

TMTA Test
Algebra II

1. Z is inversely proportional to t^2 and $z = 4$ when $t = 1$. Calculate z when $t = 2$
- A. $z = 2$
 - B. $z = 1$
 - C. $z = \frac{1}{2}$
 - D. $z = 0$
 - E. $z = -1$

2. Find the set of values p for which the given equation has real and equal roots.
- $$4x^2 - 3px + 1 = 0$$

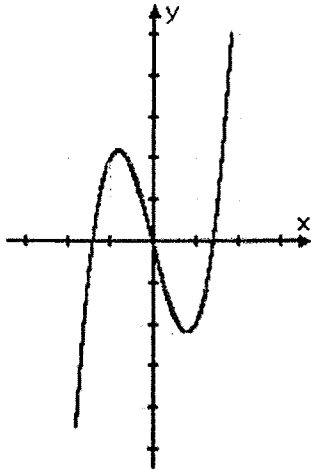
- A. $\left\{\frac{4}{3}\right\}$
- B. $\left\{\pm\frac{4}{3}\right\}$
- C. $\left\{\frac{16}{9}\right\}$
- D. $\left\{\pm\frac{16}{9}\right\}$
- E. $\left\{\frac{-4}{3}\right\}$

3. Simplify completely. $\frac{x^2+5x-6}{x^2-5x+4} \div \frac{x^2+9x+18}{x^2-x-12}$

- A. -1
- B. 2
- C. $\frac{x-3}{x+4}$
- D. 1
- E. $\frac{x+3}{x+4}$

4. After eight matches, a basketball player had scored a mean of 27 points. After three more matches, his mean was 29. Calculate the total number of points he scored in the last three games.
- A. 103
 - B. 45.64
 - C. 50.09
 - D. 102
 - E. 110

5. The graph below is:



- A. Even
- B. Odd
- C. Both
- D. Neither
- E. Symmetrical about x axis

6. The function $h(t) = -5t^2 + 20t + 2$ describes the height of a baseball, in meters, as a function of time, in seconds, from the instant the ball is hit. Mike solved the equation $-5t^2 + 20t + 2 = 0$ and its positive root represents:

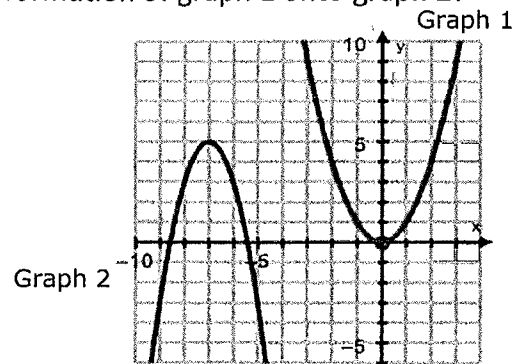
- A. The initial height of the ball
- B. The maximum height of the ball
- C. The time it takes for the ball to reach a maximum height of 2 meters
- D. The time it takes for the ball to hit the ground.
- E. The time it takes for the ball to reach a minimum height of 2 meters

7. Simplify $(2x^{\frac{1}{2}}y^{\frac{1}{3}})^6 \times (\frac{1}{2}x^{\frac{1}{4}}y^{\frac{3}{4}})^4$

- A. $4x^4y^5$
- B. $4x^3y^2$
- C. $2x^4y^5$
- D. x^3y^2
- E. x^4y^5

8. What mapping rule describes the transformation of graph 1 onto graph 2?

- A. $(x, y) \rightarrow (x + 5, -\frac{1}{2}y - 7)$
- B. $(x, y) \rightarrow (x - 7, -\frac{1}{2}y - 5)$
- C. $(x, y) \rightarrow (x + 5, -2y + 7)$
- D. $(x, y) \rightarrow (x - 7, -2y + 5)$
- E. $(x, y) \rightarrow (-x + 7, -2y + 5)$



9. The first three terms in a geometric progression are 144, x , 64 respectively, where x is positive. Find the sum to infinity of the progression.

- A. 96
- B. 144
- C. $\frac{144}{95}$
- D. 432
- E. undefined

10. Evaluate: $\frac{-5^2 + (-5)^2}{|4^2 - 2^5| - 2 * 3}$

- A. 0
- B. 10
- C. 5
- D. undefined
- E. -5

11. Given $A = \{x: 11x - 5 > 7x + 3, x \in \mathbb{R}\}$ and $B = \{x: 18x - 19 \geq 13 + 2x, x \in \mathbb{R}\}$. Find the range of set $A \cap B$.

- A. $\{x: x > 2, x \in \mathbb{R}\}$
- B. $\{x: x < 2, x \in \mathbb{R}\}$
- C. $\{x: x \geq 2, x \in \mathbb{R}\}$
- D. $\{x: x \leq 2, x \in \mathbb{R}\}$
- E. $\{x: x > 4, x \in \mathbb{R}\}$

12. Solve for x : $5^{(x+1)} + 5^{(2-x)} = 5^3 + 1$

- A. $\left\{25, \frac{1}{5}\right\}$
- B. $\{2, 1\}$
- C. $\{2, -1\}$
- D. $\{-2, -1\}$
- E. $\{-2, 1\}$

13. How many liters of a 10% acid solution should be mixed with 30 liters of a 50% acid solution to get a mix that is 20% acid?

- A. 60 liters
- B. 6 liters
- C. 9 liters
- D. 0.9 liters
- E. 90 liters

14. A cold faucet can fill the bath tub in 12 minutes, and a hot water faucet can fill the bath tub in 18 minutes. The drain can empty the bath tub in 24 minutes. If both faucets are on and the drain is open, how long will it take to fill the bath tub?

- A. 10.3 minutes
- B. 10 minutes
- C. 6.3 minutes
- D. 6 minutes
- E. 9.5 minutes

15. Find the missing root given -6 is a root of $x^2 + 10x + c = 0$.

- A. 4
- B. -4
- C. 6
- D. 24
- E. -6

16. When the polynomial $p(x) = x^3 - 3x^2 + ax + b$ is divided by $x - 1$, the remainder is -4 . When $p(x)$ is divided by $x - 2$, the remainder is also -4 . Find the remainder when $p(x)$ is divided by $x - 3$.

- A. -2
- B. 0
- C. 2
- D. -1
- E. 1

17. Solve the inequality $|2x - 5| \leq 6$.

- A. $-1 \leq x \leq 11$
- B. $\frac{-1}{2} \leq x \leq \frac{11}{2}$
- C. $\frac{1}{2} \leq x \leq \frac{11}{2}$
- D. $\frac{-11}{2} \leq x \leq \frac{1}{2}$
- E. $-1 \leq x \leq \frac{1}{2}$

18. If $(2 + i)(x + yi) = 1 + 3i$, where x and y are real, then which of the following satisfies the equation?

- A. (1, 2)
- B. (-1, -1)
- C. (2, 1)
- D. (1, -1)
- E. (1, 1)

19. Some high school students planned a school party. The budget for the food was \$480. When eight of the students failed to attend the party, the cost of the food for each attendee increased by \$10. How many students attended the party?

- A. 16
- B. 30
- C. 24
- D. 20
- E. 8

20. A movie theater runs its films continuously. One movie runs for 40 minutes and a second runs for 100 minutes. Both movies begin at 4 P.M. When will the movies begin at the same time again?

- A. 6:20 P.M.
- B. 7:20 A.M.
- C. 7:20 P.M.
- D. 8:20 P.M.
- E. 3:20 P.M.

21. If $\tan\theta = \frac{5}{12}$ and $\cos(2\theta) = 1 - 2\sin^2\theta$, then $\cos(2\theta)$ is

- A. $\frac{12}{13}$
- B. $\frac{50}{169}$
- C. $\frac{119}{169}$
- D. $\frac{-50}{169}$
- E. $\frac{-119}{169}$

22. The line $3x - 4y + 12 = 0$ meets the x axis and y axis at point A and B respectively.
The midpoint of line AB is:

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

23. Let $h(x) = x^2$ and $g(x) = x - 3$. Find x if $h(g(x)) = g(h(x))$.

- A. -2
- B. 2
- C. 12
- D. -12
- E. 6

24. $f(x)$ is defined as the product of the digits of x , e.g. $f(12) = 1 \times 2 = 2$. Find the largest three digit x such that $f(x) = 0$.

- A. 900
- B. 990
- C. 9990
- D. 90
- E. 100

25. Find the inverse of $f(x) = \frac{\frac{(2x-1)}{4} + 3}{5}$

A. $\frac{4(5y+3)+1}{2}$

B. $\frac{4(5x-3)+1}{2}$

C. $\frac{4(5x+3)+1}{20}$

D. $\frac{4(5x+3)+1}{4}$

E. $\frac{4(5x+3)+1}{2}$

26. The numbers 3, 5, 7, 8 and N are arranged in ascending order. If the mean of the numbers is equal to the median, find N.

A. 9

B. 12

C. 7

D. 11

E. 13

27. Simplify $\frac{\log_{10} 32}{\log_{10} 128}$.

A. $\frac{32}{128}$

B. $\frac{1}{4}$

C. $\frac{5}{7}$

D. $\log_{10} 32 - \log_{10} 128$

E. $\frac{7}{5}$

28. Simplify completely $\frac{8x}{2x-1} - \frac{x}{x+2}$.

A. $\frac{6x^2+17x}{(2x-1)(x+2)}$

B. $\frac{6x^2+17x}{(2x+1)(x+2)}$

C. $\frac{6x^2-17x}{(2x-1)(x+2)}$

D. $\frac{-6x^2+17x}{(2x-1)(x+2)}$

E. $\frac{6x^2+17x}{(x-1)(x+2)}$

29. Find x and y such that $\begin{pmatrix} x & 3 \\ -2 & y \end{pmatrix} \begin{pmatrix} 2 \\ 1 \end{pmatrix} = \begin{pmatrix} 5 \\ 0 \end{pmatrix}$.

A. (4, 1)

B. (1, 4)

C. (-0.5, 2)

D. (2, 0.5)

E. (-1, 4)

30. Find the inverse of matrix $A = \begin{pmatrix} 3 & -4 \\ 1 & -2 \end{pmatrix}$.

A. $\frac{-1}{2} \begin{pmatrix} -2 & -4 \\ -1 & 3 \end{pmatrix}$

B. $\frac{1}{2} \begin{pmatrix} -2 & -4 \\ -1 & 3 \end{pmatrix}$

C. $\frac{-1}{2} \begin{pmatrix} -2 & 4 \\ -1 & 3 \end{pmatrix}$

D. $\frac{-1}{2} \begin{pmatrix} -2 & -4 \\ -1 & -3 \end{pmatrix}$

E. $\frac{-1}{2} \begin{pmatrix} -2 & -4 \\ 1 & 3 \end{pmatrix}$

31. A statue that is 12 feet tall casts a shadow that is 15 feet long. Find the length of the shadow cast by a statue that is 8 feet tall.

A. 10 ft.

B. 12 ft.

C. 18 ft.

D. 6.4 ft.

E. 30 ft.

32. An arithmetic sequence has a common difference equal to 10 and its 6th term is equal to 52. Find its 15th term.

- A. 140
- B. 142
- C. 141
- D. 152
- E. 150

33. Express $3 \log_3 9 + \log_3 7 - \log_3 3$ as a single logarithm.

- A. $3 \log_3 13$
- B. $3 \log_3 21$
- C. $\log_3 42$
- D. $\log_3 1701$
- E. $\log_3 5103$

34. Find the radius of the circle having the following equation:

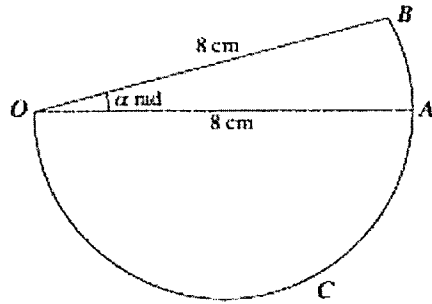
$$4x^2 + 4y^2 - 16x - 24y + 51 = 0$$

- A. 2
- B. 4
- C. $\frac{1}{16}$
- D. $\frac{1}{2}$
- E. $\frac{1}{4}$

35. What is the directrix for the parabola $x = y^2 - 14y + 3$?

- A. $4x = 185$
- B. $4x + 185 = 0$
- C. $4y + 185 = 0$
- D. $y + 183 = 0$
- E. $4y - 183 = 0$

36.



In the diagram above, OAB is a sector of a circle with center O and radius 8cm. OAC is a semicircle with diameter OA. The area of the semicircle OAC is twice the area of the sector OAB. Find α in terms of π .

- A. $\frac{\pi}{4}$
- B. $\frac{\pi}{8}$
- C. $\frac{\pi}{16}$
- D. $\frac{\pi}{2}$
- E. π

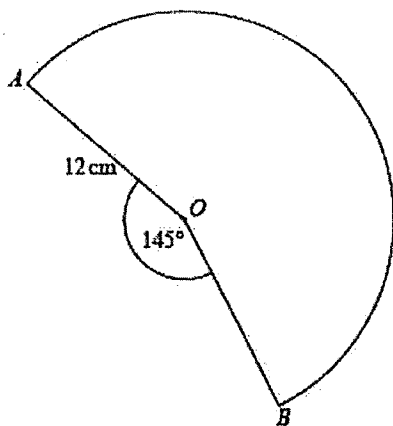
37. A line has equation $y = kx + 6$ and a curve has equation $y = x^2 + 3x + 2k$, where k is a constant. When $k = 2$, the line and curve intersect at points A and B. Find the distance AB.

- A. 6.71 units
- B. 6 units
- C. 7 units
- D. 6.2 units
- E. 7.7 units

38. John runs 10 miles at an average speed of x mi/hr. The next day he runs 12 miles at an average speed of $x - 1$ mi/hr. The time taken for the 10 mile run is 30 minutes less than the time taken for the 12 mile run. Find the time that John takes to complete the 12 mile run.

- A. 2 hr. 22 mins.
- B. 1 hr. 49 mins.
- C. 7.6 mins.
- D. 7.6 hrs.
- E. 182 mins.

39.



The diagram shows a sector, center O , and radius 12 cm . What is the perimeter of the shape above?

- A. 45.03
- B. 57.03
- C. 69.03
- D. 30.37
- E. 54.37

40. Bob and Rob each invest \$6000. Bob invests his \$6000 at a rate of 1.5% per year compound interest. Rob invests his \$6000 in a bank that pays simple interest. After 8 years, their investments are worth the same amount. The rate of simple interest per year that Rob received.

- A. 1.68%
- B. 1.48%
- C. 0.148%
- D. 1.58%
- E. 0.158%