Student Name $\qquad$
Teacher Name $\qquad$

School $\qquad$
System $\qquad$


Tennessee Comprehensive Assessment Program
Achievement Test ~ Grade 8
Practice Test

## Mathematics

## Part 1

1 Ryuta's homework assignment was to measure the temperature in his backyard and then graph the results. The results are shown below.


Based on the graph, which statement best describes the change in temperature?
A The temperature decreased, then stayed constant, and then decreased again.
B The temperature decreased, then increased, and then stayed constant.
C The temperature increased, then stayed constant, and then decreased.
D The temperature increased, then decreased, and then increased again.

2 Rennie rode her bicycle 2.2 miles up a hill in 0.2 hour. Then she rode back downhill on the same path in 0.12 hour.

$$
\text { distance }=\text { rate } \times \text { time }
$$

What is her average rate for the combined trip?
F 10.88 miles per hour
G 13.75 miles per hour
H 27.50 miles per hour
J 31.43 miles per hour

3 Which function is nonlinear?
A $\quad f(x)=5$
B $\quad f(x)=3 x$
C $f(x)=5 x^{2}-2$
D $\quad f(x)=-2 x+3$

4 What is the value of this expression?

$$
\frac{\left(1.5 \times 10^{24}\right)\left(6 \times 10^{-12}\right)}{2 \times 10^{3}}
$$

F $\quad 4.5 \times 10^{4}$
G $\quad 4.5 \times 10^{9}$
H $\quad 4.5 \times 10^{12}$
J $4.5 \times 10^{15}$

5 Which number is a rational number?
A 1
B $\pi$
C $\sqrt{6}$
D $0.832141141114 \ldots$

6 The table shows the coordinates of three points contained in the graph of a line.

| $x$ | $y$ |
| ---: | ---: |
| -1 | 1 |
| 0 | 3 |
| 1 | 5 |

What is the slope of the line?

F $\quad-2$

G $-\frac{1}{2}$
H $\quad \frac{1}{2}$
J 2

7 Coach Smith went to a store to buy tennis balls. The following packages of tennis balls are available at this store.


Coach Smith needs to buy 24 tennis balls. How much money will she save by purchasing 24 tennis balls in packages with the lowest unit price compared to the highest unit price?

A $\$ 1.05$
B $\quad \$ 1.50$
C $\$ 3.15$
D $\$ 3.60$

8 What is the solution for $x$ in the equation $f(x)=g(x)$, where $f(x)=30-0.5 x$ and $g(x)=2 x-15$ ?

F $\quad x=6$
G $x=10$
H $x=18$
J $x=30$

9 Which linear equation is best represented by this graph?


A $y=-2 x+1$
B $\quad y=-x+2$
C $y=2 x+1$
D $y=x+1$

10 What is the value of $y$ in the solution to this system of linear equations?

$$
\begin{gathered}
8 x-4 y=28 \\
-3 x+6 y=12
\end{gathered}
$$

F 2
G 3
H 5
J 6

11 Shelley received the four cards shown below.


She was asked to put the cards in order from least to greatest value. Which list shows the correct order of the cards?

A $P, T, R, S$
B $S, P, T, R$
C $T, P, R, S$
D $T, R, P, S$

12 Brenna built a skateboard ramp with the measurements shown below.


$$
a^{2}+b^{2}=c^{2}
$$

What is $x$, the length of the ramp?
F 5 inches
G 14 inches
H 17 inches
J 23 inches

13 A brand new one-dollar bill is $4.3 \times 10^{-3}$ inch thick. What would be the thickness of a stack of 200 brand new one-dollar bills?

A 0.63 inch
B 0.86 inch
C 6.3 inches
D 8.6 inches

14 The ages and heights of a number of different plants of the same species are recorded on the scatterplot.


Which equation represents a line of best fit for this scatterplot?
F $\quad y=\frac{5}{7} x$
G $y=\frac{5}{6} x$
H $\quad y=\frac{6}{5} x$
J $y=\frac{9}{5} x$

15 Tamara read a newspaper article about the cost of attending a university in 2005.

- The average cost to attend a public university was about $\$ 12,000$ per year.
- The average cost to attend a private university was about \$30,000 per year.
- The author of the article stated that a person would save between $\$ 40,000$ and $\$ 50,000$ over 4 years by attending a public university.

Which statement best describes the author's statement?
A It is valid because the total cost over 4 years of attending both types of universities is about \$42,000.

B It is invalid because the total cost over 4 years of attending both types of universities is about \$168,000.

C It is invalid because the difference in costs over 4 years of attending a private university to a public university is about $\$ 18,000$.

D It is invalid because the difference in costs over 4 years of attending a private university to a public university is about $\$ 72,000$.

16 Mrs. Myer put congruent trapezoid-shaped tiles in her kitchen, as shown below.


What is the measure of Angle $x$ ?
F $\quad 15^{\circ}$
G $75^{\circ}$
H $105^{\circ}$
J $285^{\circ}$

17 Which scatterplot displays a negative relationship over the entire set of data?
A

C




18 What appears to be the $y$-value of the $y$-intercept of this graphed linear function?


F 3

G 0

H $\frac{1}{3}$

J -3

19 The heights of five 3-year-old children are shown in this graph.


A student claimed that Amy is much taller than the other four children. Which statement best explains why this claim is misleading?

A There is no comparison to the children's heights the previous year.
B The heights are recorded in inches and not feet.
C The weights of the children are not given.
D The scale of the vertical axis is very small.

20 Which point on the number line is closest to the location of -1.2 ?


F $W$
G $X$
H $Y$
J $Z$

21 Alfonso compared the price of tiles at four different stores. Which store sells the tile at the lowest price per tile?

A Store W sells 100 tiles for $\$ 140$.
B Store $X$ sells 130 tiles for $\$ 221$.
C Store $Y$ sells 170 tiles for $\$ 255$.
D Store Z sells 180 tiles for $\$ 288$.

22 Which is closest to the straight-line distance between Points $P$ and $Q$ on the grid below?


$$
a^{2}+b^{2}=c^{2}
$$

F 8 units
G 11 units
H 13 units
J 16 units

23 Parallel Lines $t$ and $u$ when cut by Transversal $v$ form eight angles, as shown in the diagram below.


If the measure of Angle 2 is $112^{\circ}$, what is the measure of $\angle 5$ ?
A $68^{\circ}$
B $\quad 72^{\circ}$
C $112^{\circ}$
D $248^{\circ}$

24 Which equation best represents the line graphed on the grid below?


F $\quad y=3 x$
G $y=x-3$
H $\quad y=x+3$
J $y=3 x+3$

25 What is the value of $\frac{\left(8.4 \times 10^{36}\right)}{3 \times 10^{9}}$ ?
A $\quad 2.8 \times 10^{4}$
B $\quad 5.4 \times 10^{4}$
C $\quad 2.8 \times 10^{27}$
D $5.4 \times 10^{27}$

26 What is the slope of the line that passes through the points $(6,13)$ and $(10,21)$ ?

$$
m=\frac{y_{2}-y_{1}}{x_{2}-x_{1}}
$$

F 2
G 4
H 6
J 8

27 In 2008, the world's population was estimated to be $6.705 \times 10^{9}$ people. The table below shows the approximate populations of two continents the same year.

Populations of Continents

| Continent | Approximate <br> Population |
| :--- | :---: |
| Asia | $4.052 \times 10^{9}$ |
| Europe | $7.36 \times 10^{8}$ |

Which is closest to the number of people who lived on continents other than Asia or Europe?
A $1.917 \times 10^{9}$
B $\quad 2.653 \times 10^{9}$
C $\quad 3.397 \times 10^{9}$
D $4.707 \times 10^{9}$

28 Henry is practicing for a swim meet. Four of his practice results are shown in the table.

Henry's Results

| Distance <br> (in meters) | Time <br> (in seconds) |
| :---: | :---: |
| 50 | 56 |
| 100 | 130 |
| 200 | 184 |
| 400 | 345 |

$$
\text { distance }=\text { rate } \times \text { time }
$$

For which distance did Henry swim the fastest?
F 50 meters
G 100 meters
H 200 meters
J 400 meters

## Part 2

29 Jamal is on the high-jump team at his school. The graph below shows the height of each jump attempt he made at a competition.


Jump Attempts

Based on the graph, which statement best describes the heights of Jamal's jumps?
A The heights of Jamal's jumps decreased, then stayed constant.
B The heights of Jamal's jumps increased, then stayed constant.
C The heights of Jamal's jumps stayed constant, then decreased.
D The heights of Jamal's jumps stayed constant, then increased.

30 An equation is given below.

$$
4 x+2 y^{3}=5+y
$$

Which term identifies this equation as nonlinear?

```
F 4x
G 2y 3
H 5
J y
```

31 Which expression can be used to find the product of $\left(5.8 \times 10^{34}\right)$ and $\left(4.7 \times 10^{15}\right)$ ?
A $(5.8+4.7) \times 10^{(34 \times 15)}$
B $\quad(5.8+4.7) \times 10^{(34+15)}$
C $(5.8 \times 4.7) \times 10^{(34 \times 15)}$
D $(5.8 \times 4.7) \times 10^{(34+15)}$

32 Look at this list of values.

$$
\left[-1, \sqrt{8}, \frac{3}{8},-0.212\right]
$$

Which statement about these values is true?

F Only -1 is irrational.

G Only -0.212 is rational.
H $\sqrt{8}$ and $\frac{3}{8}$ are irrational.
J $-1, \frac{3}{8}$ and -0.212 are rational.

33 What is the slope of the line represented by this equation?

$$
4 x+2 y=6
$$

A -4
B -2
C 3
D 4

34 Which graph represents a linear equation that appears to have a $y$-intercept of $\left(0, \frac{1}{2}\right)$ ?


35 The triangle on the grid represents a section of Miesha's backyard.


$$
a^{2}+b^{2}=c^{2}
$$

Which is closest to the length of side $h$ in this triangle?
A 14.0 units
B $\quad 10.3$ units
C 9.3 units
D 7.5 units

36 Given: $\left\{\begin{array}{l}f(x)=2.4+0.4 x \\ g(x)=0.28 x-1.2\end{array}\right.$
What is the solution to $f(x)=g(x)$ ?
F $\quad-30$
G $\quad-10$
H 3.75
J 11.25

37 If $2 x-6 y=32$ and $3 x+5 y=6$, then which ordered pair represents the solution for $x$ and $y$ ?
A $(-3,3)$
B $(7,-3)$
C $(25,3)$
D $(-3,-7)$

38 The table below shows the masses of some of the planets in our solar system.
Mass of Planets

| Planet | Mass <br> (in kilograms) |
| :---: | :---: |
| Earth | $7.3483 \times 10^{22}$ |
| Jupiter | $1.8987 \times 10^{27}$ |
| Uranus | $8.6849 \times 10^{25}$ |
| Neptune | $1.0244 \times 10^{26}$ |

Which list of planets is in order from the least mass to the greatest mass?
F Neptune, Jupiter, Earth, Uranus
G Jupiter, Neptune, Uranus, Earth
H Earth, Uranus, Neptune, Jupiter
J Uranus, Earth, Jupiter, Neptune

39 Parallel Lines $t$ and $u$ are cut by Transversal $v$, forming eight angles, as shown below.


The measure of $\angle 1=48^{\circ}$. What is the measure of $\angle 7$ ?
A $42^{\circ}$
B $48^{\circ}$
C $132^{\circ}$
D $228^{\circ}$

40 The distance from the planet Venus to the sun is about $1.08 \times 10^{8}$ kilometers. Light travels at a rate of $3 \times 10^{5}$ kilometers per second. How much time, in seconds, does it take for light to travel from the sun to Venus?

F 0.36
G 2.78
H 360
J 2,778

41 A group of students each measured the growth of a group of plants at different ages. The results are shown in the scatterplot below.


Which conclusion about the growth rate of the group of plants is best supported by the data?
A The plants grew about 2 inches per month.
B The plants grew about 3 inches per month.
C The plants grew about 4 inches per month.
D The plants grew about 6 inches per month.

42 The graph below was included in a newspaper article about the average rainfall in a city.


The article states that the three months shown in the graph indicate a significant drop in rainfall this year compared to previous years. How is the information in the graph misleading?

F The vertical axis intervals are very small.
G The scale on the vertical axis is not constant.
H The comparison was not made with other cities.
J More than three months should have been used.

43 A student designed a rectangular flag for a school project, as shown below. The diagonal distance is 5 ft .


$$
a^{2}+b^{2}=c^{2}
$$

If the length of the flag is 4 ft , what is the width?
A 9 feet
B 6 feet
C 4 feet
D 3 feet

44 A food manufacturer compared the cooking times for different frozen foods in a microwave oven $(x)$ to the cooking times in a conventional oven $(y)$. A line of best fit for the data collected is $y=0.5 x+5$. Which scatterplot best represents this set of data?


45 The graph below shows the linear function $y=-5 x$.


If the value of $x$ is 2 , what is the value of $y$ in this function?

A 10

B $\frac{2}{5}$
C $-\frac{2}{5}$

D -10

46 Javier will sort the four equations shown by classifying them as linear or nonlinear.

$$
y=1 \quad x+y=3 \quad y=2-x^{3} \quad x=6
$$

Which shows the correct way Javier should sort the above equations?

F $x=6$
Linear


Linear

H $\begin{gathered}y=1 \\ y=2-x^{3} \\ x=6\end{gathered}$
Linear

J $\begin{gathered}y=1 \\ x+y=3 \\ x=6\end{gathered}$
Linear


Nonlinear

47 Coach Jenson will order soccer uniforms from one of the stores listed below.

- Store A sells 15 uniforms for a total of $\$ 449.85$.
- Store B sells 10 uniforms for a total of $\$ 300.00$.
- Store C sells uniforms for $\$ 32.00$ per uniform.
- Store D sells 2 uniforms for a total of $\$ 58.00$.

Which store has the lowest price per uniform?
A Store A
B Store B
C Store C
D Store D

48 Matthew measured a right triangle with a hypotenuse 10 centimeters ( cm ) long and one leg 6 centimeters long.

$$
a^{2}+b^{2}=c^{2}
$$

What is the length of the other leg of the triangle Matthew measured?
F 4 cm
G 8 cm
H $\quad 12 \mathrm{~cm}$
J 16 cm

49 The rectangle on the grid below represents the dimensions of a kitchen floor.


What is the distance, $n$, across the kitchen floor?
A 21 units
B 15 units
C 12 units
D 8 units

50 What is the value of $b$ in the solution to this system of linear equations?

$$
\begin{gathered}
2 a-4 b=4 \\
3 a+3 b=-21
\end{gathered}
$$

```
F -9
G -6
H -4
J -3
```

51 The graph of a linear function is shown below.


Which linear equation is best represented by this graph?
A $\quad y=2 x-3$
B $\quad y=3 x-2$
C $y=-2 x+3$
D $y=-3 x+2$

52 The table below shows information Miguel recorded.

Hypotenuse of a Right Triangle

| Right Triangle | Hypotenuse <br> Measure |
| :---: | :---: |
| $P$ | $\sqrt{\frac{25}{16}}$ |
| $R$ | $\sqrt{20}$ |
| $S$ | $\sqrt{25}$ |
| $T$ | $\sqrt{169}$ |

Which triangle has a hypotenuse with a length that is an irrational number?
F Triangle $P$
G Triangle $R$
H Triangle $S$
J Triangle $T$

53 The graph below shows the balance of Joey's bank account over time.


Based on the graph, which statement about Joey's bank account balance is true?
A The balance in Joey's account was highest at the end of this time period.
B The balance in Joey's account was lowest in the middle of this time period.
C The balance in Joey's account was constant throughout this time period.
D The balance in Joey's account increased steadily over this time period.

54 Which value appears to be the slope of the line graphed below?


F 4

G $\frac{1}{4}$
H $-\frac{1}{4}$
J -4

55 A rocket plane traveled at approximately 18,783.3 meters per second.

```
distance = rate }\times\mathrm{ time
```

At that rate, which is closest to the number of seconds it would take the rocket plane to travel 21,000 meters?

A 0.69
B 0.89
C 1.12
D 1.81

Mathematics
Answer Key

| 1 | C |
| :---: | :---: |
| 2 | G |
| 3 | C |
| 4 | G |
| 5 | A |
| 6 | J |
| 7 | D |
| 8 | H |
| 9 | A |
| 10 | H |
| 11 | D |
| 12 | H |
| 13 | B |
| 14 | H |


| 15 | D |
| :---: | :---: |
| 16 | H |
| 17 | D |
| 18 | F |
| 19 | D |
| 20 | G |
| 21 | A |
| 22 | H |
| 23 | A |
| 24 | J |
| 25 | C |
| 26 | F |
| 27 | A |
| 28 | J |


| 29 | B |
| :---: | :---: |
| 30 | G |
| 31 | D |
| 32 | J |
| 33 | B |
| 34 | F |
| 35 | B |
| 36 | F |
| 37 | B |
| 38 | H |
| 39 | C |
| 40 | H |
| 41 | A |
| 42 | F |


| 43 | D |
| :---: | :---: |
| 44 | F |
| 45 | D |
| 46 | J |
| 47 | D |
| 48 | G |
| 49 | B |
| 50 | J |
| 51 | A |
| 52 | G |
| 53 | A |
| 54 | G |
| 55 | C |

