

2018 TAME High School Practice Mathematics Test

- (1) Arturo took four exams and made grades of 65, 88, 92 and 75. If Arturo wants to have an average of at least 80, which of the following is the lowest grade he can make on the next exam? (Assume all exam grades are weighted equally and normal rounding practices.)
A) 80 B) 78 C) 81 D) None of these
- (2) Write the numbers -2 , 4 , 0 , 1.5 , $\frac{1}{2}$, and $-\frac{3}{2}$ in increasing order.
A) $-2, 4, 0, 1.5, \frac{1}{2}, -\frac{3}{2}$
B) $-2, -\frac{3}{2}, 0, 1.5, \frac{1}{2}, 4$
C) $-2, -\frac{3}{2}, 4, 0, 1.5, \frac{1}{2}$
D) $-2, -\frac{3}{2}, 0, \frac{1}{2}, 1.5, 4$
- (3) Simplify: $\frac{x^{a+2}}{x^{a-2}}$.
A) x^4 B) $\frac{a}{x}$ C) 0 D) -1
- (4) A boat traveled upstream 10 miles in one hour. The return trip only took 30 minutes. Assuming the current speed is constant what is the current speed?
A) 5 mph B) 10 mph C) 15 mph D) $6\frac{2}{3}$ mph
- (5) What is the slope of the straight-line perpendicular to $2x + 5y = 10$?
A) $\frac{2}{5}$ B) $-\frac{2}{5}$ C) $\frac{5}{2}$ D) $\frac{1}{10}$
- (6) What is the slope of the straight line passing through the points $(3, 4)$ and $(3, 6)$?
A) 0 B) undefined C) 1 D) 2
- (7) Solve $|x - 2| = 5$ for x .
A) $\{3\}$ B) $\{7\}$ C) $\{7, -3\}$ D) $\{-7\}$
- (8) What is the equation of the straight line that contains the points $(1, 5)$, $(-1, 13)$ and $(3, -3)$?
A) $4x - y = 9$ B) $x - 4y = 8$ C) $y = -4x - 9$ D) $y = -4x + 9$
- (9) Michelle deposited \$400 in her savings account. After one year the balance in the account was \$428. What was her annual interest rate for the account?
A) 28% B) 14% C) 7% D) None of these
- (10) Where does the line $2x + 5y = 10$ cross the y -axis?
A) $(0, 5)$ B) $(2, 0)$ C) $(2, 5)$ D) $(0, 2)$

- (11) If the ratio of the angles of a triangle are 1 : 1 : 3, then the largest angle has a measure of ____°.
 A) 36° B) 72° C) 144° D) 108°
- (12) Which of the following could be a right triangle with the given sides?
 A) 3, 6, $3\sqrt{5}$ B) 3, 4, 6 C) 11, 12, 13 D) 1, 3, 5
- (13) What is the area of parallelogram with a base of 6-cm and a height of 8-cm?
 A) 24 cm^2 B) 48 cm^2 C) 12 cm^2 D) None of these
- (14) The measure of the interior angle of a regular polygon is 150° . What is this regular polygon?
 A) dodecagon B) heptagon C) octagon D) decagon
- (15) If the side opposite the 45° of a right triangle is $\sqrt{8}$ -cm, then the hypotenuse is ____ cm.
 A) 8 cm B) 16 cm C) 4 cm D) 24 cm
- (16) What is the area of the largest square that can be put in a circle of radius 8 meters?
 A) 256 m^2 B) 64 m^2 C) $8\sqrt{2} \text{ m}^2$ D) None of these
- (17) Which of the following statements is not a true statement?
 A) The sum of the acute angles of a right triangle is 180° .
 B) In a triangle there can be but one right angle or one obtuse angle.
 C) Each angle of an equilateral triangle contains 60° .
 D) The sum of the angles of a triangle is equal to a straight angle.
 E) If two angles of one triangle equal two angles of a second triangle, then the third angles are equal.
- (18) The diagonals from one vertex of a nonagon divide the nonagon into a set of ____ triangles.
 A) 9 B) 11 C) 6 D) 7
- (19) A right triangle has a leg of length 18, a hypotenuse of length 30 and an area of 216. What is the length of the altitude to the hypotenuse?
 A) 24 B) 14.4 C) 18 D) 22
- (20) Three circles are tangent externally to each other. The lines of centers are 12, 18, and 16 inches, respectively. What is the length of the longest radius?
 A) 14 inches B) 5 inches C) 10 inches D) 11 inches
- (21) Find the area of a trapezoid with lower base 10-m, upper base 6-m, if a leg 4-m makes an angle of 60° with the lower base.
 A) $16\sqrt{3} \text{ m}^2$ B) $\frac{8\sqrt{3}}{3} \text{ m}^2$ C) 30 m^2 D) $12\sqrt{2} \text{ m}^2$
- (22) A silo, 20 feet high, is in the form of a right hexagonal prism whose base is 8 feet on a side. How many square feet of material would it take to make its sides?
 A) 650 ft^2 B) $2,075 \text{ ft}^2$ C) $1,260 \text{ ft}^2$ D) 960 ft^2
- (23) What is the remainder when $(x^3 + 5x^2 + 14 + 11x)$ is divided by $(x + 2)$?
 A) 0 B) -4 C) 4 D) -2

- (24) Which of the following is not a factor of $24xy + 12x^2 + 36x^3$?
 A) $4x$ B) $(2y + x + 3x^2)$ C) $6x$ D) $(2x + y + 3x^2)$
- (25) The sum of three consecutive odd integers is forty more than the smallest of these. Find the largest of these?
 A) 19 B) 21 C) 39 D) 17
- (26) I own a lawnmower that usually takes me 28 minutes to mow a part of my yard. To speed up the mowing process I rent another lawnmower, which is used by brother, and together we finish mowing the same part of the yard in only 12 minutes. How long would it take me to mow the lawn using only the rented lawnmower?
 A) 21 minutes B) 18 minutes C) 22 minutes D) 17 minutes
- (27) When water freezes, it expands 9% of its volume. How much water must freeze to form 545 cubic inches of ice?
 A) 125 in^3 B) 520 in^3 C) 500 in^3 D) 495 in^3
- (28) Determine maximum area of a rectangle that can be constructed with a perimeter of 44 inches.
 A) 11 in^2 B) 121 in^2 C) 240 in^2 D) $1,936 \text{ in}^2$
- (29) Which of the following is not a rational root for the equation: $12x^4 - 20x^3 - x^2 = -6x$.
 A) $\frac{2}{3}$ B) $-\frac{1}{2}$ C) 1 D) $\frac{3}{2}$
- (30) Which term of 2, 9, 16, . . . is 142?
 A) 30 B) 23 C) 21 D) 31
- (31) If you were asked to insert four arithmetic means between 1 and 11, what would they be?
 1) 2, 3, 4, 5 B) 2, 4, 6, 8 C) 3, 5, 7, 9 D) 3, 4, 5, 6
- (32) Find the number of permutations of the letters in the word ABILENE.
 A) 2,860 B) 5,040 C) 1,260 D) 420
- (33) Find the 15th term of the arithmetic sequence: 1.00, 1.25, 1.50, 1.75, . . .
 A) 4.50 B) 6.25 C) 5.00 D) 7.75
- (34) Two meshed gears have 35 and 56 teeth respectively. If the speeds are inversely proportional to the number of teeth, at what speed should the second gear be driven so that the first gear will run at 1450 revolutions per minute (rpm)?
 A) $906\frac{1}{4}$ rpm B) $660\frac{3}{4}$ rpm C) 750 rpm D) $875\frac{1}{2}$ rpm
- (35) A triangle has angles of 20° and 30° . If the side opposite the smaller angle is 6 then the perimeter of the triangle to the tenth's place is
 A) 15.2 B) 13.4 C) 11.2 D) 15.3

- (36) A ship sails 90 miles due north from a harbor near Houston and then turns 30° toward the east and sails 30 miles. How far from the harbor, to the mile, is the ship at that time?
 A) 120 miles B) 117 miles C) 124 miles D) 95 miles
- (37) In a survey of 500 residents, 300 were opposed to the use of the photo-cop for issuing traffic tickets. It is found that the point estimate for the mean is 60% with a standard error of 0.022. Construct the 95% confidence interval for the population proportion.
 A) (300, 500) B) (0.564, 0.636) C) (0.578, 0.622) D) (0.557, 0.643)
- (38) Assume that the weights of quarters are normally distributed with a mean of 5.67 g and a standard deviation 0.070 g. A vending machine will only accept coins weighing between 5.48 g and 5.82 g. What percentage of legal quarters will be rejected?
 A) 1.62% B) 0.0196% C) 1.94% D) 2.48%
- (39) A researcher sits at a street corner and records the number of cars that pass a red light each hour. What type of study is this?
 A) Observational B) Categorical C) Survey D) Experimental
- (40) What is the remainder when $-19x^2 + 6x^3 + x + 6$ is divided by $(x - 3)$?
 A) 1 B) -1 C) 0 D) 2
- (41) $\sum_{n=1}^{100} \log \tan^n \left(\frac{\pi}{4} \right)$
 A) π B) ∞ C) 0 D) 1
- (42) In the sequence 24, 21, 18, 15, . . . , -276 is what term?
 A) 100 B) 101 C) 102 D) 103
- (43) The graph of $x^2 - 9y^2 = 1$ is called a(n)
 A) circle B) parabola C) ellipse D) hyperbola
- (44) If $3^{x-y} = 12$ and $3^{y+1} = 10$, then 3^x equals
 A) 40 B) .25 C) .4 D) .75
- (45) Find the sum of the roots of $\tan^2 x - 9 \tan x + 1 = 0$ that are between $x = 0$ and $x = 2\pi$.
 A) 9.4257. . . B) 2π C) 4.5347. . . . D) π
- (46) Solve the equation $2\cos^2 x + \sin x - 2 = 0$ over the interval $[0, 2\pi)$.
 A) $\left\{ \frac{\pi}{6}, \frac{5\pi}{6} \right\}$ B) $\left\{ \frac{\pi}{3}, \frac{2\pi}{3}, \frac{\pi}{2}, \frac{3\pi}{2} \right\}$ C) $\left\{ 0, \pi, \frac{\pi}{6}, \frac{5\pi}{6} \right\}$ D) $\left\{ \frac{\pi}{3}, \frac{2\pi}{3} \right\}$
- (47) Find the location of the center, for the hyperbola described by the equation $\frac{(x+4)^2}{4} - \frac{(y+2)^2}{64} = 1$.
 A) (-4, -2) B) (8, -2) C) (-2, 4) D) (2, 8)

- (48) Find a rectangular equation for the plane curve defined by the parametric equations: $x = 3 \tan t$ and $y = 4 \sec t$; $0 \leq t \leq 2\pi$.
- A) $\frac{y^2}{16} - \frac{x^2}{9} = 1$; for x in $-\infty < x < \infty$
- B) $y = 4\sqrt{\frac{x^2}{9} + 1}$; for x in $-\infty < x < \infty$
- C) $\frac{y^2}{16} + \frac{x^2}{9} = 1$; for x in $-\infty < x < \infty$
- D) $y = x^2 - 9$; ; for x in $-3 \leq x \leq \infty$
- (49) If the cosine of an acute angle is $\frac{1}{3}$, what is the cosine of an angle half that size?
- A) $\frac{1}{6}$ B) $\frac{2}{3}$ C) $\sqrt{\frac{1}{6}}$ D) $\sqrt{\frac{2}{3}}$
- (50) Which of these, when graphed as equations in polar coordinates, will result in a straight line?
- I) $r \sin(\theta)\cos^2(2\theta) = \sin 2(2\theta + 2\pi)$
 II) $r(\cos(\theta) - \sin(\theta)) = 0$
 III) $r \cos(\theta) = 2r \sin(\theta) + 5$
- A) I only B) II only C) III only D) I, II and III
- (51) If $f'(x) = 6x + 1$ and $f(1) = 8$, then $f(x) = Ax^2 + Bx + C$ and C equals
- A) 4 B) 0 C) 2 D) 6
- (52) Suppose that f is an even, periodic function with period 2, and that $f(x) = x$ for all x in the interval $[0; 1]$. Find $f(3.14)$.
- A) 3.14 B) -3.14 C) -.14 D) .86
- (53) Compute the following limit: $\lim_{x \rightarrow 1} \frac{\sin^2 + x^2 + x - 3}{1 - \cos(x^2 - 4x + 3)}$.
- A) 18 B) $\frac{3}{5}$ C) 16 D) $\frac{12}{7}$
- (54) A radioactive substance decays exponentially with time. In 2 hours, a sample of will decay to 90% of its original mass. How many hours will it take for a sample to decay to 10% of its original mass?
- A) 18 B) $\frac{2}{1 - \log 9}$ C) $\frac{\ln 10}{\ln 10 - \ln 9}$ D) $2\ln\left(\frac{1}{9}\right)$

- (55) What is the derivative of the function: $f(x) = x^2 + 2^x + e^x + e^2$?
- A) $f'(x) = 2x + x2^{x-1} + e^x$
 B) $f'(x) = 2x + \ln(x)2^{x-1} + e^x + e^2$
 C) $f'(x) = 2x + 2^x + e^x$
 D) $f'(x) = 2x + \ln(2)2^x + e^x$
- (56) Where does the tangent line to the graph of the function $f(x) = x^2 - 3x + 1$ at the point $(0, 1)$ hit the x-axis?
- A) $x = -1$ B) $x = 3$ C) $x = \frac{1}{3}$ D) $x = -\frac{1}{3}$
- (57) A water tank has the shape of an inverted cone with base radius of $2m$ and height of $4m$. If water is being pumped into the tank at a rate of $2m^3/\text{min}$, at what rate is the water level rising when the tank is $3m$ deep?
- A) $\frac{8}{9\pi} m/\text{min}$ B) $\frac{9}{8\pi} m/\text{min}$ C) $\frac{8\pi}{9} m/\text{min}$ D) $\frac{9\pi}{8} m/\text{min}$
- (58) Find the derivative of $\tan x$ with respect to $\sin x$.
- A) $\sec x \tan x$ B) $\sec^2 x$ C) $\sec^2 x \sin x$ D) $\sec^3 x$
- (59) The function $f(x) = xe^{-x}$ has a local maximum at x equals:
- A) 0 B) -1 C) 1 D) e
- (60) A rocket moves in a straight line. At time t seconds its position in meters is: $R(t) = 5t^3$, $0 \leq t \leq 10$. At what time is the instantaneous velocity of the rocket equal to its average velocity between $t = 0$ and $t = 10$ seconds.
- A) $10\sqrt{5}$ seconds B) $\frac{100}{3}$ seconds C) $\frac{10\sqrt{3}}{3}$ seconds D) 10 seconds

2017 TAME High School Practice Mathematics Test Answer Key

(1) B	(21) A	(41) C
(2) D	(22) D	(42) B
(3) A	(23) C	(43) D
(4) A	(24) D	(44) A
(5) C	(25) B	(45) A
(6) B	(26) A	(46) C
(7) C	(27) C	(47) A
(8) D	(28) B	(48) A
(9) C	(29) C	(49) D
(10) D	(30) C	(50) D
(11) D	(31) C	(51) A
(12) A	(32) D	(52) D
(13) B	(33) A	(53) A
(14) A	(34) A	(54) B
(15) C	(35) B	(55) D
(16) D (128 M ²)	(36) B	(56) C
(17) A	(37) D	(57) A
(18) D	(38) C	(58) D
(19) B	(39) A	(59) C
(20) D	(40) C	(60) C