VIRGINIA STANDARDS OF LEARNING

GRADE 7
MATHEMATICS

2023 Mathematics Standards of Learning

Practice Item Set

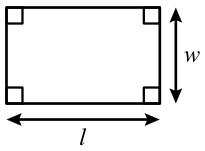
Printed in the United States of America.

Questions 1–2 are in the non-calculator section. Questions in this section may not be answered with a calculator.

Questions 3–22 are in the calculator section. A calculator may be used with questions in this section.

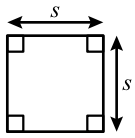
Middle School Mathematics Formula Sheet
2023 *Mathematics Standards of Learning*

Geometric Formulas



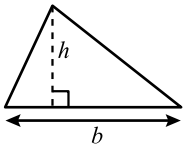
$p = 2l + 2w$

$A = lw$

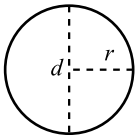


$p = 4s$

$A = s^2$



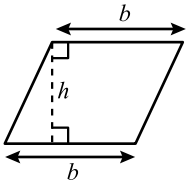
$A = \frac{1}{2}bh$



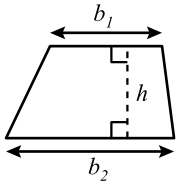
$C = 2\pi r$

$C = \pi d$

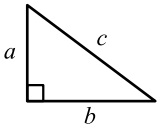
$A = \pi r^2$



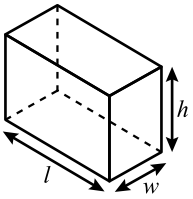
$A = bh$



$A = \frac{1}{2}h(b_1 + b_2)$



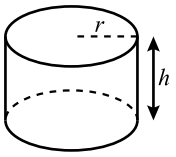
$a^2 + b^2 = c^2$



$V = lwh$

$V = Bh$

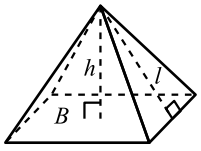
$S.A. = 2lw + 2lh + 2wh$



$V = \pi r^2 h$

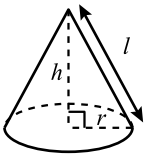
$V = Bh$

$S.A. = 2\pi r^2 + 2\pi rh$



$V = \frac{1}{3}Bh$

$S.A. = \frac{1}{2}lp + B$



$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}Bh$

$S.A. = \pi r^2 + \pi rl$

Abbreviations

milligram	mg
gram	g
kilogram	kg
milliliter	mL
liter	L
kiloliter	kL
millimeter	mm
centimeter	cm
meter	m
kilometer	km
square centimeter	cm^2
cubic centimeter	cm^3

ounce	oz
pound	lb
quart	qt
gallon	gal.
inch	in.
foot	ft
yard	yd
mile	mi.
square inch	sq in.
square foot	sq ft
cubic inch	cu in.
cubic foot	cu ft

Area	A
Area of Base	B
Circumference	C
Perimeter	p
Surface Area	$S.A.$
Volume	V

Pi

$\pi \approx 3.14$

$\pi \approx \frac{22}{7}$

1 Samantha stated that 324 is a perfect square. Which factors could Samantha have used to justify her statement?

A 17 and 17
B 18 and 18
C 81 and 81
D 162 and 162

2 Which operation should be performed last when using the order of operations to simplify this expression?

$$20 - 6^2 \bullet 2$$

F $20 - 72$
G $^{-}16 \bullet 2$
H $20 - 36$
J $6 \bullet 2$

The non-calculator section of the practice item set ends here.

A calculator may be used with questions in the next section.

3 Adam had 820 baseball cards. He gave 25% of the cards to his brother. How many cards did Adam give to his brother?

A 795
B 615
C 205
D 164

4 The table shows the number of different-colored roses sold at a flower shop.

Roses Sold

Color	Number of Roses
Yellow	
Red	
Pink	
Orange	

Key:  = 20 roses

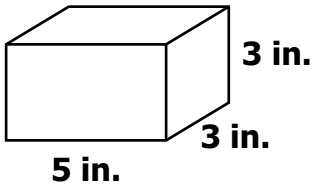
The shop owner will create a circle graph to represent the data. What percent of the circle should be used to represent the number of pink roses sold?

F 15%
G 20%
H 25%
J 30%

5 A cylinder has a radius of 7 inches and a height of 20 inches. Which is closest to the surface area of this cylinder?

A 517 sq in.
B 769 sq in.
C 1,187 sq in.
D 3,077 sq in.

6 The measurements of a rectangular prism are shown.



If the height of this rectangular prism was multiplied by $\frac{1}{2}$, the surface area would —

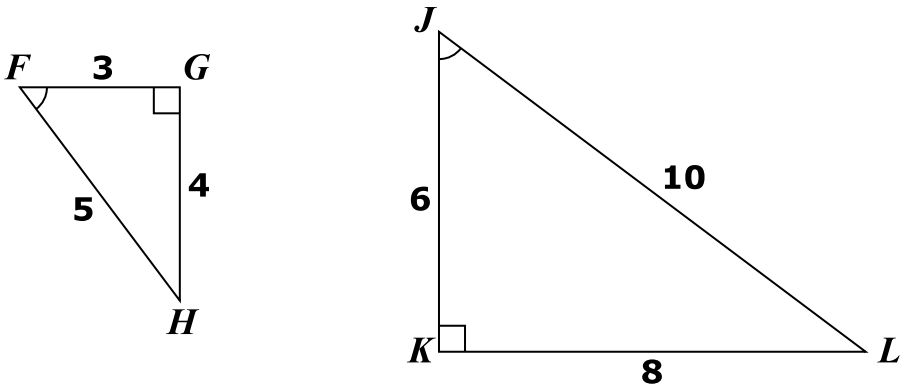
F be double the original surface area.

G be half the original surface area.

H decrease by 24.

J decrease by $\frac{1}{2}$.

7 Two similar triangles are shown.



Which statement is NOT true?

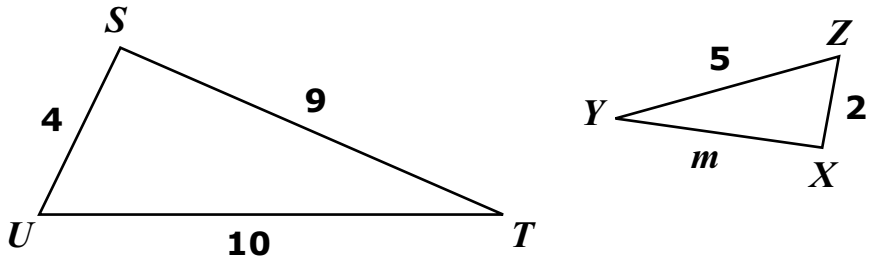
A $\overline{GH}$ corresponds to $\overline{KL}$

B $\angle H$ corresponds to $\angle L$

C $\overline{FH} \cong \overline{JL}$

D $\angle F \cong \angle J$

8 **Triangle STU is similar to triangle XYZ.**



Which proportion can be used to find m ?

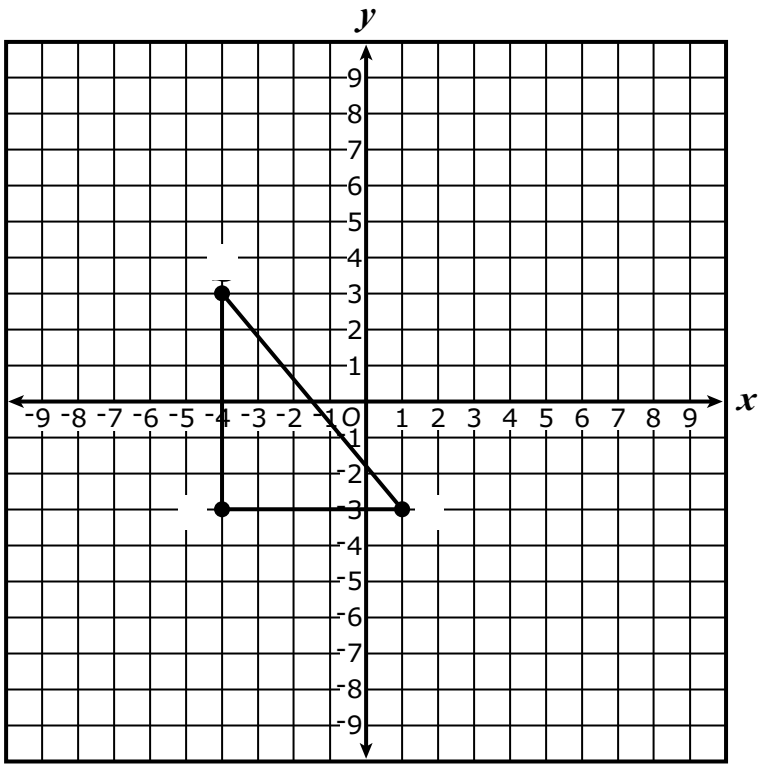
F $\frac{9}{m} = \frac{10}{5}$

G $\frac{4}{m} = \frac{10}{2}$

H $\frac{10}{m} = \frac{4}{2}$

J $\frac{10}{m} = \frac{9}{5}$

9 **Triangle PQR is dilated by a scale factor of 2 using the origin as the center of dilation. What appears to be the new coordinates of point R after this dilation?**



A $(1, -6)$

B $(2, -6)$

C $(2, -3)$

D $(3, -1)$

10 The distance, d, a spring stretches is directly proportional to the force, F, on the spring. The constant of proportionality is 0.25. Which equation represents this relationship?

F $d = \frac{0.25}{F}$

G $d = 0.25F$

H $F = 0.25d$

J $F = d + 0.25$

11 One brand of dog food is sold in 4-pound bags, 12-pound bags, and 24-pound bags.

- **A 4-pound bag costs $6.00.**
- **A 12-pound bag costs $18.00.**
- **A 24-pound bag costs $36.00.**
- **All of the costs include tax.**

What is the slope of the linear equation that models the relationship between the number of pounds of dog food, x, and the cost in dollars, y ?

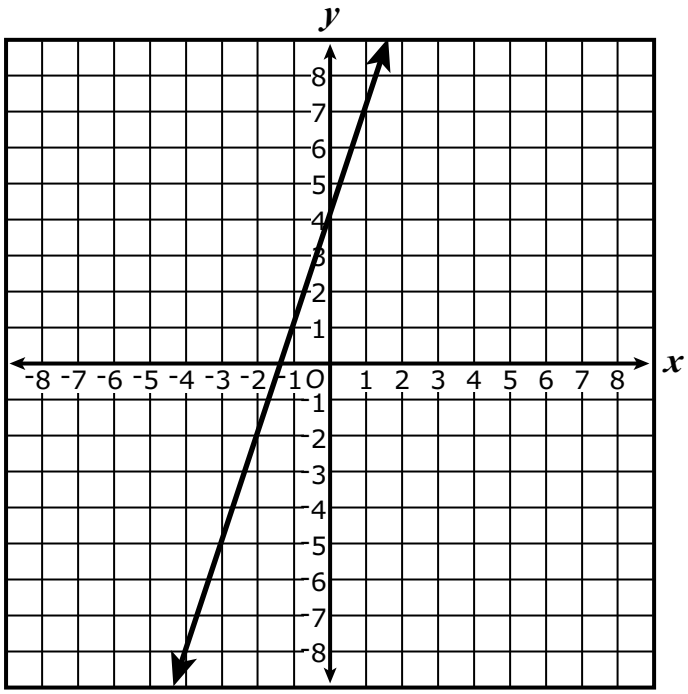
A $\frac{9}{2}$

B $\frac{3}{2}$

C $\frac{2}{3}$

D $\frac{1}{3}$

12 The graph of a line is shown.



Which statement best describes the slope of this line?

F It is negative because as the x-values decrease, the y-values increase.

G It is positive because as the x-values increase, the y-values increase.

H It is negative because the graph contains negative x- and y-values.

J It is positive because the graph has a positive y-intercept.

Directions: Use the following information to answer questions 13–15.

A school club is selling T-shirts to raise money for a field trip. The club members —

- **purchase a pack of 24 T-shirts for $348**
- **sell each T-shirt for $19.00**

13 Which equation best represents the total sales in dollars, y, of x T-shirts?

A $y = 19x$

B $y = \frac{x}{19}$

C $y = 24x$

D $y = \frac{x}{24}$

14 The T-shirt supplier sells T-shirts only in packages of 24. Which table best shows the amount the club will earn after paying for the T-shirt packages and selling the T-shirts?

F

Club Earnings

Number of T-Shirts Sold	24	48	72	96
Amount Earned (dollars)	108	127	146	165

G

Club Earnings

Number of T-Shirts Sold	24	48	72	96
Amount Earned (dollars)	108	216	324	432

H

Club Earnings

Number of T-Shirts Sold	24	48	72	96
Amount Earned (dollars)	348	696	1,044	1,392

J

Club Earnings

Number of T-Shirts Sold	24	48	72	96
Amount Earned (dollars)	456	912	1,368	1,824

15 The club members decide to increase the price of the T-shirts. They will charge 5% more than the original amount. Which dollar value represents 5% of the original price?

A $0.05
B $0.95
C $3.80
D $5.00

End of Set

16 If $n = 3$, what is the value of $(3 + n^4) \div 3$?

F 5
G 16
H 28
J 30

17 What is the solution to the equation?

$$\frac{d - 3.4}{7} = 2.8$$

A $d = 3.0$
B $d = 3.8$
C $d = 16.2$
D $d = 23.0$

18 Beatrice has 18 pencils. Beatrice has 2 more than 4 times the number of pencils Rick has. Exactly how many pencils does Rick have?

F 11 pencils
G 7 pencils
H 5 pencils
J 4 pencils

19 Which set of values contains only solutions to $-3x < 15$?

A $\{-5, -4, -3\}$
B $\{-8, -7, -6\}$
C $\{-4, -3, -2\}$
D $\{-7, -6, -5\}$

20 A spinner has 8 equal-sized sections.

- **2 red**
- **1 yellow**
- **3 blue**
- **2 green**

A class spun the arrow on the spinner 20 times. The arrow landed on green 3 times. The class will spin the arrow on the spinner a total of 500 times. As the number of spins increases, the experimental probability of the arrow landing on green will most likely approach —

F 0.15
G 0.25
H 0.3
J 0.375

21 A fair number cube has faces labeled 1, 2, 3, 4, 5, and 6. Wesley rolled this number cube 30 times. This table shows his results.

Wesley's Results

Number Landing Face-up	Frequency
1	5
2	6
3	4
4	4
5	3
6	8

Wesley compared the theoretical and experimental probabilities. Which statement correctly compares the theoretical and experimental probabilities that the number landing face-up is a multiple of 3 ?

A The theoretical probability of $\frac{1}{3}$ is less than the experimental probability.

B The experimental probability of $\frac{1}{3}$ is less than the theoretical probability.

C The theoretical probability of $\frac{12}{30}$ is less than the experimental probability.

D The experimental probability of $\frac{12}{30}$ is less than the theoretical probability.

22 Jason represented the values of his 35 baseball cards in a histogram and in a stem-and-leaf plot. Which statement best describes the graph Jason could use to find the median value of his 35 baseball cards?

F A histogram because it lists each value in a set of data

G A histogram because it shows the frequency of data using intervals

H A stem-and-leaf plot because it lists each value in a set of data

J A stem-and-leaf plot because it shows the frequency of data using intervals

Grade 7 Mathematics
Practice Item Set Spring 2025
Answer Key

Sequence Number	Correct Answer	Reporting Category	Reporting Category Description
1	B	001	Number, Number Sense, Computation and Estimation
2	F	003	Probability, Statistics, Patterns, Functions, and Algebra
3	C	001	Number, Number Sense, Computation and Estimation
4	J	001	Number, Number Sense, Computation and Estimation
5	C	002	Measurement and Geometry
6	H	002	Measurement and Geometry
7	C	002	Measurement and Geometry
8	F	002	Measurement and Geometry
9	B	002	Measurement and Geometry
10	G	003	Probability, Statistics, Patterns, Functions, and Algebra
11	B	003	Probability, Statistics, Patterns, Functions, and Algebra
12	G	003	Probability, Statistics, Patterns, Functions, and Algebra
13	A	003	Probability, Statistics, Patterns, Functions, and Algebra
14	G	003	Probability, Statistics, Patterns, Functions, and Algebra
15	B	001	Number, Number Sense, Computation and Estimation
16	H	003	Probability, Statistics, Patterns, Functions, and Algebra
17	D	003	Probability, Statistics, Patterns, Functions, and Algebra
18	J	003	Probability, Statistics, Patterns, Functions, and Algebra
19	C	003	Probability, Statistics, Patterns, Functions, and Algebra
20	G	003	Probability, Statistics, Patterns, Functions, and Algebra
21	A	003	Probability, Statistics, Patterns, Functions, and Algebra
22	H	003	Probability, Statistics, Patterns, Functions, and Algebra

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