

# 2018 – 2019 TAME High School Practice Divisional Mathematics Test

- (1) If  $y + 2 = 9$ , then  $y^2 + 4y$  equals  
A) 49                      B) 64                      C) 77                      D) 81
- (2) What is the smallest angle measure in degrees, in a triangle, if one angle is eighty-four degrees and the other two angles are in a ratio of three to five?  
A)  $36^\circ$                       B)  $24^\circ$                       C)  $12^\circ$                       D)  $8^\circ$
- (3) The average of  $4$ ,  $4^2$ ,  $4^3$ , and  $4^4$  is  
A)  $4^{2.5}$                       B) 68                      C) 72                      D) 85
- (4) Liz does baby sitting on weekends for \$2.25 an hour. What is the fewest number of hours she can baby-sit and earn more than twelve dollars?  
A) 8                      B) 7                      C) 6                      D) 5
- (5) A bag contains fifty marbles numbered 1 through 50. What is the probability that a marble drawn at random is a multiple of six?  
A)  $\frac{4}{25}$                       B)  $\frac{7}{50}$                       C)  $\frac{8}{25}$                       D)  $\frac{3}{25}$
- (6) If the sum of the interior angles of a convex regular polygon is  $540^\circ$ , then how many sides does the polygon have?  
A) 4                      B) 5                      C) 6                      D) 7
- (7) In how many ways can forty-seven be written as the sum of two primes?  
A) 0                      B) 1                      C) 2                      D) 3
- (8) A coat originally priced at eighty dollars was put on sale at twenty-five percent off. If ten percent tax was added to the sale price, then the total selling price of the coat was  
A) \$45                      B) \$54                      C) \$68                      D) \$66
- (9) There are six red balls in a bag that contains only red and green balls. If the probability of drawing a red ball is one-fourth, then how many green balls are in the bag?  
A) 12                      B) 18                      C) 24                      D) 30
- (10) If there are 120 seats in a row, what is the fewest number of seats that must be occupied so that the next person seated must sit next to someone?  
A) 60                      B) 30                      C) 41                      D) 40
- (11) The average of ten different positive whole numbers is ten. What is the largest possible value of any of these numbers?  
A) 10                      B) 50                      C) 55                      D) 90
- (12) Several students are seated at a large circular table. They pass around a bag containing 199 pieces of candy. Each person receives the bag, takes one piece of candy and then passes the bag to the next person. If Matt takes the first and last piece of candy, then what is the least number of students sitting at the table?  
A) 11                      B) 16                      C) 17                      D) 20



- (27) The graph of  $f(x) = x^3 - 6x^2 - 36x + 8$  has a relative maximum at  $x =$   
 A) 0                                      B) -2                                      C) 2                                      D) 4
- (28) What is the area of the region bounded by the curves:  $y = 2x^3$ ,  $y = x^3 + 8$  and  $x = 0$ ?  
 A) 4                                      B) 8                                      C) 12                                      D) 16
- (29) For the function  $f(x) = 3x^5 - 2x^4 + 6x^3 - 4x^2 - 24x + 16$ , how many zeros are real and rational?  
 A) none                                      B) 1                                      C) 2                                      D) 3
- (30) Biologist have determined (with the help of some mathematically inclined friends) that the polynomial function  $P(t) = -0.00005t^3 + 0.003t^2 + 1.2t + 80$  approximates the population  $t$  days later of a group of wild pheasants left to reproduce on their own with no predators. Determine the maximum pheasant population.  
 A) 168                                      B) 172                                      C) 175                                      D) 182
- (31) Jim makes quarterly \$500 payments into a retirement account that pays quarterly interest. If the account pays 8% compounded quarterly, how much will be in Jim's account at the end of the first year?  
 A) \$1010.00                                      B) \$1530.20                                      C) \$2060.80                                      D) \$3156.55
- (32) How many chords would you have to draw in a circle to divide the circle into 37 parts? (For example one chord divides a circle into two parts.)  
 A) 3 chords                                      B) 4 chords                                      C) 6 chords                                      D) 8 chords
- (33) What is the area of regular octagon with side 10 and apothem 12?  
 A) 240                                      B) 120                                      C) 60                                      D) 50
- (34) If  $f(x) = \frac{2x-1}{x+2}$ , then  $f'(0) =$   
 A)  $\frac{1}{2}$                                       B)  $\frac{5}{4}$                                       C) 5                                      D)  $\frac{3}{4}$
- (35) A right circular cylinder and cone have the same base and height. What is the ratio of the volume of the cone to the volume of the cylinder?  
 A) 3 : 1                                      B) 3 : 4                                      C) 1 : 3                                      D) 2 : 3
- (36) What is the value of  $x$  so that the determinant of  $\begin{bmatrix} 1 & 0 & x \\ 3 & -2 & 4 \\ 0 & -1 & x \end{bmatrix}$  equals fourteen?  
 A) -4                                      B) -2                                      C) -1                                      D) 0
- (37) A triangle has vertices D(-1, 1), E(3, -2), and F(k, 2). Determine the value of  $k$  so that angle F is  $90^\circ$ .  
 A) -3                                      B) -2                                      C) -1                                      D) 1

- (38) For the  $k$  that satisfies  ${}_kC_5 = {}_kC_4$ , find the value of  ${}_kC_3$ .  
A) 20                                      B) 35                                      C) 56                                      D) 84
- (39) On February 13, it was reported that the length of daylight was 10 hours and 24 minutes, the sunrise was 6:57 AM, and the sunset was 8:15 PM. The length of daylight and sunrise were correct, but the sunset was wrong. When did the sun really set?  
A) 5:10 PM                                      B) 5:21 PM                                      C) 5:41 PM                                      D) 5:57 PM
- (40) The mean, median, and unique mode of the positive integers 3, 4, 5, 6, 6, 7,  $x$  are all equal. What is the value of  $x$ ?  
A) 5                                      B) 6                                      C) 7                                      D) 11
- (41) The Fort Worth Zoo has a number of two-legged birds and a number of four-legged mammals. On one visit to the zoo, Kenzie counted 200 heads and 522 legs. How many of the animals that Kenzie counted were two-legged birds?  
A) 61                                      B) 122                                      C) 139                                      D) 150
- (42) A square with an integer side length is cut into 10 squares, all of which have integer side length and at least 8 of which have area 1. What is the smallest possible value of the length of the side of the original square?  
A) 3                                      B) 4                                      C) 5                                      D) 6
- (43) At 210 miles per hour, how long would it take a race car to complete a  $1\frac{2}{5}$  mile lap at the race track?  
A) 24 seconds                                      B) 28 seconds                                      C) 34 seconds                                      D) 40 seconds
- (44) The function  $f$  that satisfies  $f''(t) = 6t$  with  $f'(0) = 1$  and  $f(0) = 2$  is:  
A)  $f(t) = 3t^3 + 2$                                       B)  $f(t) = t^3 + 2t + 1$                                       C)  $f(t) = t^3 + t + 2$                                       D)  $f(t) = t^3 + t + 1$
- (45) Determine the area of the region bounded by  $y = x$  and  $y = x^2 - 3x + 3$ .  
A)  $\frac{4}{3}$                                       B)  $\frac{8}{4}$                                       C)  $\frac{5}{4}$                                       D)  $\frac{14}{3}$
- (46) The equation  $(\log_3 x)^2 - 4\log_3 x + 3 = 0$  has two roots  $R_1$  and  $R_2$ . What is  $R_1 + R_2$ ?  
A) 30                                      B) 12                                      C) 3                                      D) -4
- (47) How many distinct solutions does the equation  $|x^2 + 7x + 12| = |x^2 + 15x + 36|$  have?  
A) 1                                      B) 2                                      C) 3                                      D) 4
- (48) If  $f(x)$  is a linear function with  $f(3) = 18$  and  $f(6) = 33$ , what is the  $y$ -intercept of  $f(x)$ ?  
A) -7                                      B) 3                                      C) 4                                      D) 6
- (49) What is the distance between the two parallel lines  $3x + 4y = 5$  and  $3x + 4y = 10$ ?  
A) 1                                      B) 2                                      C) 5                                      D) 10
- (50) Two students are driving separately to a math contest. The first leaves at 6 AM, traveling at 60 mph. The second leaves at 6:30 AM. What is the speed of travel of the second student, if they both arrive at 8:30 AM?  
A) 65 mph                                      B) 70 mph                                      C) 75 mph                                      D) 80 mph

# 2018 – 2019 TAME High School Practice Divisional Mathematics Test Answer Key

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|--------|--------|
| (1) C  | (26) D |
| (2) A  | (27) B |
| (3) D  | (28) C |
| (4) C  | (29) B |
| (5) A  | (30) D |
| (6) B  | (31) C |
| (7) A  | (32) D |
| (8) D  | (33) C |
| (9) B  | (34) B |
| (10) D | (35) C |
| (11) C | (36) B |
| (12) A | (37) D |
| (13) C | (38) D |
| (14) A | (39) B |
| (15) B | (40) D |
| (16) D | (41) C |
| (17) A | (42) B |
| (18) C | (43) A |
| (19) D | (44) C |
| (20) A | (45) A |
| (21) B | (46) A |
| (22) D | (47) C |
| (23) B | (48) B |
| (24) D | (49) A |
| (25) C | (50) C |