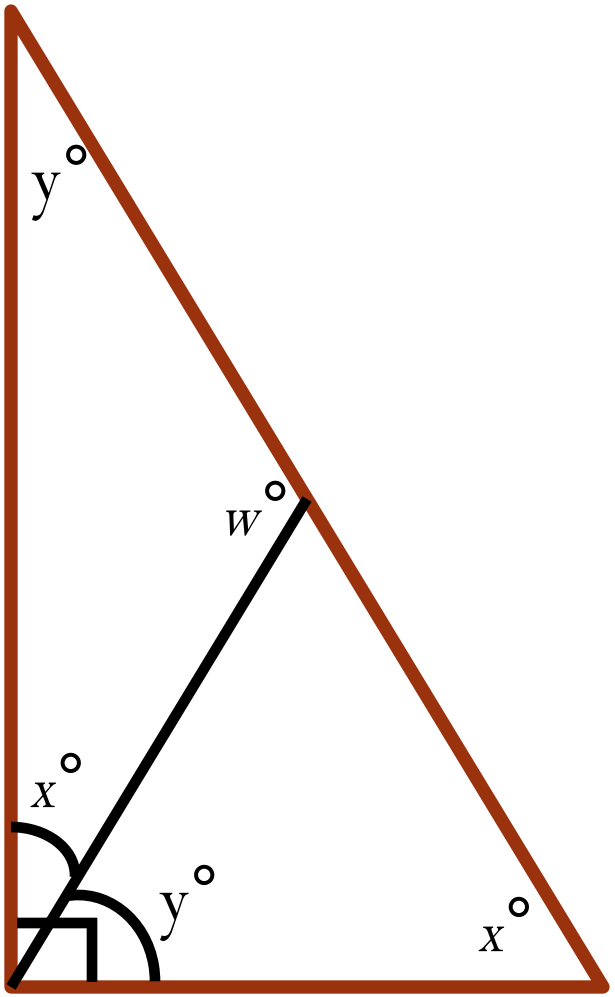
A) 30

B) 60

C) 90

D) 120

E) 150



Note: Figure not dra

Difficulty Level 3

45) Three integers have a sum of 7 and a product of 0. If the difference of the greatest number and the least number is 11, then the least of these numbers is

A) -18

B) -11

C) -9

D) -2

E) 0

Difficulty Level 4

46) Four points lie on a circle. How many different triangles can be drawn with three of these points as vertices?

A) 4

B) 5

C) 6

D) 7

E) 8

Difficulty Level 3

47) If a, b, and c are consecutive positive integers such that $a<b<c$ and abc is NOT a multiple of 4, then which of the following must be true?

A) a is even

B) b is even

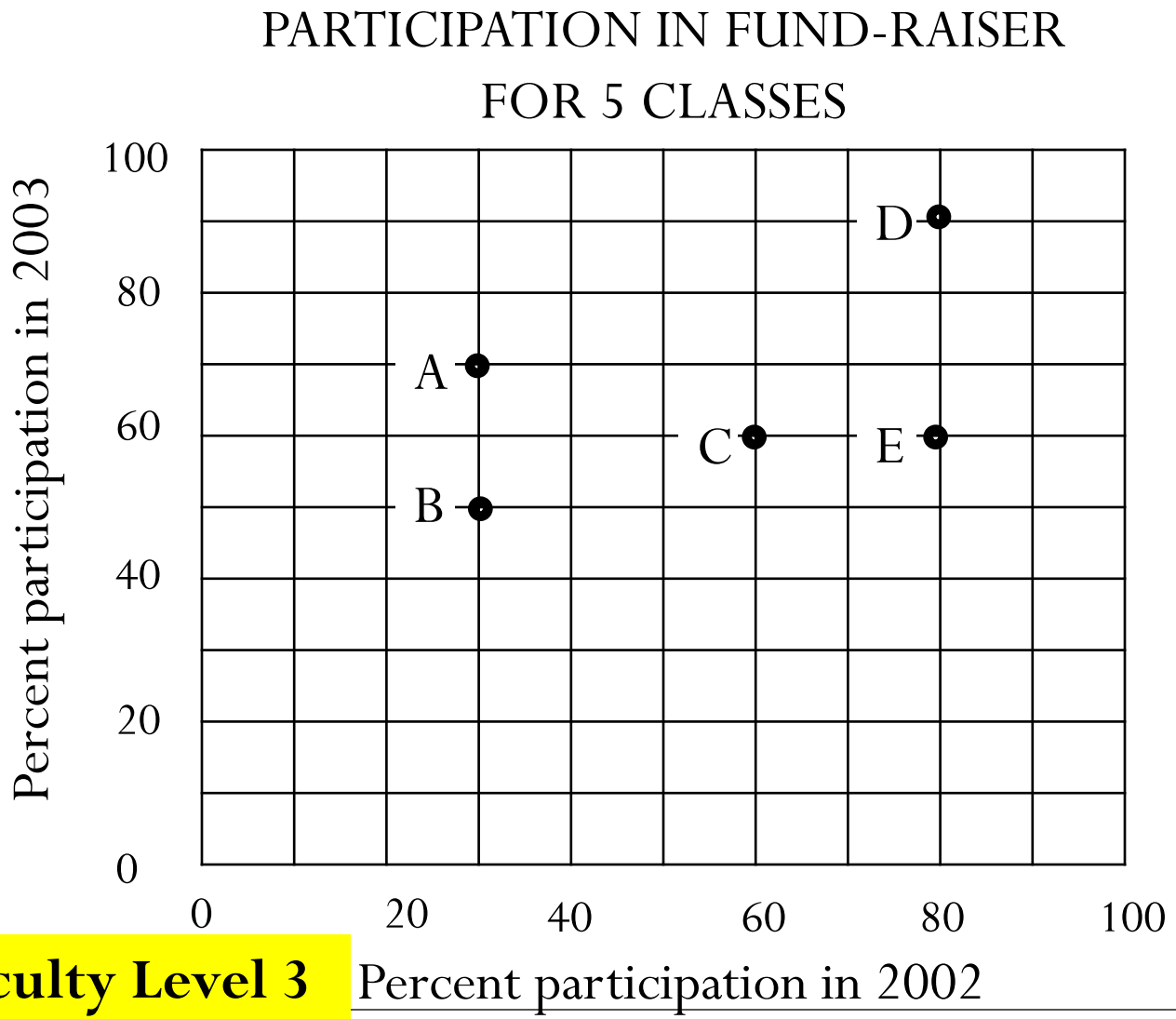
C) c is even

D) $a + b + c$ is odd

E) abc is odd

Difficulty Level 4

48) Use the graph. For which class was the change in percent participation the greatest from 2002 to 2003?



A) A

B) B

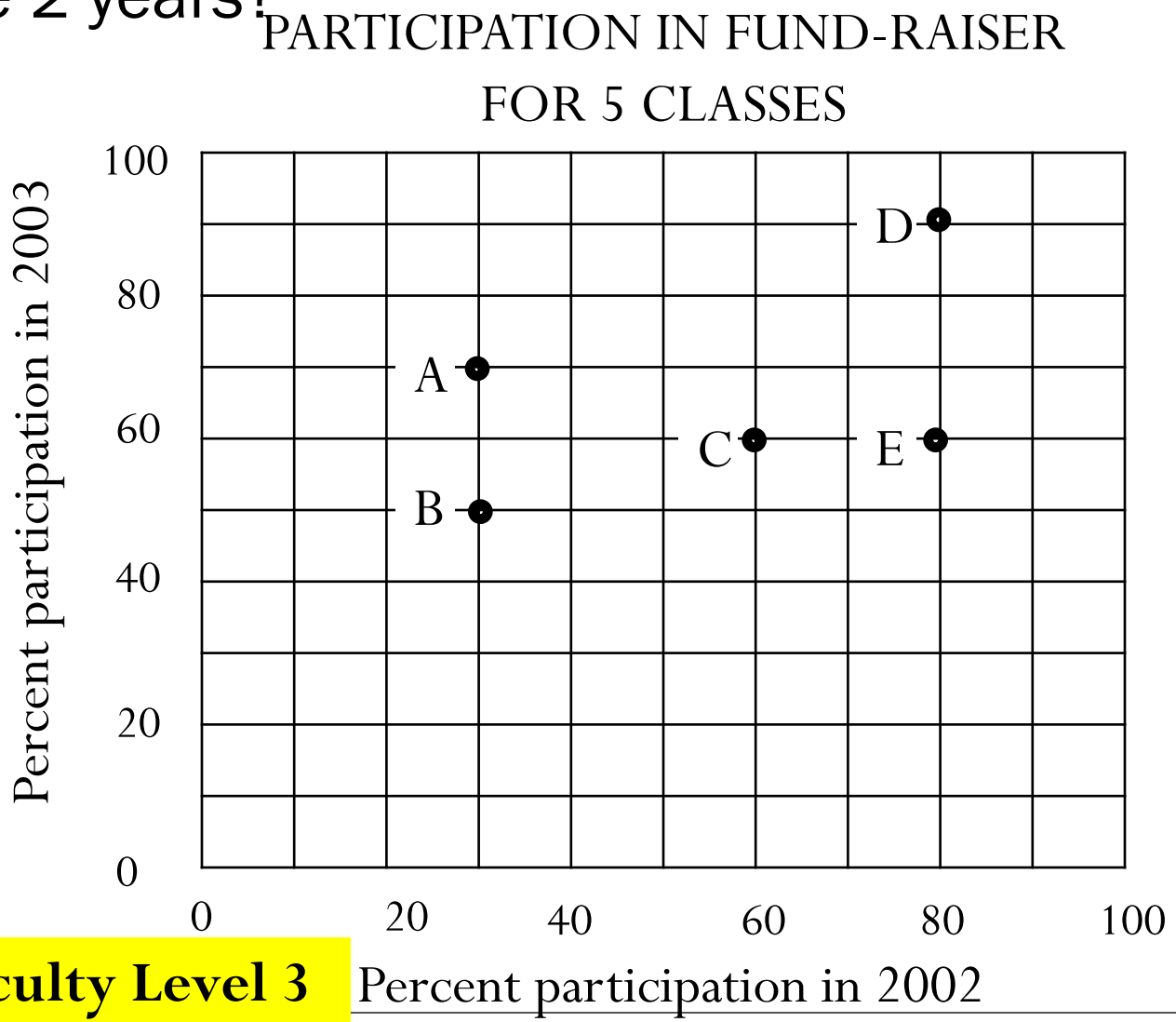
C) C

D) D

E) E

Difficulty Level 3

49) If class B and class E each had 100 students in 2002 and 2003, then, in total, how many more students participated in the fund-raiser from class E than from class B over the 2 years?



A) 10

B) 20

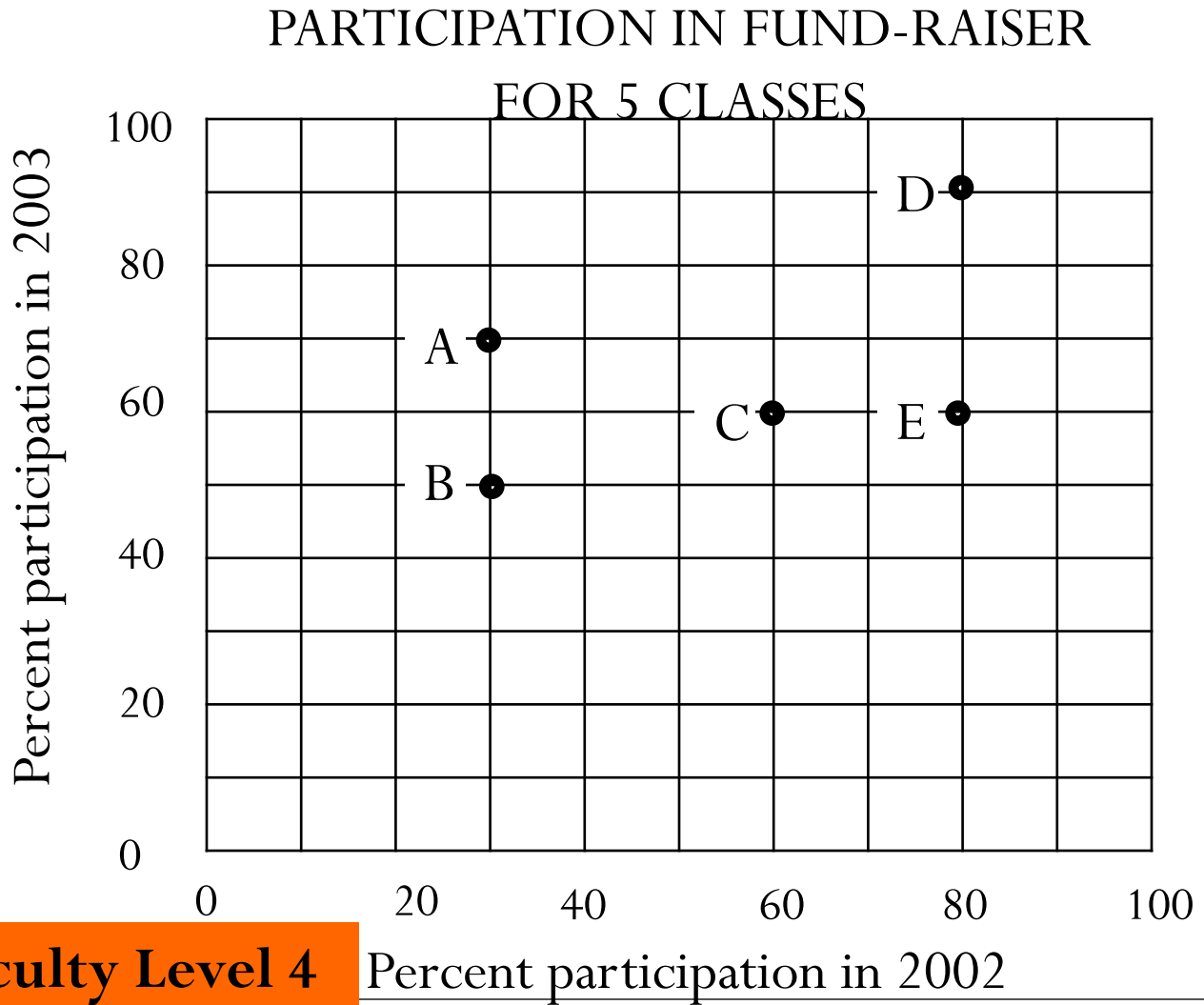
C) 30

D) 40

E) 60

Difficulty Level 3

50) In 2002, the same number of students participated in the fund-raiser from class C as from class D. If class D contained 120 students in 2002, how many students were there in class C in 2002?



A) 90

B) 100

C) 120

D) 140

E) 160

Difficulty Level 4

51) If $x = -1$ is a solution of the equation $x^2 = 4x + c$ where c is a constant, what is another value of x that satisfies the equation?

A) -5

B) -1

C) 1

D) 2

E) 5

Difficulty Level 4

1, 2, 6, 7, 9

52) A three-digit integer is to be formed from the digits listed above. If the first digit must be odd, either the second or the third digit must be 2, and no digit may be repeated, how many such integers are possible?

A) 6

B) 9

C) 18

D) 24

E) 30

Difficulty Level 4

53) If one pound of grain can feed five chickens or two pigs, then ten pounds of grain can feed 20 chickens and how many pigs?

A) 8

B) 10

C) 12

D) 24

E) 40

Difficulty Level 4

54) Point C is the center of the circle on the figure below. The shaded region has an area of 3π square centimeters. What is the perimeter of the shaded region in centimeters?

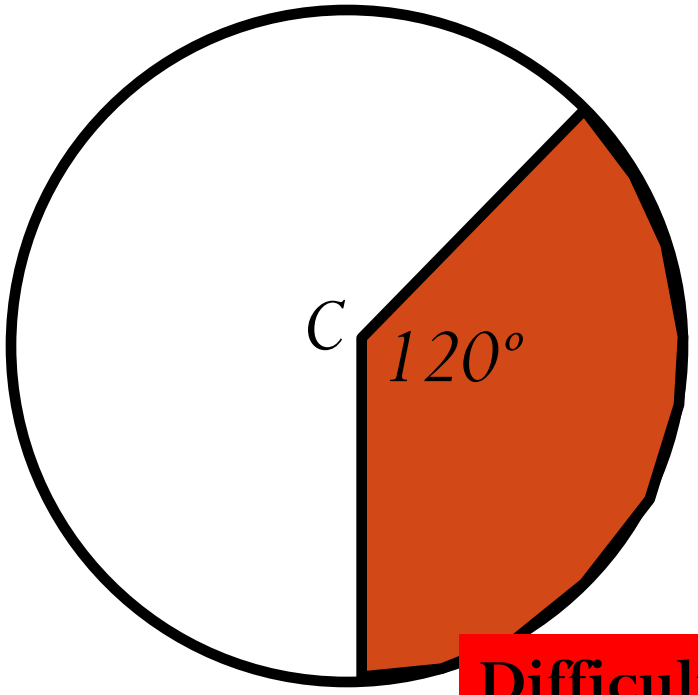
A) $2\pi + 6$

B) $2\pi + 9$

C) $2\pi + 12$

D) $3\pi + 6$

E) $3\pi + 12$



Difficulty Level 5

Practice Test 2
Section 3 – 20 questions

55) If n is 3 times an even number, then which of the following could be n?

A) 14

B) 15

C) 16

D) 17

E) 18

Difficulty Level 1

56) A machine can produce 50 computer chips in 2 hours. At this rate, how many computer chips can the machine produce in 7 hours?

A) 175

B) 200

C) 225

D) 250

E) 275

Difficulty Level 2

57) In the figure below, what is the value of x?

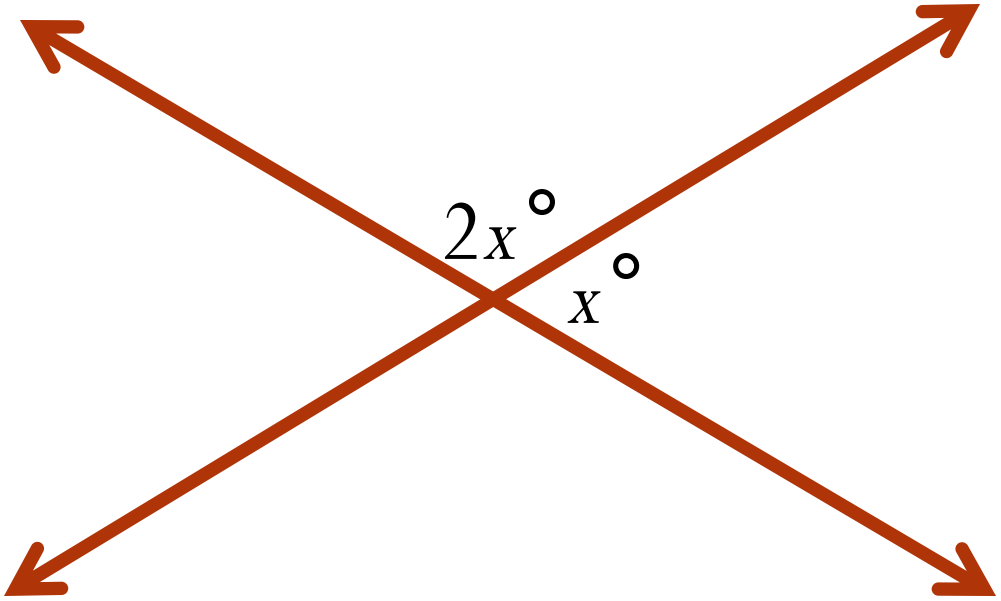
A) 40

B) 45

C) 60

D) 75

E) 90



Difficulty Level 2

58) Any positive integer that is divisible by 6 and 15 must also be divisible by

A) 12

B) 21

C) 30

D) 72

E) 90

Difficulty Level 2

59) If n percent of 20 is 4, what is n?

A) $\frac{1}{5}$

B) 2

C) 5

D) 20

E) 500

Difficulty Level 2

60) If $f(x) = 3x + n$, where n is a constant, and $f(2) = 0$, then $f(0) =$

A) -6

B) -2

C) 0

D) 2

E) 6

Difficulty Level 3

61) A square has the same area as a right triangle with sides of lengths 6, 8, and 10. What is the length of one side of the square?

A) 4

B) $2\sqrt{3}$

C) $\sqrt{15}$

D) $2\sqrt{6}$

E) 12

Difficulty Level 3

62) If $12v = 3w$ and $v \neq 0$, then which of the following is equivalent to $2w - 8v$?

A) 0

B) $4w$

C) $-6w$

D) $2v$

E) $-2v$

Difficulty Level 3

63) If x is a negative number and $2|x| + 1 > 5$, then which of the following must be true?

A) $x < -3$

B) $x < -2.5$

C) $x < -2$

D) $x > -2$

E) $x > -5$

Difficulty Level 3

64) If $x = -2$, then $-x^2 - 8x - 5 =$

A) 3

B) 7

C) 15

D) 23

E) 25

Difficulty Level 2

65) If $\frac{5}{m} \leq \frac{2}{3}$, then what is the smallest possible positive value of m?

A) 6

B) 6.5

C) 7

D) 7.5

E) 8

Difficulty Level 3

66) Theo wants to buy a sweater that is priced at $60.00 before tax. The store charges a 6% sales tax on all purchases. If he gives the cashier $70.00 for the sweater, how much should he receive in change?

A) $3.60

B) $6.40

C) $7.40

D) $9.40

E) $66.40

Difficulty Level 3

67) When m is subtracted from n, the result is r. Which of the following expresses the result when $2m$ is added to s?

A) $s + 2n - 2r$

B) $s + 2n + 2r$

C) $2s + 2n - 2r$

D) $2s + 2n + 2r$

E) $s - 2n + 2r$

Difficulty Level 3

68) In the figure below, the slope of line ℓ is $\frac{3}{5}$ and the area of the triangle is 48 square units. What is the value of $x + y$?

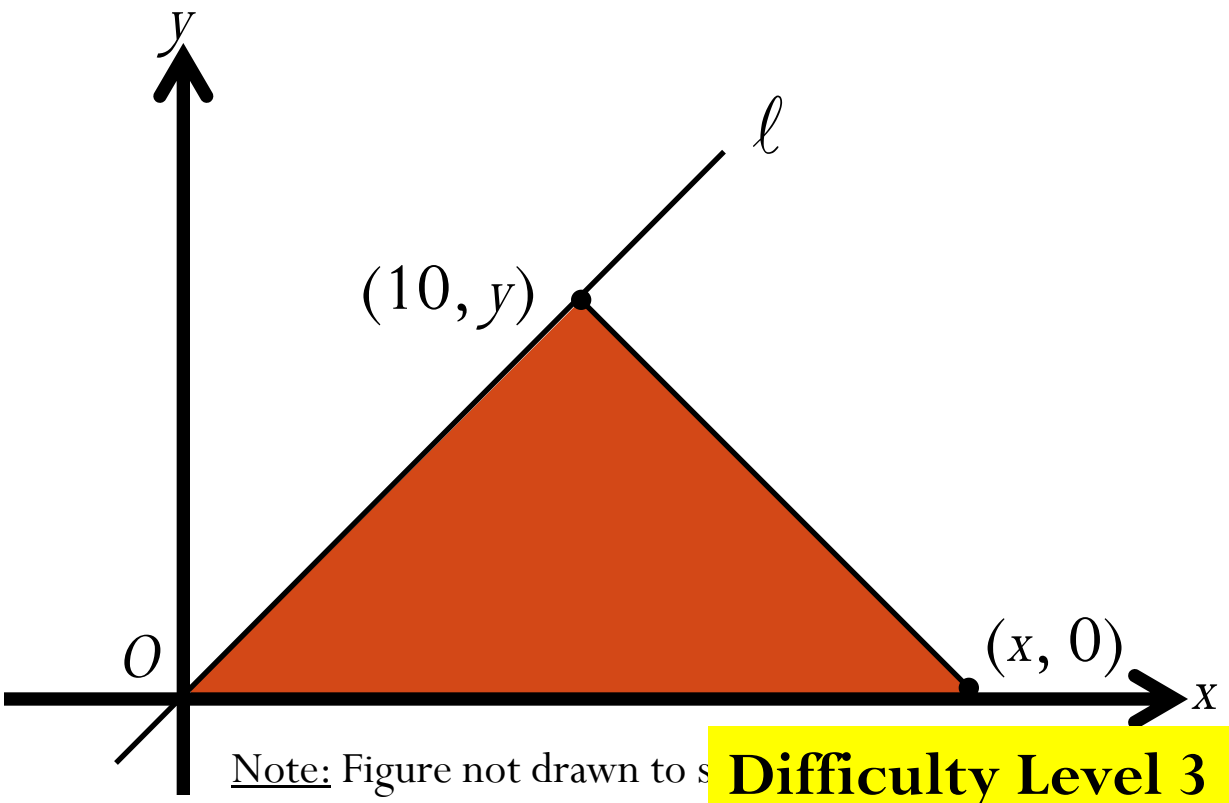
A) 13

B) 14

C) 19

D) 22

E) 96



Note: Figure not drawn to s

Difficulty Level 3

69) Ellen takes a trip that is y miles long in total, where $y > 20$. She travels the first 15 miles at an average speed of 30 miles per hour and the rest of the trip at an average speed of 40 miles per hour. Which of the following represents the total time of the trip, in hours?

A) $\frac{1}{2}+\frac{y-15}{40}$

B) $2+\frac{y-15}{40}$

C) $\frac{1}{2}+40y-15$

D) $2+40(y-15)$

E) $\frac{1}{2}+40(y-15)$

Difficulty Level 4

70) If y varies directly as m and inversely as the square of n, and if $y = 8$ when $m = 16$ and $n = 1$, then, what is the value of y when $m = 8$ and $n = 4$?

A) 0.125

B) 0.25

C) 0.5

D) 1

E) 2

Difficulty Level 3

71) If $a + b = s$ and $a - b = t$, then which of the following expresses the value of ab in terms of s and t?

A) st

B) $\frac{(s-t)}{2}$

C) $\frac{(s+t)}{2}$

D) $\frac{(s^2-t^2)}{4}$

E) $\frac{(s^2-t^2)}{2}$

Difficulty Level 4

72) If $y = m^4 = n^3$ and y is greater than 1, then mn=

A) $y^{1/12}$

B) $y^{1/7}$

C) $y^{7/12}$

D) y^{7}

E) y^{12}

Difficulty Level 4

73) In the figure below, if $AB = 6$ and $BC = 12$, what is the area of the shaded region?

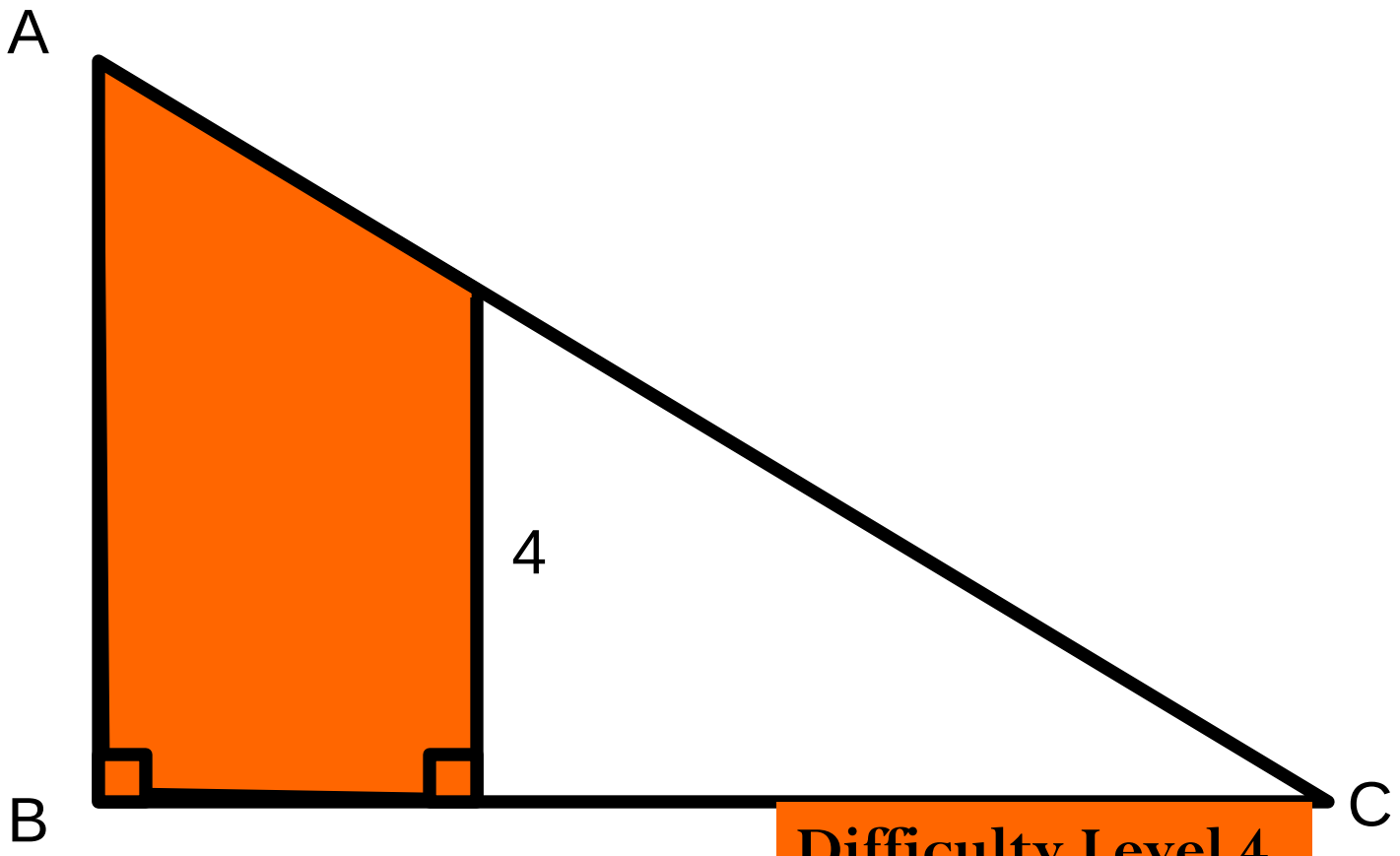
A) 20

B) 22

C) 24

D) 26

E) 28



Note: Figure not drawn to scale.

Difficulty Level 4

74) Every car at a certain dealership is either a convertible, a sedan, or both. If one-fifth of the convertibles are also sedans and one-third of the sedans are also convertibles, which of the following could be the total number of cars at the dealership?

A) 28

B) 29

C) 30

D) 31

E) 32

Difficulty Level 5

Practice Test 2
Section 4– 18 questions

75) A square has a perimeter of 36 centimeters. What is its area in square centimeters?

A) 24

B) 36

C) 49

D) 64

E) 81

Difficulty Level 1

76) If b is a positive integer less than 100, then how many integer pairs (a, b) satisfy the equation $\frac{a}{b} = \frac{1}{10}$?

A) 7

B) 8

C) 9

D) 10

E) 11

Difficulty Level 3

77) According to the table below, how much will it cost, in dollars, to clean each bathroom twice and each office once in the McKenzie Office Building?

A) 200

B) 400

C) 450

D) 600

E) 850

CLEANING COSTS IN THE McKENZIE OFFICE BUILDING

Room Type	Number of Rooms in the Building	Cost per Room to Clean
Bathrooms	10	$20
Offices	30	$15

Difficulty Level 2

78) If $a^2 - b^2 = 10$ and $a - b = 2$, what is the value of $a + b$?

A) 5

B) 6

C) 7

D) 8

E) 9

Difficulty Level 3

79) For all integers n greater than 1, let $f(n) = k$, where k is the sum of all the prime factors of n. What is the value of $f(14) - f(6)$?

A) 4

B) 5

C) 6

D) 9

E) 14

Difficulty Level 3

80) The average (arithmetic mean) of four different positive integers is 20. What is the greatest possible value of any of these integers?

A) 68

B) 70

C) 73

D) 74

E) 77

Difficulty Level 3

81) The radius of circle *A* is twice the radius of circle *B*. If the sum of their circumferences is 36π, then what is the radius of circle *A*?

A) 9

B) 12

C) 14

D) 16

E) 18

Difficulty Level 4

82) The figure below shows a cube. How many different planes can be drawn such that each contains *exactly* two edges of the cube?

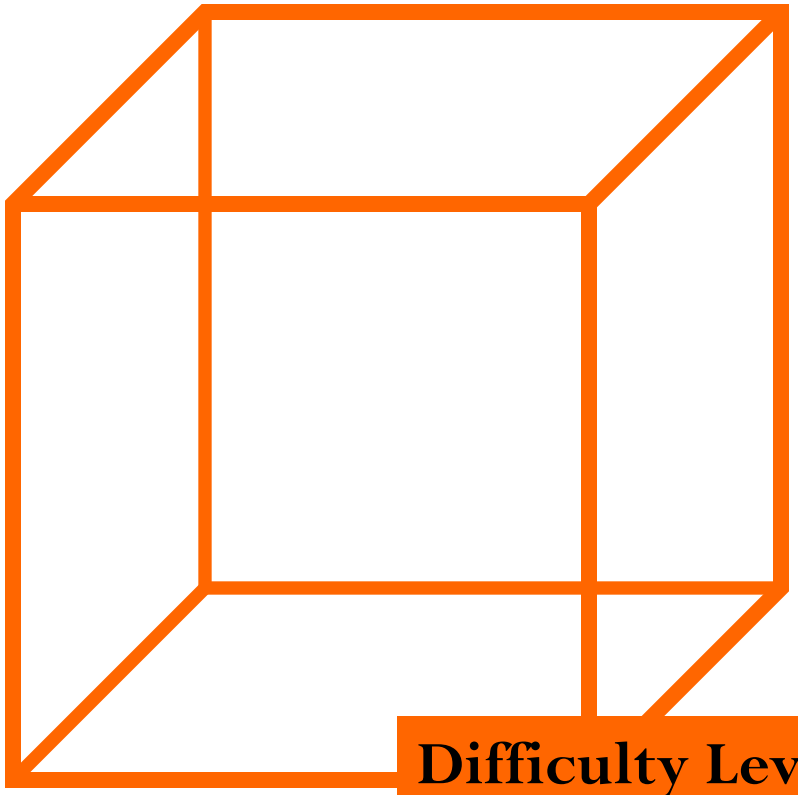
A) 4

B) 5

C) 6

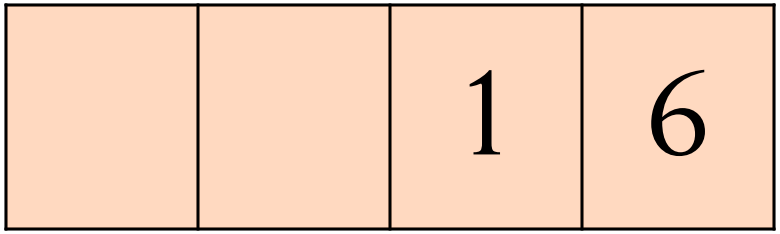
D) 7

E) 8



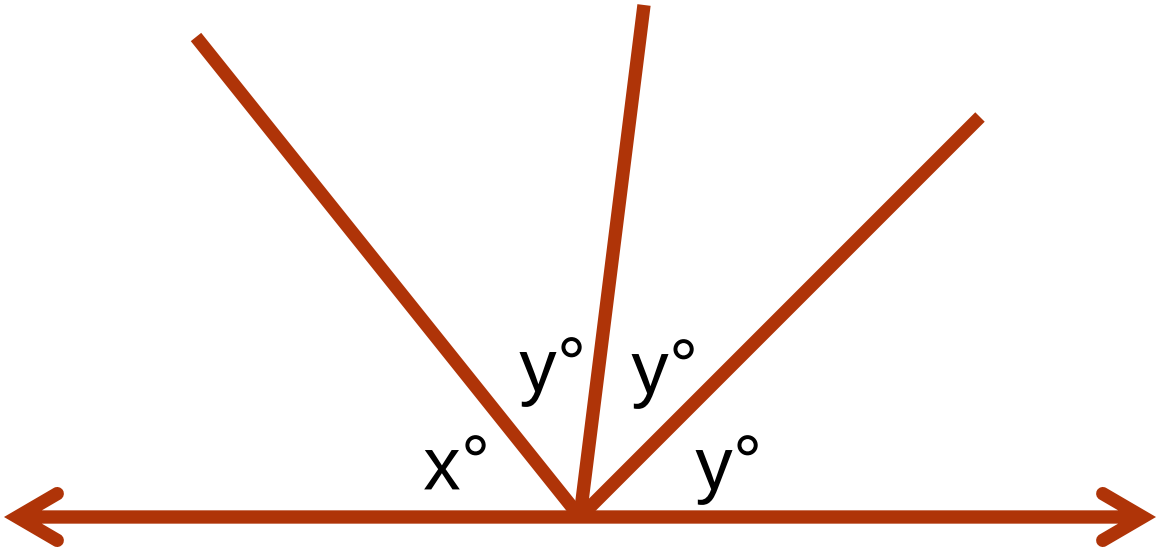
Difficulty Level 4

83) If 10 less than$2x$ is 22, then what is the value of x?



Difficulty Level 1

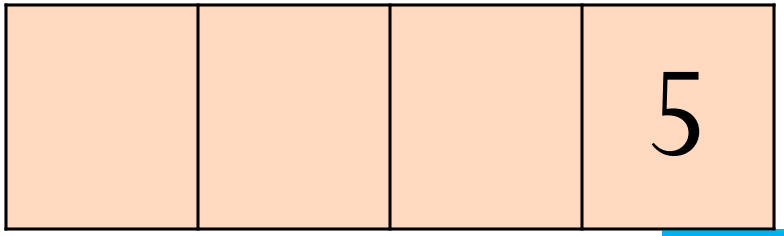
84) In the figure below, if $x = 2y$, then what is the value of y?



		3	6

Difficulty Level 2

85) If $8x + 4y = 20$, then what is the value of $2x + y =$



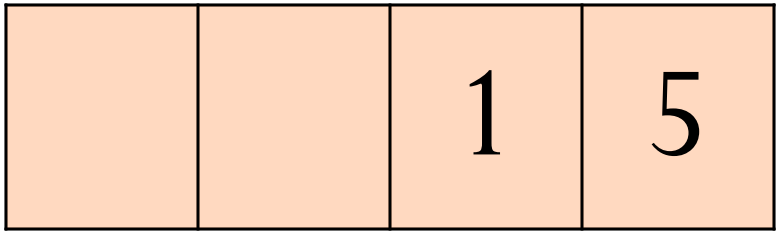
Difficulty Level 2

86) In the *xy*-plane, the line $mx - 3y = 21$ passes through the point (3, 5). What is the value of *m*?

		1	2

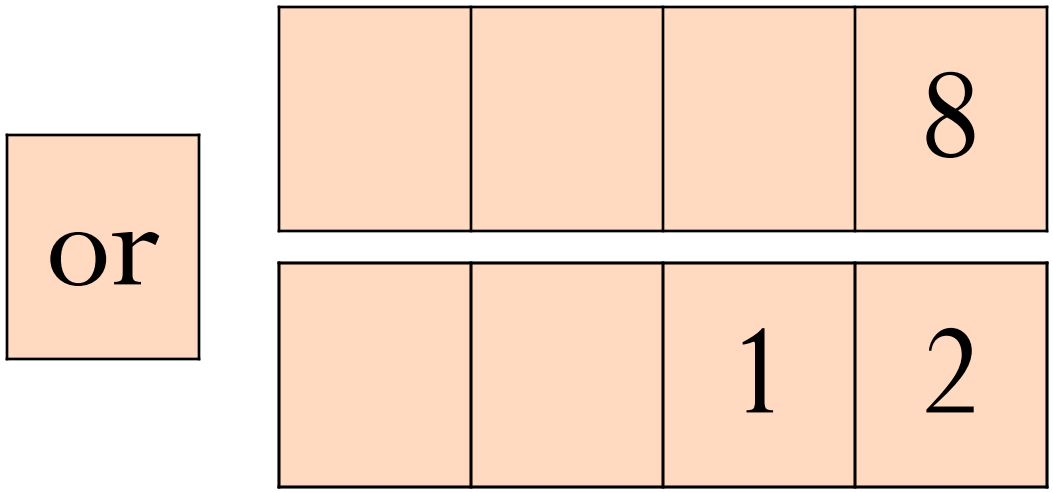
Difficulty Level 3

87) The ratio of men to women in a room is 4:5. If the room contains three more women than men, how many women are in the room?



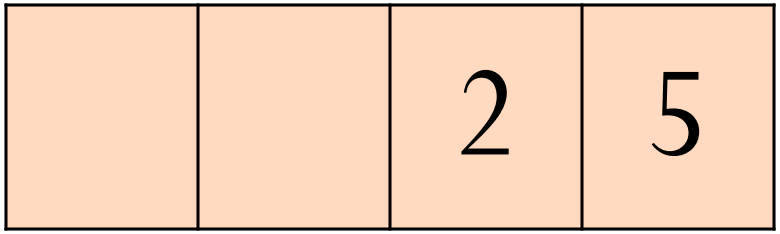
Difficulty Level 3

88) If, for some constant value b, the equation $y = |2x-b|$ is satisfied by the point (5, 2) then what is one possible value of b?



Difficulty Level 4

89) A mixture of water and sucrose is 10% sucrose by weight. How many grams of pure sucrose must be added to a 200-gram sample of this mixture to produce a mixture that is 20% sucrose?



Difficulty Level 4

90) A runner runs a 16-mile race at an average speed of 8 miles per hour. By how many minutes can she improve her time in this race if she trains and increases her average speed by 25%?

		2	4

Difficulty Level 3

End Of Part 1