ST. MARY'S DOMINICAN HIGH SCHOOL
Geometry and Geometry (Honors) Summer Worksheet

Dear student:

The purpose of this summer worksheet is to help you practice your math skills while providing examples of ACT/PSAT-type questions. The questions were specifically chosen because they relate to topics that will be used in your math class next year or because they cover material you have learned that is on the ACT/PSAT.

In order to receive full credit for your work, be sure to follow these instructions.

1. **Print out the worksheet and show all work neatly and in a concise manner next to each question– in PENCIL! If work can not be shown, explain how you were able to solve the problem or what strategy you used (process of elimination, guess and check, graphing calculator, etc.).**

2. **Check your answers with the answer key provided. Review and re-try any questions you missed. If you have difficulty with any of the concepts, please review them during the summer.**

3. **Bring your completed assignment to school on the second day of class.**

Standardized Test-Taking Tips:

1. Underline or circle key numbers/words in the problem.
2. Read the question that is being asked. Many times the answer to the question is not necessarily the solution to the equation.
3. As you eliminate choices, scratch them out.
4. Use these strategies as they apply:
    - Guess and check with the choices (start with the middle choice)
    - Assign numbers to represent variables in the question
    - Start at the end and work backwards
    - Look for a pattern on a simpler problem
    - Use a graphing calculator to assist when needed

Note: On the ACT, unless otherwise stated, all of the following should be assumed:

1. Illustrative figures lie in a plane.
2. Geometric figures lie in a plane.
3. The word "line" indicates a straight line.
4. The word "average" indicates the arithmetic mean.

Choices are usually listed from either greatest to least or least to greatest.
You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator. Reference the "ACT Math Formulas" file in School Links and Files.

Your work will be collected, and a grade will be given based on **completeness and effort**.
Try your best!!! If you need assistance, consult the video tutors available at khanacademy.org or https://academy.act.org/summer-slide-educator/.

Sincerely,

St. Mary's Dominican Mathematics Department

Pre-Algebra

1. What is $\frac{1}{9}$ of 63% of \$6,000?

   A. \$34,020
   B. \$ 4,200
   C. \$ 3,402
   D. \$ 420
   E. \$ 42

2. On a particular road map, $\frac{1}{2}$ inch represents 18 miles. About how many miles apart are two towns that are $2\frac{1}{2}$ inches apart on the map?

   A. 18
   B. 22.5
   C. 36
   D. 45
   E. 90

3. The blood types of 150 people were determined for a study as shown in the table below.

Blood Type	Number of People
O	62
A	67
B	15
AB	6

   If 1 person from this study is randomly selected, what is the probability that this person has either Type A or Type AB blood?

   A. $\frac{62}{150}$
   B. $\frac{66}{150}$
   C. $\frac{68}{150}$
   D. $\frac{73}{150}$
   E. $\frac{84}{150}$

4. The length of a rectangle with area 54 square centimeters is 9 centimeters. What is the perimeter of the rectangle, in centimeters?

   A. 6
   B. 12
   C. 15
   D. 24
   E. 30

5. Which of the following is equivalent to $\sqrt{54}$?

   A. $2\sqrt{3}$
   B. $3\sqrt{6}$
   C. 15
   D. $9\sqrt{3}$
   E. $9\sqrt{6}$

6. $3^3 + \left(6^2 - 12\right) \div 4$

   A. 3
   B. 6.75
   C. 9
   D. 33
   E. 60

7. A jar contains 8 red marbles, 14 blue marbles, 11 yellow marbles, and 6 green marbles. If a marble is selected at random, what is the probability that it will be green?

   A. $\frac{2}{39}$
   B. $\frac{2}{13}$
   C. $\frac{3}{13}$
   D. $\frac{8}{39}$
   E. $\frac{11}{39}$

Elementary Algebra

8. If $m = 4$, $n = 5$, and $p = 9$, what is the value of $mp - mn$?

   A. 16
   B. 31
   C. 41
   D. 56
   E. 81

9. If $12(x-7)=-11$, then x = ?

A. $-\frac{95}{12}$
B. $-\frac{3}{2}$
C. $-\frac{11}{12}$
D. $-\frac{1}{3}$
E. $\frac{73}{12}$

10. Which of the following is equivalent to $(2x+3)(x-7)$?

A. $2x^2-21$
B. $2x^2-11x-21$
C. $2x^2+11x-21$
D. $2x^2+17x-21$
E. $2x^2+17x+21$

11. Which of the following expressions is equivalent to $-x^2-x$?

A. $-x(x+1)$
B. $-x(x-1)$
C. $-x(1-x)$
D. $x(x+1)$
E. $x(x-1)$

12. The average distance from Earth to the sun, which is 9.3×10^7 miles, is about how many times the average distance from Earth to the moon, which is 2.4×10^5 miles?

A. 4×10^2
B. 7×10^2
C. 4×10^{12}
D. 1×10^{13}
E. 2×10^{13}

13. The formula $d = rt$ is used to calculate the distance an object travels over a period of time, t, at a constant rate, r. Based on this formula, what is the rate, r, in terms of d and t?

A. $r = \frac{d}{t}$
B. $r = dt$
C. $r = \frac{t}{d}$
D. $r = d - t$

14. Which of the following is a solution to the equation $2x^2 + 4x = 3 + 3x^2$?

A. -1
B. 0
C. 3
D. 6

15. If (x, y) is the solution to the system of equations below, what is the value of x?

$$-3x - 4y = 20$$
$$x - 10y = 16$$

A. -14
B. -12
C. -4
D. 16

16. What is the value of x when $2x + 3 = 3x - 4$?

A. -7
B. $-\frac{1}{5}$
C. $\frac{1}{5}$
D. 1
E. 7

17. The length, in inches, of a box is 3 inches less than twice its width, in inches. Which of the following gives the length, l inches, in terms of the width, w inches, of the box?

A. $l = \frac{1}{2}w + 3$
B. $l = w + 3$
C. $l = w - 3$
D. $l = 2w + 3$
E. $l = 2w - 3$

18. $\left(x^3+2x^2-6x+5\right)-\left(2x^3+4x^2-5x+10\right)$ is equivalent to:

A. $3x^3+6x^2-11x+15$
B. $-x^3+6x^2-11x+15$
C. $-x^3-2x^2-x-5$
D. $-2x^3-2x^2+x+5$
E. $x^3+6x^2-2x+15$

19. Which expression would be appropriate to complete the following equation in order for the equation to illustrate the Associative Property of Addition: 5 + (7 + 0) = ?

A. (7 + 0) + 5
B. 5 + (0 + 7)
C. (5 + 7) + 0
D. 5 + 7
E. 12

20. A moving company uses plastic wrap to bundle groups of boxes together. If a portion of plastic wrap that measures 900 inches in length is used to bundle each group of boxes, how many groups of boxes can be bundled using 1,500 feet of the same type of plastic wrap?

A. 5
B. 20
C. 25
D. 30

21. Marlon is bowling in a tournament and has the highest average after 5 games, with scores of 210, 225, 254, 231, and 280. In order to maintain this exact average, what *must* be Marlon's score for his 6th game?

A. 200
B. 210
C. 231
D. 240
E. 245

22. The expression $(3x-4y^2)(3x+4y^2)$ is equivalent to:

A. $9x^2-16y^4$
B. $9x^2-8y^4$
C. $9x^2+16y^4$
D. $6x^2-16y^4$
E. $6x^2-8y^4$

23. $-3\left|-6+8\right| = ?$

A. -42
B. -6
C. -1
D. 6
E. 42

24. Which of the following is equivalent to $2x^2+8-(x^2+4)$?

A. $3x^2-4$
B. $3x^2+4$
C. x^2+12
D. x^2-4
E. x^2+4

25. The relationship between Fahrenheit and Celsius is $F=\frac{9}{5}C+32$. If the temperature is 68° Fahrenheit, what is the temperature in degrees Celsius?

A. 14°
B. 20°
C. 32°
D. 64.8°
E. 68°

26. If $\frac{y}{y-3}=\frac{42}{39}$, then what does y equal?

A. 39
B. 41
C. 42
D. 45
E. 81

27. Dimitry bought a pair of pants at the discounted price of \$30. The original price of the pants was \$40. What was the percent of the discount?

A. 4%
B. 10%
C. 25%
D. $33\frac{1}{3}\%$
E. 75%

Plane Geometry

28. The sides of a square are 3 cm long. One vertex of the square is at (2, 0) on a square coordinate grid marked in centimeter units. Which of the following points could also be a vertex of the square?

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

29. A boy who is 4 feet tall stands in front of a tree that is 24 feet tall. If the tree casts a shadow that is 18 feet long on the ground, what is the length of the boy's shadow, in feet?

    A. 3
    B. 4
    C. 5
    D. 6
    E. 8

30. A rectangle has a side length of 8 and a perimeter of 24. What is the area of the rectangle?

    A. 16
    B. 24
    C. 32
    D. 64
    E. 96

31. In ΔABC, the measure of $\angle B$ is 90°, and the measure of $\angle C$ is 18°. What is the measure of $\angle A$? Hint: The sum of the angles of a triangle is 180°.

    A. 18°
    B. 22.5°
    C. 36°
    D. 45°
    E. 72°

32. The perimeter of a certain scalene triangle is 100 inches. The side lengths of the triangle are represented by 5x, 3x + 30, and 2x + 10, respectively. What is the length, in inches, of the longest side of the triangle?

    A. 6
    B. 22
    C. 30
    D. 48
    E. 72

33. A rectangle is $3\sqrt{5}$ meters wide and $5\sqrt{5}$ meters long. What is the area, in square meters, of the rectangle?

A. 75
B. $16\sqrt{5}$
C. $15\sqrt{5}$
D. $8\sqrt{10}$
E. $8\sqrt{5}$

Intermediate Algebra

34. For any nonzero value of y, $\left(y^{-5}\right)^3 = ?$

A. $\frac{1}{y^{15}}$
B. $\frac{1}{y^2}$
C. y^8
D. y^{15}
E. y^{125}

35. If $f(x) = (3x+7)^2$, then $f(1) = ?$

A. 10
B. 16
C. 58
D. 79
E. 100

36. A parachute design uses 18 separate pieces of rope. Each piece of rope must be at least 270 centimeters and no more than 280 centimeters long. What inequality represents all possible values of the total length of rope x, in centimeters, needed for the parachute?

A. $270 \le x \le 280$
B. $4,860 \le x \le 4,870$
C. $4,860 \le x \le 5,040$
D. $5,030 \le x \le 5,040$

37. In the expression below, a is an integer. If $3x+4$ is a factor of the expression below, what is the value of a?

$$12x^2 + ax - 20$$

A. -15
B. -1
C. 1
D. 16

38. What is the sum of the two solutions of the equation $x^2 + 3x - 28 = 0$?

A. -28
B. -7
C. -3
D. 0
E. 4

39. What is the simplest form of $f(x) = \dfrac{2x-4}{2x^2-2x-4}$?

A. $f(x) = \dfrac{x-2}{x^2+x-2}$

B. $f(x) = \dfrac{2(x-2)}{2(x+2)(x-1)}$

C. $f(x) = \dfrac{1}{x+1}$

D. $f(x) = \dfrac{1}{2x^2}$

40. A grocer carries two types of frozen meals that have the fat and carbohydrate content shown in the table below. John wants to purchase a combination of the two types of meals with no more than 350 grams of fat and no more than 2975 grams of carbohydrates. If John purchases 10 Szechuan chicken meals, what is the greatest number of stir-fry meals he can purchase so that the combination will satisfy the requirements?

Type of Meal	**Fat (g)**	**Carbohydrates (g)**
Stir-fry	4	40
Szechuan chicken	5	35

A. 60
B. 65
C. 70
D. 75

41. For two consecutive integers, the result of adding the smaller integer and triple the larger integer is 79. What are the two integers?

A. 18, 19
B. 19, 20
C. 20, 21
D. 26, 27
E. 39, 40

42. A group of cells grows in number as described by the equations $y = 16(2)^t$, where t represents the number of days and y represents the number of cells. According to this formula, how many cells will be in the group at the end of the first 5 days?

A. 80
B. 160
C. 400
D. 512
E. 1,280

43. If x is not equal to 2 or -2, what is equivalent to $\frac{3x^2 - 8x + 4}{x^2 - 4}$?

A. $3 - 8x$
B. $4 - 2x$
C. $\frac{3x - 2}{x - 2}$
D. $\frac{3x + 2}{x + 2}$
E. $\frac{3x - 2}{x + 2}$

44. What is the slope of the line represented by the equation $6y - 18x = 6$?

A. -18
B. 1
C. 3
D. 6
E. 18

45. If $s^2 - 4s - 6 = 6,$ what are the possible values of s?

A. -2, -6
B. -2, 6
C. 2, -6
D. 2, -3

Coordinate Geometry

46. Points $R(6, 4)$ and $S(-4, 5)$ lie in the standard (x, y) coordinate plane. What is the slope of $\overline{RS}$?

A. $-\frac{2}{9}$
B. $-\frac{1}{10}$
C. $\frac{1}{10}$
D. $\frac{2}{9}$
E. $\frac{9}{2}$

47. The points (-2, 3) and (0, 1) lie on a straight line. What is the slope-intercept equation of the line?

A. $y = 2x - 1$
B. $y = x + 5$
C. $y = x + 1$
D. $y = -x + 1$
E. $y = -2x + 3$

48. Lines p and n lie in the standard *(x, y)* coordinate plane. An equation for line p is $y = 0.12x + 3{,}000$. The slope of line n is 0.1 greater than the slope of line p. What is the slope of line n?

A. 0.012
B. 0.02
C. 0.22
D. 1.2
E. 300

49. What is the y-intercept of the line in the standard (x, y) coordinate plane that goes through the points (4, 5) and (-2, -7)?

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

50. What is the equation of a line that is perpendicular to $y = \frac{2}{3}x + 5$ and contains the point (4, -3)?

A. $y = \frac{2}{3}x + 4$

B. $y = -\frac{2}{3}x - \frac{1}{3}$

C. $y = -\frac{2}{3}x + 3$

D. $y = -\frac{3}{2}x + 3$

E. $y = -\frac{3}{2}x - 9$

51. What is the equation of a line that has a y-intercept of -3 and is parallel to the line $3x = 4 + 5y$?

A. $y = -\frac{3}{5}x + 3$

B. $y = -\frac{5}{3}x + 3$

C. $y = -\frac{5}{3}x - 3$

D. $y = \frac{3}{5}x + 3$

E. $y = \frac{3}{5}x - 3$

52. In the *(x, y)* coordinate plane, what is the *y*-intercept of the line $12x - 3y = 12$?

A. -4
B. -3
C. 0
D. 4
E. 12

Answer Key

1. D
2. E
3. D
4. E
5. B
6. D
7. B
8. A
9. E
10. B

11. A
12. A
13. A
14. C
15. C
16. E
17. E
18. C
19. C
20. B

21. D
22. A
23. B
24. E
25. B
26. C
27. C
28. E
29. A
30. C

31. E
32. D
33. A
34. A
35. E
36. C
37. C
38. C
39. C
40. B

41. B
42. D
43. E
44. C
45. B
46. B
47. D
48. C
49. A
50. D

51. E
52. A