Spring 2025

GRADE 8 MATHEMATICS

PTM0822_3,1

1. Solve the equation $4x^2 = 256$. What are the possible values of *x*? Select **all** the correct answers.

A. -8

- **B.** 0
- **C.** 8
- **D.** 4
- **E.** 16

PTM0824_P

2. The table represents a function.



What values of *x* can be added to the table to remain a function? Select **all** the correct answers.

- **A.** x = 0
- **B.** x = 1
- **C.** *x* = 2
- **D.** *X* = 3
- **E.** *X* = 4
- **F.** *X* = 5

PTM0819_1

3. The scatter plot shows the relationship between the temperature, in degrees Fahrenheit, and the number of visitors to Serengeti National Park in Tanzania.



Which of these is the best description of the type of relationship between the temperature and the number of visitors to Serengeti National Park?

- A. Positive linear association
- B. Negative linear association
- C. Nonlinear association
- **D.** No association

PTM0802_8

4. In 2021, Washington, D.C., had the highest population density in the United States, with approximately 11×10^3 people per square mile. New Jersey had the second highest population density, with approximately 13×10^2 people per square mile.

To the nearest whole number, how many times the population density of New Jersey was the population density of Washington, D.C.?

Enter your answer in the space.

PTM0825_P

5. Which sets of ordered pairs represent a function?

Select **all** the correct answers.

- **A.** Set A: (2, 3), (4, 5), (6, 7), (8, 9)
- **B.** Set B: (2, 3), (2, 4), (3, 5), (4, 6)
- **C.** Set C: (1, 2), (2, 4), (3, 6), (4, 8)
- **D.** Set D: (2, 2), (2, 3), (2, 4), (2, 5)
- **E.** Set E: (1, 2), (2, 2), (3, 2), (4, 2)

PTM0820_4

6. Which graph shows the line of best fit for the scatter plot?







7. Solve for *x*.

7x - 4 = 2(15 - x) + 20

Enter your answer in the space.

M18_D925_2

8. Which expression represents the solution to the equation shown?

$$x^3 = 2$$

- **A.** $\sqrt[2]{3}$
- **B.** $\sqrt[3]{2}$
- **C.** $2\sqrt{3}$
- **D.** $3\sqrt{2}$

PTM0809_3

9. A system of linear equations is shown.

$$y = 2x - 1$$
$$y = -3x + 4$$

Which statement describes the solution to the system of equations?

- **A.** The solution is a point that is on the line y = 2x 1 but not on the line y = -3x + 4.
- **B.** The solution is a point that is on the line y = -3x + 4 but not on the line y = 2x 1.
- **C.** The solution is the point where the two lines intersect.
- **D.** The solution is a point that is not on either line.

M18_B765_3

- **10.** Which expression has a value between 11 and 12?
 - **A.** $\sqrt{115}$
 - **B.** $\sqrt{120}$
 - **C.** $\sqrt{130}$
 - **D.** $\sqrt{145}$

PTM0801_4,1

11. Which expressions are equivalent to the expression $\left(\frac{4^3}{4^{-2}}\right)^2$? Select **all** the correct answers.

A.
$$\frac{4^{6}}{4^{-4}}$$

B. $\frac{4^{5}}{4^{0}}$
C. $\frac{4^{1}}{4^{-4}}$
D. $(4^{5})^{2}$
E. $(4^{1})^{2}$

8M20_002_2

- **12.** What value of x makes the equation $(17^{-8})(17^{15}) = \frac{1}{17^{x}}$ true?
 - **A.** -23
 - **B.** -7
 - **C.** 7
 - **D.** 23

- 13. Lydia is riding her bike at a constant rate of speed. She travels 3 miles in 18 minutes. Bryce is riding his bike at a constant rate of speed. The equation y = 5x represents the number of minutes, y, that it takes Bryce to ride x miles.
 - Show or explain how to determine Lydia's rate of speed in minutes per mile.
 - Show or explain how to determine Bryce's rate of speed in minutes per mile.
 - Who is traveling faster? How much faster?

14. Two points are shown on the coordinate plane.



Use the points on the coordinate plane.

- Why can the Pythagorean theorem be used to find the distance between the two points in the coordinate plane?
- Write an equation that can be used to find the distance between the two points in the coordinate plane.
- What is the distance between the two points in the coordinate plane?

15. A diagram of a triangle is shown. The measure of an interior angle and the measure of an exterior angle are missing.



Use the diagram.

- How can you use the two given interior angle measures to find the missing exterior angle measure?
- How can you use the missing interior angle measure to find the missing exterior angle measure?
- What is the missing exterior angle measure?

PTM0811_4

16. Function K is represented by y = 2x - 7.

Function *L* is represented by the table.

x	У
-2	11
-1	8
0	5
1	2
2	-1

Which function has the greater rate of change?

- **A.** Function *K*, because the *y*-intercept of function *K* is greater than the *y*-intercept of function *L*
- **B.** Function *L*, because the slope of function *L* is greater than the slope of function *K*
- **C.** Function *L*, because the *y*-intercept of function *L* is greater than the *y*-intercept of function *K*
- **D.** Function *K*, because the slope of function *K* is greater than the slope of function *L*

PTM0821_:

17. This question has two parts.

Maria, Alex, David, and Jackie each threw a baseball and kicked a football into the air.

Part A

Maria threw the baseball 75 feet. Alex threw the baseball a distance 10.5 feet shorter than the distance Maria threw the baseball. David threw the baseball 12.75 feet farther than Alex did. Jackie threw the baseball 1.6 times as far as David did.

- Write an expression to determine the distance Jackie threw the baseball.
- How far did Jackie throw the baseball?
- Show your work.

Enter your answer in the space provided. Show all your work to support your answer.

Part B

Maria kicked the football 8 feet into the air. Alex kicked the football 1.5 feet higher than Maria did. David kicked the football 2.25 feet lower than Alex did. Jackie kicked the football 1.2 times as high as David did.

- Write an expression to determine the height Jackie kicked the football into the air.
- How high did Jackie kick the football into the air?
- Show your work.

PTM0807_1

18. Two similar right triangles are shown.



Which statement describes the relationship between the hypotenuses of the similar triangles and the slope of the line?

- **A.** The ratio of rise to run for the hypotenuses of both triangles is equivalent to $\frac{3}{2}$, which means the slopes between the pairs of points on the line are the same.
- **B.** The ratio of rise to run for the hypotenuses of both triangles is equivalent to $\frac{2}{3}$, which means the slopes between the pairs of points on the line are the same.
- **C.** The ratio of rise to run for the hypotenuse of the bottom triangle is $\frac{3}{2}$. The ratio of rise to run for the hypotenuse of the top triangle is $\frac{6}{4}$. The ratios are not equivalent, which means the slope of a line can be different between pairs of points on the same line.
- **D.** The ratio of rise to run for the hypotenuse of the bottom triangle is $\frac{2}{3}$. The ratio of rise to run for the hypotenuse of the top triangle is $\frac{4}{6}$. The ratios are not equivalent, which means the slope of a line can be different between pairs of points on the same line.

PTM0827_1,4,3

19. Parallelogram *WXYZ* is shown on the coordinate plane.



Parallelogram WXYZ undergoes a translation 2 units to the right and 1 unit up and a rotation 90 degrees clockwise about the origin to produce parallelogram W'X'Y'Z'. Which statements are true?

Select **all** the correct answers.

- **A.** Angle X' will measure 75°.
- **B.** Angle X' will measure 165°.
- **C.** Line segment X'Y' will be parallel to line segment W'Z'.
- **D.** Line segment W'X' is the same length as line segment WX.
- **E.** Line segment W'Z' will be 3 units longer than line segment WZ.

PTM0815_17

20. Sam is making a flag for the New York Dance Parade. The flag is a right triangle with one leg 8 inches long and the other leg 15 inches long.



What is the length of the hypotenuse of the triangle in inches? Enter your answer in the space.

M18_A619_P

21. A linear function includes the points (1, 3) and (-1, -5).

What are the slope and *y*-intercept of the function?

Select **all** the correct answers.

- **A.** Slope = -4
- **B.** Slope = -1
- **C.** Slope = 4
- **D.** (0, -4)
- **E.** (0, -1)
- **F.** (0, 4)

PTM0826_P_2,4:3

22. This question has two parts.

Part A

Which equation defines a linear function and why?

Select **all** the correct answers.

A. y = 3x(x+2)

- **B.** 4y + 7 = 3x 1
- **C.** x = -3
- **D.** Its graph contains only points on a straight, non-vertical line.
- **E.** Its graph contains some points on a straight, non-vertical line.
- **F.** Its graph contains points not on a straight, non-vertical line.

Part B

Consider the given equation.

$$y = 10.7x^3 - 4$$

Which value in the equation indicates that the equation defines a nonlinear function?

Enter your answer in the space.

PTM0804_3

23. Truck P travels 110 miles in 2 hours, driving at a constant rate.

The graph shows the relationship between the time and the distance that Truck Q travels.



Which statement accurately describes the two proportional relationships?

- A. Truck P travels 55 miles per hour. Truck Q travels 55 miles per hour.Truck P is traveling at the same rate as Truck Q.
- B. Truck P travels 70 miles per hour. Truck Q travels 55 miles per hour.Truck P is traveling at a greater rate than Truck Q.
- **C.** Truck P travels 55 miles per hour. Truck Q travels 70 miles per hour. Truck Q is traveling at a greater rate than Truck P.
- D. Truck P travels 70 miles per hour. Truck Q travels 70 miles per hour.Truck P is traveling at the same rate as Truck Q.

PTM0823_:

24. This question has two parts.

A system of equations is shown.

$$\begin{cases} y = 2x + 3 \\ y = -x + 1 \end{cases}$$

Part A

- Identify the point of intersection when both equations are graphed on the same coordinate plane.
- Explain using words or symbols why the point of intersection represents the solution to the system of equations.

Enter your answer in the space provided.

Part B

- Solve the same system of equations algebraically.
- Does your solution match the point of intersection in Part A? Explain why or why not.

Enter your answer in the space provided.

25. There is a proportional relationship between the number of nights, x, visitors stay at a hotel and the cost in dollars, y. The equation y = 175x represents the cost in dollars, y, to stay at the Atlas Hotel for x nights. The table shows how much it costs in dollars, y, to stay at the Emerald Hotel for x nights.

Emerald Hotel Costs

Number of Nights, x	Cost (dollars), y
3	540
5	900

- Show or explain how to determine the rate in dollars per night at the Atlas Hotel.
- Show or explain how to determine the rate in dollars per night at the Emerald Hotel.
- Which hotel charges less per night? How much less?

Enter your answer in the space provided. Show all your work to support your answer.

8M23_026_4

26. Which equation has infinitely many solutions?

A. -x = x

- **B.** 2x + 1 = 2x 1
- **C.** x + 6 = 5x + 30
- **D.** 3(x+2) = 3x+6



Please let your teacher know that you have completed your test.

