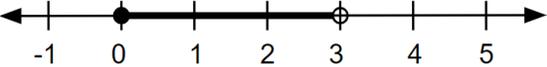


ACT Prep: Numbers I

- Which of the following numbers is an imaginary number?
  - $-3^2$
  - $(-5)^2$
  - $\sqrt{5}$
  - $\sqrt{-49}$
  - $-\sqrt{36}$
- If  $m^{-3} = 64$ , then  $8m =$ 
  - $-192$
  - $-24$
  - $\frac{1}{4}$
  - $2$
  - $32$
- There are 45 students signed up for the performance band, while 30 are signed up for the jazz band. If 19 students signed up for both bands, how many students are signed up for only one of the bands?
  - 11
  - 16
  - 37
  - 56
  - 75
- Which of the following inequalities represents the same set as the set graphed on the number line shown?
  - $0 < x < 3$
  - $0 \leq x \leq 3$
  - $-1 < x < 5$
  - $-1 \leq x < 3$
  - $0 \leq x < 3$
- For any real numbers  $a$  and  $b$ ,  $(10a^2)(5ab)(2ab^4)$  is equivalent to
  - $100a^4b^5$
  - $100a^2b^4$
  - $17a^4b^5$
  - $17a^2b^4$
  - $17a^9b^9$

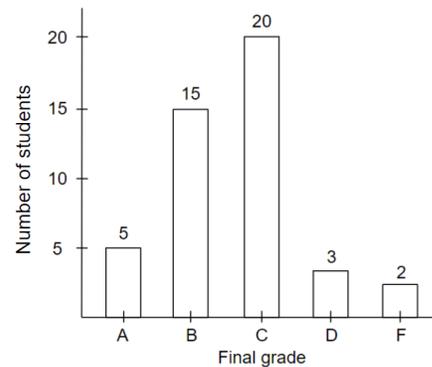
ACT Prep: Numbers II

6. Let  $x \Delta y = \frac{x+1}{y}$  for positive integers  $x$  and  $y$ . What is the value of  $7 \Delta (-2)$ ?

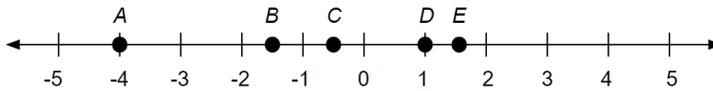
- (A) -4
- (B) -1
- (C) 3
- (D) 8
- (E) 14

7. The following chart represents the final course grades for students in two math classes. What fraction of students in the courses received a final course grade of A or B?

- (A)  $\frac{1}{9}$
- (B)  $\frac{2}{9}$
- (C)  $\frac{3}{9}$
- (D)  $\frac{4}{9}$
- (E)  $\frac{5}{9}$



8. Using the following number line, which point satisfies the inequality  $|-x + 1| > 4$ ?



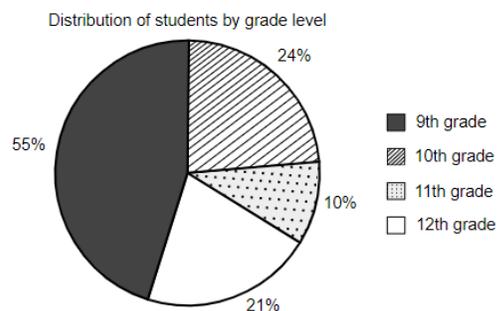
- (A) A
- (B) B
- (C) C
- (D) D
- (E) E

9. What is the least common multiple of 12, 20, and 40?

- (A) 60
- (B) 120
- (C) 480
- (D) 800
- (E) 9600

10. The following circle graph represents the distribution of students in a local high school. If there are 1000 total students in the high school, how many more are 9th graders than 11th graders?

- (A) 500
- (B) 450
- (C) 350
- (D) 120
- (E) 100



ACT Prep: Numbers III

11. The following table represents the number of town residents who live in each district. If the total number of residents in the town is 650, how many residents live in district 2?

- (A) 42  
 (B) 70  
 (C) 315  
 (D) 503  
 (E) 552

District	Number of Residents
1	147
2	?
3	335
4	98

12. If  $3^m = 1$ , which of the following is a possible value of  $m$ ?

- (A) -1  
 (B) 0  
 (C) 1  
 (D) 2  
 (E) 3

13. What is the value of  $(-x)^2 - (-x)$  when  $x = -2$ ?

- (A) -4  
 (B) -2  
 (C) 0  
 (D) 2  
 (E) 4

14. For any real number  $a$ ,  $(6a^5)^2 =$

- (A)  $12a^7$   
 (B)  $36a^7$   
 (C)  $12a^{10}$   
 (D)  $36a^{10}$   
 (E)  $8a^3$

15. A number has three prime factors: 2, 3, and 7. Which of the following is a possible value of the number?

- (A) 12  
 (B) 14  
 (C) 49  
 (D) 81  
 (E) 84

ACT Prep: Algebra I

16. What is the value of  $x$  when  $3x - 5 = 4x + 9$ ?

- (A) -14
- (B) -5
- (C) 0
- (D) 1
- (E) 2

17. For what values of  $x$  is  $x^2 - 3x - 10 = 0$ ?

- (A)  $x = 3$
- (B)  $x = 10$
- (C)  $x = 5$
- (D)  $x = 3$  and  $x = 10$
- (E)  $x = 5$  and  $x = -2$

18. Which of the following is a root of  $-5x + x^2$ ?

- (A) -5
- (B) -3
- (C) 1
- (D) 3
- (E) 5

19. When  $x \neq 0$ ,  $\frac{x^2 - 4x^2 + x^2}{x} =$

- (A)  $-2x^6$
- (B)  $-2x^5$
- (C)  $-2x^4$
- (D)  $-2x^2$
- (E)  $-2x$

20. If  $A = \begin{bmatrix} -1 & 2 \\ 4 & 9 \end{bmatrix}$  and  $B = \begin{bmatrix} 0 & -8 \\ 1 & 1 \end{bmatrix}$  such that  $A - B = \begin{bmatrix} x & y \\ z & w \end{bmatrix}$ , what is the value of  $z$ ?

- (A) -1
- (B) 0
- (C) 3
- (D) 4
- (E) 5

ACT Prep: Algebra II

21. Last week, a student began collecting rare coins. Since then, he has doubled his collection by obtaining 36 more coins than he started with. How many coins are currently in his collection?
- (A) 18  
(B) 36  
(C) 72  
(D) 84  
(E) 116
22. For what positive value of  $x$  is  $3x^2 - 19x = 14$ ?
- (A) 2  
(B) 3  
(C) 7  
(D) 14  
(E) 19
23. Which of the following is equivalent to the expression  $3a^2 - 2b^2 + b$ ?
- (A)  $2a^2b^2b$   
(B)  $a^2b^2 + b$   
(C)  $3a^2 - b(2b + 1)$   
(D)  $3a^2 - b(2b - 1)$   
(E)  $3a^2 - 2b(b + 1)$
24. The product of two numbers is 20, while their sum is 12. What is the difference between the two numbers?
- (A) 8  
(B) 17  
(C) 33  
(D) 188  
(E) 212
25. Which of the following represents the solution set to the inequality  $-\frac{1}{2}x + 5 \geq 9$ ?
- (A)  $x \leq -8$   
(B)  $x \leq -4$   
(C)  $x \leq 0$   
(D)  $x \leq 4$   
(E)  $x \leq 8$

ACT Prep: Algebra III

26. What is the value of  $x$  if the following equations are true?

$$2x - y = -8$$

$$3x + 2y = 2$$

- (A) -4
- (B) -2
- (C) 4
- (D) 10
- (E) 12

27.  $(3x^2 - 5x + 1) - (3x^2 - 2x + 6) =$

- (A)  $-3x - 5$
- (B)  $-3x + 7$
- (C)  $-7x - 7$
- (D)  $-7x - 5$
- (E)  $-7x + 7$

28. Which of the following values of  $x$  makes the equation  $x - 5 = 9 - x$  true?

- (A) 2
- (B) 4
- (C) 7
- (D) 14
- (E) The equation is not true for any value of  $x$ .

29. Given the equation  $2(x + 1) = -(y + 2)$ , when  $y = 0$ , which of the following is the value of  $x$ ?

- (A) -4
- (B) -2
- (C) 0
- (D) 3
- (E) 5

30. What is the least common denominator of  $\frac{3}{8a}$  and  $\frac{1}{6a}$  ?

- (A)  $6a$
- (B)  $8a$
- (C)  $14a$
- (D)  $24a$
- (E)  $48a$

ACT Prep: Probability, Statistics, and Sequences I

31. The average of 5 numbers is 20. What is the sum of these same numbers?
- (A) 4
  - (B) 5
  - (C) 15
  - (D) 25
  - (E) 100
32. The average of 5 numbers is 12.4. The average of four of these numbers is 11. What is the value of the fifth number?
- (A) 1.4
  - (B) 17.0
  - (C) 18.0
  - (D) 44.0
  - (E) 62.0

33. What is the average of the numbers 228, 219, 202, and 252?
- (A) 219.00
  - (B) 223.50
  - (C) 225.25
  - (D) 229.75
  - (E) 300.25

34. A professor kept track of the attendance at his Monday-Wednesday-Friday class for one week. The average daily attendance was 32. How many students attended his class on Friday?

Day	Attendance
Monday	32
Wednesday	34
Friday	?

- (A) 29
  - (B) 30
  - (C) 31
  - (D) 32
  - (E) 33
35. How many distinct arrangements of four letters (without repeats) from the set {A, B, C, D, E} are possible?
- (A) 15
  - (B) 20
  - (C) 25
  - (D) 120
  - (E) 625

ACT Prep: Probability, Statistics, and Sequences II

36. A coin is selected from a box containing two different types of coins. The probability of selecting the first type of coin is three times the probability of selecting the second type. If there are 240 coins of the first type, how many coins of the second type are in the box?
- (A) 80
  - (B) 110
  - (C) 243
  - (D) 720
  - (E) 832
37. Hanna and Jake are hoping to get selected as the host of this year's talent show. The committee chooses a host by random selection, and this year only 29 students entered their name into the drawing. What is the probability either Hanna or Jake is selected as the host this year?
- (A) 4
  - (B) 5
  - (C) 15
  - (D) 25
  - (E) 100
38. On an exam, students must select one short-answer question and one essay question to complete. If the exam has five short-answer and three essay questions, how many distinct combinations of questions can students select?
- (A) 2
  - (B) 7
  - (C) 8
  - (D) 15
  - (E) 45
39. The sum of the first five terms of an arithmetic sequence is 55. What is the value of the sixth term of the sequence if the first term is 3?
- (A) 3
  - (B) 7
  - (C) 15
  - (D) 19
  - (E) 23
40. What is the median of  $\sqrt{2}$ , 5,  $\sqrt{3}$ , 1, and  $\sqrt{5}$ ?
- (A)  $\sqrt{2}$
  - (B) 5
  - (C)  $\sqrt{3}$
  - (D) 1
  - (E)  $\sqrt{5}$

ACT Prep: Probability, Statistics, and Sequences III

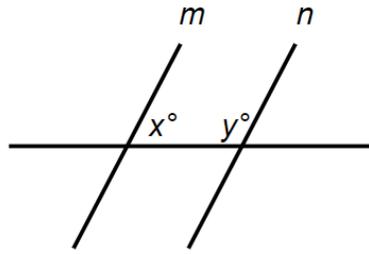
41. A box contains red and black cards. The probability of selecting a red card is half the probability of selecting a black card. What is the probability of selecting a black card?
- (A)  $\frac{1}{4}$                       (D)  $\frac{2}{3}$   
 (B)  $\frac{1}{3}$                       (E)  $\frac{3}{4}$   
 (C)  $\frac{1}{2}$
42. What is the 101st term of the sequence 5, 4, 3, 0, 8, 5, 4, 3, 0, 8, ...?
- (A) 0  
 (B) 3  
 (C) 4  
 (D) 5  
 (E) 8
43. The sum of ten numbers is 250. What is the average of the ten numbers?
- (A) 25  
 (B) 50  
 (C) 110  
 (D) 125  
 (E) 240
44. Hunter has collected 35 science books over the last two years, and 5 of these science books cover biology. What is the probability a randomly selected science book in his collection covers biology?
- (A)  $\frac{1}{35}$   
 (B)  $\frac{1}{30}$   
 (C)  $\frac{1}{7}$   
 (D)  $\frac{1}{6}$   
 (E)  $\frac{1}{5}$
45. The results of a career interest survey of students in a statewide mathematics club are provided in the following table. If a student is randomly selected from this group, what is the probability the student indicated interest in an aviation career?

Career	Number of Students
Medical (doctor, nurse, etc..)	82
Aviation	18
Engineering	22
Computer science and technology	48
Other	30

- (A)  $\frac{1}{200}$   
 (B)  $\frac{1}{182}$   
 (C)  $\frac{1}{18}$   
 (D)  $\frac{9}{100}$   
 (E)  $\frac{41}{100}$

46. In the following figure, lines  $m$  and  $n$  are parallel, and the value of  $x$  is 36. What is the value of  $y$ ?

- (A) 24
- (B) 36
- (C) 64
- (D) 72
- (E) 144



47. A line in the  $(x, y)$  coordinate plane has a slope of  $-\frac{5}{4}$  and passes through the point  $(-3, 5)$ . What is the  $y$ -intercept of this line?

- (A)  $-5$
- (B)  $-\frac{15}{4}$
- (C)  $\frac{5}{4}$
- (D) 14
- (E) 20

48. In the  $(x, y)$  coordinate plane, a circle with radius 6 is centered at point  $Q$  on the  $x$ -axis. If the point  $(-9, 0)$  is on the circumference of the circle, which of the following could be the  $x$ -coordinate of  $Q$ ?

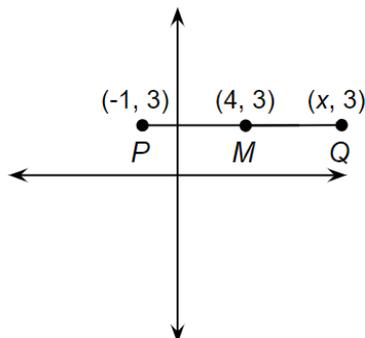
- (A)  $-12$
- (B)  $-3$
- (C) 3
- (D) 9
- (E) 21

49. In the  $(x, y)$  coordinate plane, what is the  $x$ -intercept of the line  $2x - 5y = 10$ ?

- (A)  $-5$
- (B)  $-2$
- (C) 2
- (D) 5
- (E) 10

50. In the following figure,  $M$  is the midpoint of the line segment  $PQ$ . What is the value of  $x$ ?

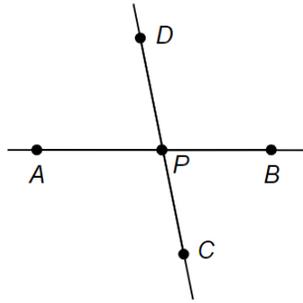
- (A) 3
- (B) 5
- (C) 6
- (D) 9
- (E) 10



ACT Prep: Coordinate Geometry II

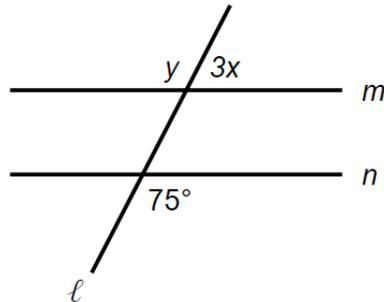
51. In the following figure, line  $AB$  and  $CD$  intersect at a point  $P$ . If  $\angle APD = 80^\circ$ , what is the measure of  $\angle APC$  in degrees?

- (A) 10
- (B) 100
- (C) 170
- (D) 200
- (E) 280



52. Line  $\ell$  is a transversal of the parallel lines  $m$  and  $n$ . The measures of two angles are given in terms of  $x$  and  $y$ . What is the value of  $x$ , in degrees?

- (A) 25
- (B) 30
- (C) 35
- (D) 50
- (E) 75



53. If lines  $AB$  and  $CD$  are perpendicular and intersect at point  $P$ , what is the measure of  $\angle APB$  in degrees?

- (A) 30
- (B) 45
- (C) 60
- (D) 90
- (E) 180

54. What is the slope intercept form of the line  $5x + 8y = 11$ ?

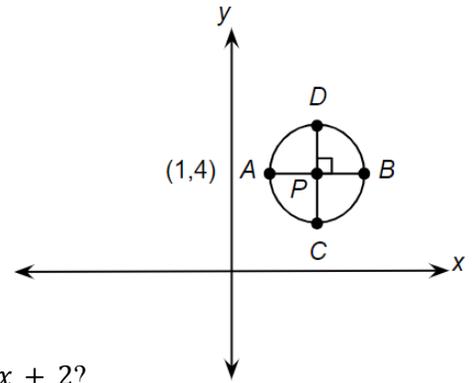
- (A)  $y = \frac{11}{8} - \frac{5}{8}x$
- (B)  $y = \frac{11}{8} - 5x$
- (C)  $y = 11 - \frac{5}{8}x$
- (D)  $y = 11 - 5x$
- (E)  $y = 19 - 40x$

55. Which of the following is the equation of a line parallel to the line passing through the points  $(-1, 4)$  and  $(3, 8)$ ?

- (A)  $y = x - 10$
- (B)  $y = 2x + 7$
- (C)  $y = -x + 4$
- (D)  $y = -\frac{1}{2}x - 6$
- (E)  $y = \frac{1}{3}x - 8$

56. In the following figure, the circle centered at point  $P$  has a radius of 2, and  $AB$  is parallel to the  $x$ -axis. If the line segments  $AB$  and  $DC$  are both diameters such that  $A$  has coordinates  $(1, 4)$ , what are the coordinates of point  $D$ ?

- (A)  $(-1, 4)$
- (B)  $(1, 2)$
- (C)  $(3, 4)$
- (D)  $(3, 6)$
- (E)  $(5, 4)$

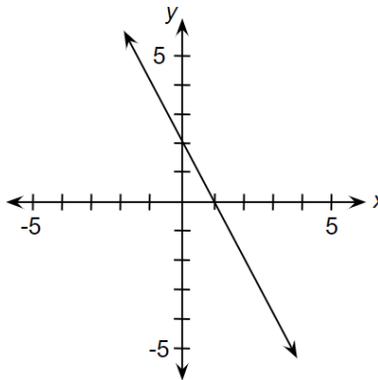


57. In the  $(x, y)$  coordinate plane, what is the  $x$ -intercept of the line  $y = -\frac{1}{4}x + 2$ ?

- (A)  $-8$
- (B)  $-2$
- (C)  $-\frac{1}{4}$
- (D)  $2$
- (E)  $8$

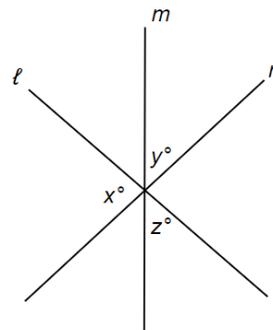
58. What is the slope of the line in the following figure?

- (A)  $-3$
- (B)  $-2$
- (C)  $-\frac{1}{2}$
- (D)  $\frac{1}{2}$
- (E)  $2$



59. In the following figure, lines  $m$ ,  $n$ , and  $\ell$  intersect to form angles with the indicated measures. What is the value of  $x + y + z$ ?

- (A)  $30$
- (B)  $60$
- (C)  $90$
- (D)  $120$
- (E)  $180$



60. In the  $(x, y)$  coordinate plane, which of the following points would lie on the graph of the line  $2y - x = 8$ ?

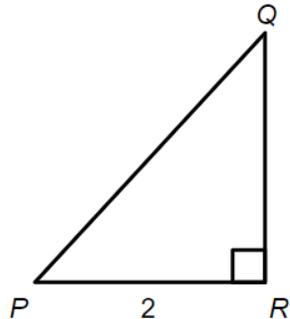
- (A)  $(-2, -3)$
- (B)  $(-1, 1)$
- (C)  $(0, 4)$
- (D)  $(2, 3)$
- (E)  $(4, 8)$

61. If  $0^\circ \leq \alpha \leq 90^\circ$  and  $\cos \alpha = \frac{9}{7}$ , then  $\sec \alpha =$

- (A)  $-\frac{9}{7}$                       (D)  $\frac{2}{7}$   
 (B)  $-\frac{7}{9}$                       (E)  $\frac{7}{9}$   
 (C)  $\frac{1}{8}$

62. In the following figure, the length of  $PR$  is half the length of  $QR$ . What is the length of line segment  $PQ$ ?

- (A)  $\sqrt{2}$   
 (B)  $\sqrt{5}$   
 (C)  $2\sqrt{2}$   
 (D)  $2\sqrt{5}$   
 (E)  $4\sqrt{5}$

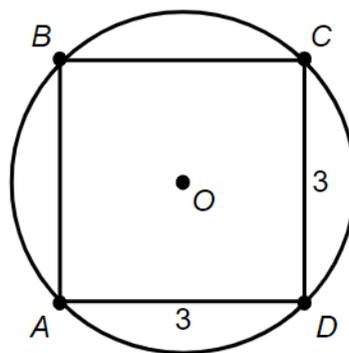


63. In square units, what is the area of a circle with a circumference of  $6\pi$ ?

- (A)  $3\pi$   
 (B)  $6\pi$   
 (C)  $9\pi$   
 (D)  $12\pi$   
 (E)  $36\pi$

64. In the following figure, the square  $ABCD$  is inscribed in the circle centered at point  $O$ . What is the area of the circle?

- (A)  $\frac{\pi}{4}$   
 (B)  $\frac{3\pi}{4}$   
 (C)  $\frac{3\pi}{2}$   
 (D)  $\frac{9\pi}{4}$   
 (E)  $\frac{9\pi}{2}$

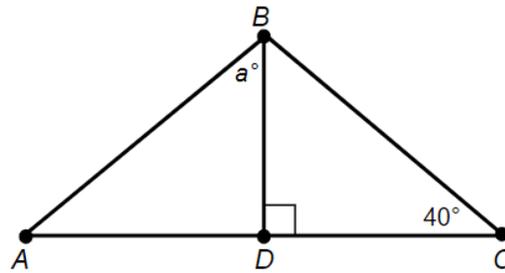


65. In square meters, what is the area of a rectangle with a diagonal of 25 meters and a width of 15 meters?

- (A) 200  
 (B) 250  
 (C) 275  
 (D) 300  
 (E) 375

66. Triangle  $ABC$  in the following figure is an isosceles triangle with height  $BD$ . What is the value of  $a$ ?

- (A) 45
- (B) 50
- (C) 60
- (D) 65
- (E) 90

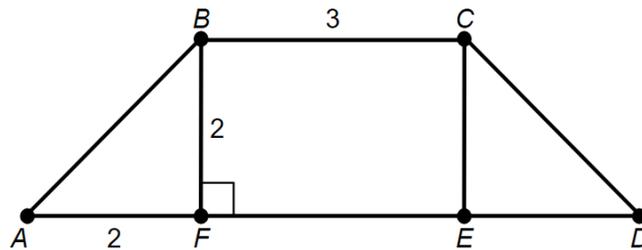


67. The length of a rectangle is 5 times its width. If the width is represented by  $w$ , which of the following expressions is the perimeter of the rectangle in terms of  $w$ ?

- (A)  $5w$
- (B)  $6w$
- (C)  $10w$
- (D)  $12w$
- (E)  $14w$

68. In the following figure,  $FBCE$  is a rectangle, while  $ABF$  and  $ECD$  are congruent right triangles. What is the area of the quadrilateral  $ABCD$ ?

- (A) 6
- (B) 8
- (C) 10
- (D) 12
- (E) 16

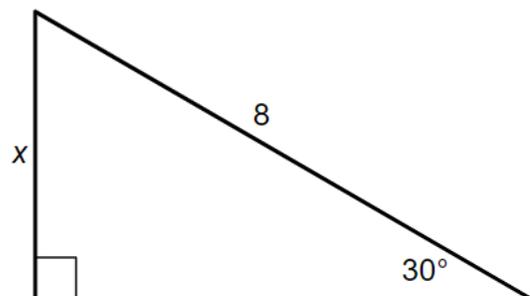


69. A rectangle has an area of 45 square meters and a width of 9 meters. In meters, what is the length of the rectangle?

- (A) 5
- (B) 7
- (C) 14
- (D) 27
- (E) 36

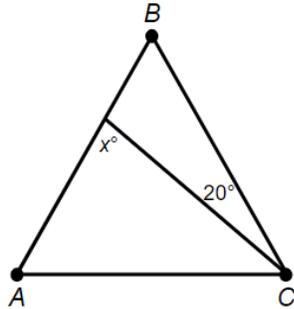
70. Given the right triangle in the following figure, what is the value of  $x$ ?

- (A) 4
- (B)  $2\sqrt{5}$
- (C) 8
- (D)  $4\sqrt{3}$
- (E)  $8\sqrt{3}$



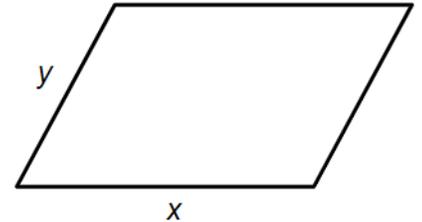
71. In the following figure,  $ABC$  is an equilateral triangle. What is the value of  $x$ ?

- (A) 40
- (B) 60
- (C) 80
- (D) 100
- (E) 120



74. The parallelogram in the following figure has a perimeter of 32 feet. If  $x$  is three times as large as  $y$ , what is the value of  $x$  in feet?

- (A) 2
- (B) 4
- (C) 8
- (D) 12
- (E) 24



72. In feet, what is the perimeter of a square that has an area of 49 feet?

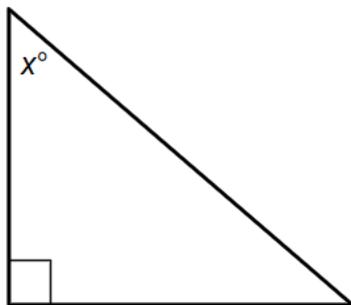
- (A) 14
- (B) 28
- (C) 56
- (D) 98
- (E) 196

75. If the interior angles of a quadrilateral have measures  $x^\circ$ ,  $(2x)^\circ$ ,  $(x + 45)^\circ$ , and  $(x + 55)^\circ$ , then  $x =$

- (A) 16
- (B) 23
- (C) 52
- (D) 65
- (E) 78

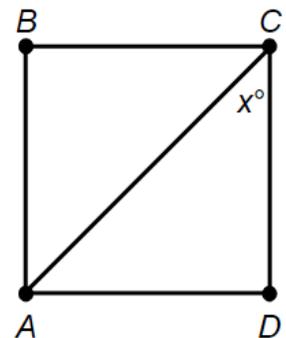
73. Given the triangle in the following figure, if  $\tan x = \frac{1}{2}$ , then  $\sin x =$

- (A)  $\sqrt{2}$
- (B)  $\sqrt{3}$
- (C)  $\sqrt{5}$
- (D)  $\frac{\sqrt{5}}{5}$
- (E)  $\frac{\sqrt{3}}{2}$



76. If the area of the square  $ABCD$  in the following figure is 16, what is the value of  $\tan x$ ?

- (A)  $\frac{\sqrt{2}}{8}$
- (B)  $\frac{1}{4}$
- (C) 1
- (D)  $\sqrt{2}$
- (E)  $4\sqrt{2}$



ACT Prep: Proportions I

77. If  $M\%$  of 135 is 54, then  $M =$

- (A) 2.5
- (B) 4
- (C) 25
- (D) 40
- (E) 81

78. In a large company, the ratio of full-time to part-time employees is 3:2. If there are 800 total employees, how many are part-time?

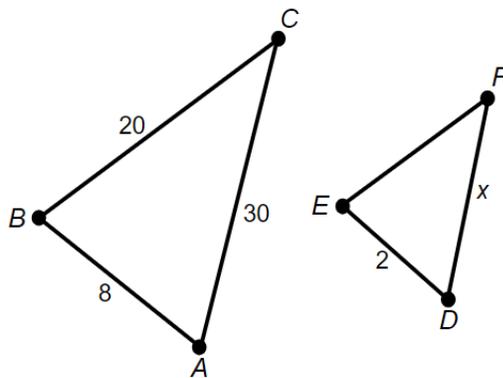
- (A) 260
- (B) 320
- (C) 400
- (D) 480
- (E) 530

79. A rectangle has a width of 5 meters and a length of 14 meters. If a similar rectangle has a width of 15 meters, what is its perimeter, in meters?

- (A) 42
- (B) 58
- (C) 60
- (D) 78
- (E) 114

80. In the following figure, triangles  $ABC$  and  $DEF$  are similar. What is the value of  $x$ ?

- (A) 5.0
- (B) 7.5
- (C) 15.0
- (D) 24.0
- (E) 36.5



81. In an election with two parties, Party A won 54% of the votes. If Party B received 874 votes, how many votes were cast in total?

- (A) 400
- (B) 472
- (C) 1619
- (D) 1900
- (E) 2102

ACT Prep: Proportions II

82. In a college with 14,000 students, 490 are majoring in mathematics. What percentage of the student body does the number of math majors represent?
- (A) 0.0035%  
(B) 0.035%  
(C) 0.35%  
(D) 3.5%  
(E) 35%
83. If 80% of a number is 122, what is 40% of the number?
- (A) 48.8  
(B) 61.0  
(C) 73.2  
(D) 83.0  
(E) 244.0
84. A factory's quality assurance can inspect 28 hard drives in 40 minutes. How many minutes will it take the specialist to inspect 196 hard drives?
- (A) 47  
(B) 49  
(C) 89  
(D) 137  
(E) 280
85. A \$154.99 graphing calculator can be purchased with a coupon that gives a 15% discount. What is the price of the calculator if it is purchased with the coupon?
- (A) \$23.25  
(B) \$68.47  
(C) \$131.74  
(D) \$139.99  
(E) \$152.67
86. The following table represents the percentages of employees in each of four possible classifications at a certain company. If there are no other possible classifications, what is the value of  $x$ ?

Classification	Percentage
Part-time	35%
Full-time, hourly	20%
Full-time, salary	24%
Full-time, salary and bonus	$x\%$

- (A) 1  
(B) 21  
(C) 44  
(D) 79  
(E) 65

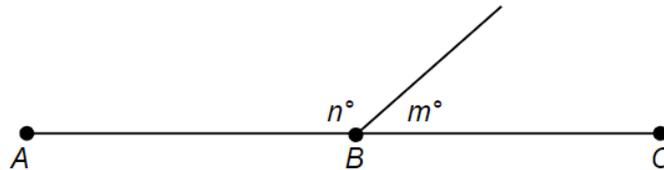
ACT Prep: Proportions III

87. A weather station reported that 90% of the days in a 30-day period had a measurable snowfall. How many of these days received measurable snowfall?
- (A) 3
  - (B) 12
  - (C) 18
  - (D) 27
  - (E) 29

88. Every student enrolled in a science course is either a physics major or a biology major. If the ratio of physics majors to biology majors is 3 to 1 and there are 21 physics majors enrolled, how many biology majors are enrolled in the course?
- (A) 7
  - (B) 15
  - (C) 23
  - (D) 45
  - (E) 63

89. Points  $A$ ,  $B$ , and  $C$  in the following figure are collinear. If the ratio of  $m$  to  $n$  is 2:3, what is the value of  $n$  in degrees?

- (A) 36
- (B) 94
- (C) 108
- (D) 120
- (E) 170



90. Every 6 minutes, a red LED flashes to indicate that a machine is operating correctly. If the machine operates correctly for 800 minutes, how many times will the LED flash?

- (A) 133
- (B) 134
- (C) 135
- (D) 136
- (E) 137

91. For the first two hours he is at work, Harrison files 14 folders every hour. For the remainder of his seven-hour workday, he files 22 folders every hour. How many folders did Harrison file over the entire day?

- (A) 28
- (B) 98
- (C) 138
- (D) 182
- (E) 308

ACT Prep: Functions I

92. In the standard  $(x, y)$  coordinate plane, the graph of the function  $f(x) = 3x - 5$  crosses through the point  $(q, 4)$ . What is the value of  $q$ ?
- (A) 2
  - (B) 3
  - (C) 5
  - (D) 7
  - (E) 9
93. Which of the following expressions is equivalent to  $(2m - 6)^2$  for all values of  $m$ ?
- (A)  $4m^2 - 12$
  - (B)  $4m^2 - 24$
  - (C)  $4m^2 - 36$
  - (D)  $4m^2 - 24m + 36$
  - (E)  $4m^2 - 12m + 36$
94. If  $2x^2 - 6x = -4$  and  $x < 0$ , then  $x =$
- (A) -6
  - (B) -4
  - (C) -2
  - (D) -1
  - (E) There is no such value of  $x$
95. If  $f(r, s) = rs - r$ , then  $f(2, -3) =$
- (A) -8
  - (B) -4
  - (C) 1
  - (D) 6
  - (E) 7
96. If  $x > 0$  and  $2x^2 - 5x + 3 = x^2 - 5x + 2$ , then  $x =$
- (A) 1
  - (B) 2
  - (C) 3
  - (D) 5
  - (E) There is no such value of  $x$

ACT Prep: Functions II

97. If  $f(x) = \frac{x-4}{x+1}$  for all nonzero values of  $x$ , then  $f(5) =$

- (A)  $-4$
- (B)  $\frac{1}{6}$
- (C)  $1$
- (D)  $\frac{3}{2}$
- (E)  $5$

98. Which of the following is a factor of  $x^2 - 36$ ?

- (A)  $x - 36$
- (B)  $x - 9$
- (C)  $x - 6$
- (D)  $x + 3$
- (E)  $x + 12$

99. If  $f(x) = x + 10$  and  $g(x) = -5x - 8$ , then  $(f \circ g)(7) =$

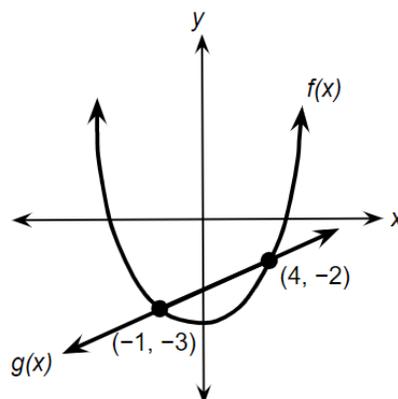
- (A)  $-93$
- (B)  $-85$
- (C)  $-43$
- (D)  $-33$
- (E)  $-29$

100. In the  $(x, y)$  coordinate plane, which of the following functions would have a graph that crosses or touches the  $x$ -axis at only one point?

- (A)  $x^2 + 5$
- (B)  $x^2 - 6$
- (C)  $x^2 - 8x + 16$
- (D)  $x^2 + 2x + 18$
- (E)  $-x^2 + 4x - 10$

101. Given the following graphs of  $f(x)$  and  $g(x)$  in the standard  $(x, y)$  coordinate plane, for what values of  $x$  is  $g(x) > f(x)$ ?

- (A)  $x < -1$  and  $x > 4$
- (B)  $-1 < x < 4$
- (C)  $x < -3$
- (D)  $x < 4$
- (E)  $x > -2$



ACT Prep: Functions III

102. If  $x = 4$  and  $y = -1$ , then  $xy^4 + x^3y =$

- (A) -8
- (B) -16
- (C) -18
- (D) -60
- (E) -68

103. How many real number solutions does the equation  $2x^3 = 9$  have?

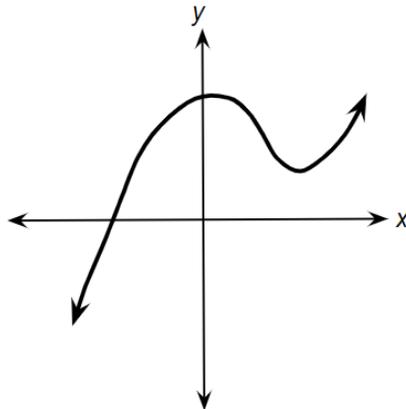
- (A) 0
- (B) 1
- (C) 2
- (D) 3
- (E) 9

104. If  $f(x) = 2x + 6$  and  $f(b) = 18$ , then  $b =$

- (A) 6
- (B) 12
- (C) 24
- (D) 36
- (E) 42

105. The complete graph of a function  $f(x)$  is shown in the following figure. How many real solutions does the equation  $f(x) = 0$  have?

- (A) 0
- (B) 1
- (C) 2
- (D) 3
- (E) 4



106. If  $f(x) = x + 2$  and  $g(x) = x^2 - x - 6$ , then which of the following is equivalent to  $\frac{g(x)}{f(x)}$  for all values of  $x \neq -2$ ?

- (A)  $x - 12$
- (B)  $x - 8$
- (C)  $x - 4$
- (D)  $x - 3$
- (E)  $x + 4$

Answers: have been worked out and verified

Numbers		Algebra		Probability/Stats		Coordinate Geometry	
1.	D	16.	A	31.	E	46.	E
2.	D	17.	E	32.	C	47.	C
3.	C	18.	E	33.	C	48.	B
4.	E	19.	E	34.	B	49.	D
5.	A	20.	C	35.	D	50.	D
-----							
6.	A	21.	C	36.	A	51.	B
7.	D	22.	C	37.	E	52.	C
8.	A	23.	D	38.	D	53.	E
9.	B	24.	A	39.	E	54.	A
10.	B	25.	A	40.	C	55.	A
-----							
11.	B	26.	B	41.	D	56.	D
12.	B	27.	A	42.	D	57.	E
13.	D	28.	C	43.	A	58.	B
14.	D	29.	B	44.	C	59.	E
15.	E	30.	D	45.	D	60.	C

Geometry		Proportions		Functions	
61.	E	77.	D	92.	B
62.	D	78.	B	93.	D
63.	C	79.	E	94.	E
64.	E	80.	B	95.	A
65.	D	81.	D	96.	E
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66.	B	82.	D	97.	B
67.	D	83.	B	98.	C
68.	C	84.	E	99.	D
69.	A	85.	C	100.	C
70.	A	86.	B	101.	B
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71.	C	87.	D	102.	D
72.	B	88.	A	103.	B
73.	D	89.	C	104.	A
74.	D	90.	A	105.	B
75.	C	91.	C	106.	D
76.	C				