Georgia Milestones
Assessment System

Analytic Geometry Formula Sheet

Below are the formulas you may find useful as you take the test. However, you may find that you do not need to use all of the formulas. You may refer to this formula sheet as often as needed.

Quadratic Formulas

Quadratic Equations
Standard Form: $y = ax^2 + bx + c$
Vertex Form: $y = a(x - h)^2 + k$

Quadratic Formula
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Average Rate of Change
The change in the *y*-value divided by the change in the *x*-value for two distinct points on a graph.

Geometry Formulas

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

Trigonometric Relationships
$\sin \theta = \frac{opp}{hyp}$; $\cos \theta = \frac{adj}{hyp}$; $\tan \theta = \frac{opp}{adj}$

Equation of a Circle
$(x - h)^2 + (y - k)^2 = r^2$

Circumference of a Circle
$C = \pi d$ or $C = 2\pi r$
$\pi \approx 3.14$

Arc Length of a Circle
Arc Length $= \frac{2\pi r\theta}{360}$

Area of a Circle
$A = \pi r^2$

Area of a Sector of a Circle
Area of Sector $= \frac{\pi r^2 \theta}{360}$

Volume
Cylinder	$V = \pi r^2 h$
Pyramid	$V = \frac{1}{3} Bh$
Cone	$V = \frac{1}{3} \pi r^2 h$
Sphere	$V = \frac{4}{3} \pi r^3$

Statistics Formulas

Conditional Probability
$$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$$

Multiplication Rule for Independent Events
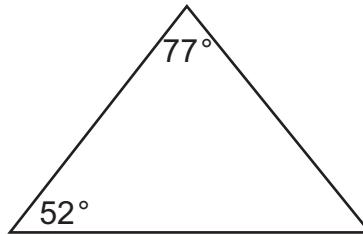$P(A \text{ and } B) = P(A) \cdot P(B)$

Addition Rule
$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

You can find mathematics formula sheets on the Georgia Milestones webpage at
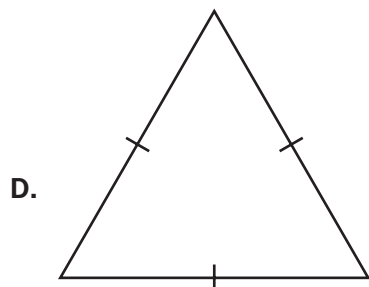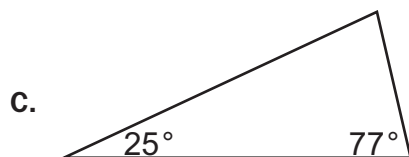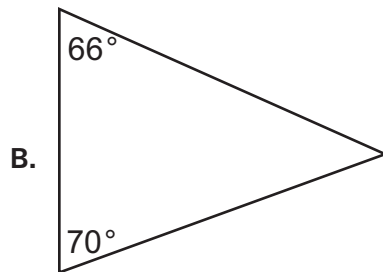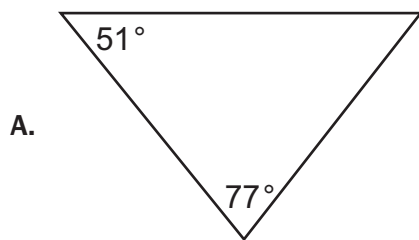http://www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/Georgia-Milestones-EOC-Resources.aspx.

Item 1

Selected-Response

Look at the triangle.
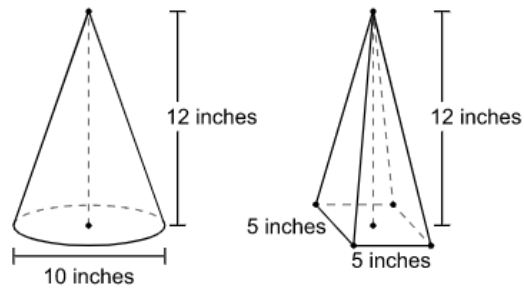

Which triangle is similar to the given triangle?

A.

B.

C.

D.

Item 2

Keypad-Input Technology-Enhanced

A cone and a pyramid are shown.

How many times the volume of the pyramid is the volume of the cone? Use 3.14 for π and round your answer to the nearest tenth.
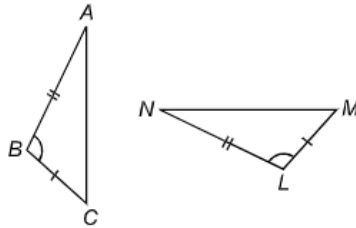
➡ Use a mouse, touchpad, or touchscreen to enter a response.

Item 3

Drop-Down Technology-Enhanced

Two triangles are shown.

Use the drop-down menus to complete the congruence statement.

△ABC ≅ △[____▼] by [____▼] congruence.

➲ Use a mouse, touchpad, or touchscreen to click the arrow beside each of the two blank boxes. When you click the arrow, a drop-down menu will appear, showing you all the possible options for that blank box. Each drop-down menu with its options is shown below.

△ABC ≅ △[____▼] by [____▼] congruence.

LMN	AA
LNM	AAS
MLN	ASA
MNL	SAS
NLM	SSA
NML	SSS

Item 4

Selected-Response

Which equation is true?

A. sin 40° = tan 50°

B. cos 40° = cos 50°

C. sin 40° = sin 50°

D. cos 40° = sin 50°

Item 5

Coordinate-Graph Technology-Enhanced

The triangle shown is rotated 180° counterclockwise around the origin and reflected across the *x*-axis.

Graph the image of the triangle after the transformations by plotting the vertices and line segments.
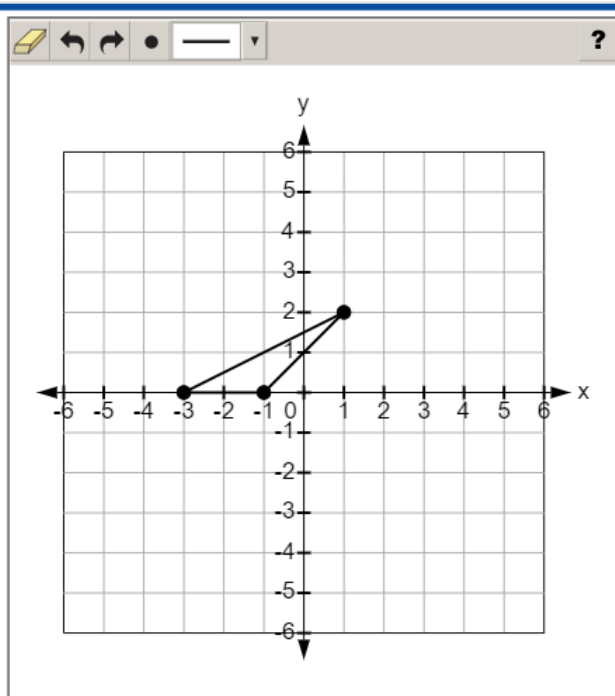
➲ Use a mouse, touchpad, or touchscreen to graph the image of the triangle on the coordinate grid. At most 3 points and 3 line segments can be graphed.

Item 6

Selected-Response

Which point is NOT on a circle with a center of (0, 0) and a radius of 10?

A. (0, 5)

B. (10, 0)

C. (0, −10)

D. (−8, 6)

Item 7

Drag-and-Drop Technology-Enhanced

Right triangle *FGH* is shown.
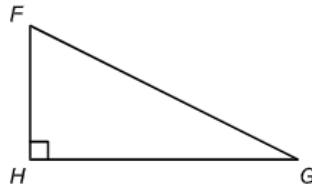
Move the sides of triangle *FGH* into the boxes to complete the trigonometric ratio.

$$\tan G = \frac{\boxed{}}{\boxed{}}$$

FG   GH   HF

➲ Use a mouse, touchpad, or touchscreen to move the side labels into the boxes. Each side label may be used 2 times.

Item 8

Selected-Response

Points *A*, *B*, *C*, *D*, and *E* are located on circle *O*, as shown in this figure.
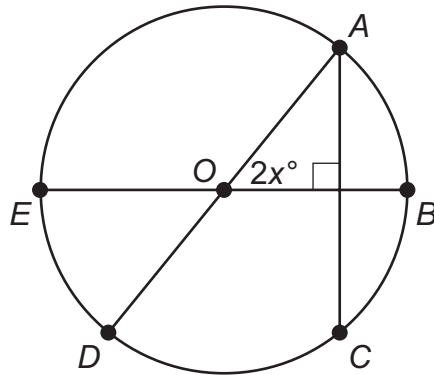
The measure of $\overset{\frown}{CD}$ is 80°. What is the value of *x*?

A. 50
B. 40
C. 35
D. 25

Item 9

Selected-Response

Which expression is equivalent to $-4\sqrt{28x} \cdot \sqrt{7x^3}$?

A. $-56x^2$
B. $4x^2\sqrt{7}$
C. $-4x\sqrt{196}$
D. $-28x$

Item 10

Selected-Response

Which value is an irrational number?

A. $4 + \sqrt{7}$

B. $\sqrt{2} \ \sqrt{8}$

C. $\dfrac{\sqrt{3} \ \sqrt{12}}{5}$

D. $\sqrt{3} - \sqrt{3}$

Item 11

Drag-and-Drop Technology-Enhanced

Move each expression to the correct column in the table.

Equivalent to $3\sqrt{6}$	Equivalent to $6\sqrt{3}$	Equivalent to $6\sqrt{6}$

$2\sqrt{54}$ $\sqrt{18} \cdot \sqrt{3}$ $3\sqrt{2} \cdot \sqrt{3}$ $\sqrt{3} \cdot \sqrt{6} \cdot \sqrt{6}$ $3\sqrt{3} + 3\sqrt{3}$

➥ Use a mouse, touchpad, or touchscreen to move expressions into the columns. Each expression may be used once.

Item 12

Multi-Select Technology-Enhanced

Select THREE equations that are true.

A. $(3x^2 + 7x - 4) + (x^2 + x + 3) = 4x^2 + 8x - 1$

B. $(5x^2 - 6x + 2) - (2x^2 - 4x + 1) = 3x^2 - 2x + 1$

C. $(3x^2 + 5x + 4) + (x^2 + 2x - 5) = 3x^2 + 7x - 1$

D. $(6x^2 - 3x - 8) - (3x^2 + 5x - 4) = 3x^2 - 2x - 4$

E. $(x + 8)(x - 9) = x^2 + x - 72$
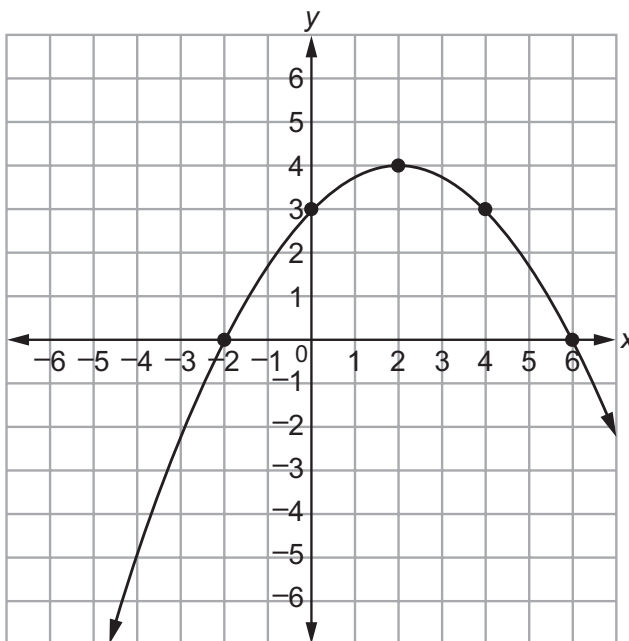
F. $(x - 3)(x - 7) = x^2 - 10x + 21$

Item 13

Selected-Response

A weather balloon is 10 yards in diameter. It is in the shape of a sphere. What is the volume of the weather balloon to the nearest cubic yard?

A. 59 cubic yards

B. 105 cubic yards

C. 294 cubic yards

D. 523 cubic yards

Item 14

Multi-Part Technology-Enhanced

The coordinate grid shows the graph of the quadratic function $f(x)$.

The equation of $f(x)$ can be written in the form $f(x) = a(x - h)^2 + k$, where a, h, and k are rational numbers.

Part A

What are the values of h and k?

A. $h = -2$ and $k = 3$
B. $h = -2$ and $k = 6$
C. $h = 2$ and $k = 3$
D. $h = 2$ and $k = 4$

Part B

**Which statement describes the value of a for the function $f(x)$?**

A. The value of a is a number less than -1.
B. The value of a is a number between -1 and 0.
C. The value of a is a number between 0 and 1.
D. The value of a is a number greater than 1.

Item 15

Drag-and-Drop Technology-Enhanced

A quadratic equation is shown.

$$y = -x^2 + 4$$

Move the graph that represents the key features of the given quadratic equation onto the coordinate grid in the appropriate position.
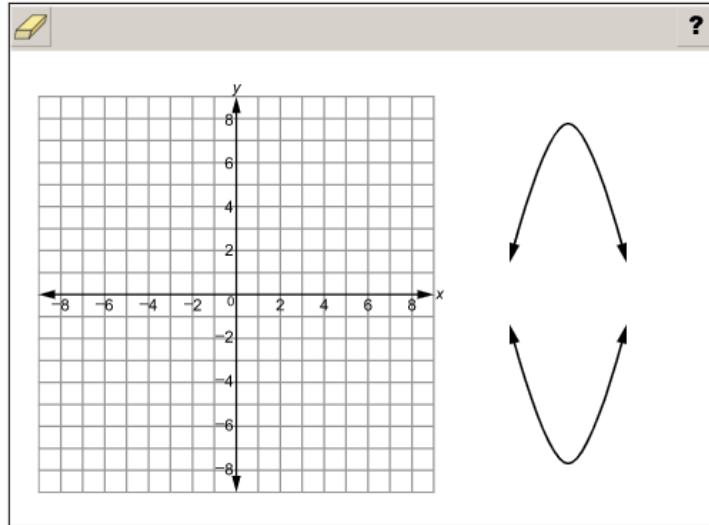
➲ Use a mouse, touchpad, or touchscreen to move the curve onto the grid. Only 1 curve may be placed on the grid.

Item 16

Multi-Part Technology-Enhanced

Part A

Which situation could be modeled by a function with a domain of all positive integers?

A. the distance a runner has moved during a race as a function of time since the race started

B. the amount of fish food required in a fish tank as a function of the number of fish in the tank

C. the amount of power required to operate a computer as a function of the length of time the computer is on

D. the amount of water required by an animal as a function of the mass of the animal

Part B

Select the situation that could be modeled by a function with a domain that includes positive and negative real numbers.

A. the height of a plant as a function of time since the seed was planted

B. the elevation of a hiker as a function of the number of steps taken

C. the temperature as a function of the time of day

D. the amount of time required to read a book as a function of the number of words in the book

E. the amount of precipitation as a function of the outdoor temperature

Item 17

Selected-Response

The table defines a quadratic function.

x	y
–1	5
0	1
1	–1
3	1

What is the average rate of change between $x = -1$ and $x = 1$?

A.   undefined

B. $-\dfrac{1}{3}$

C.   –3

D.   –4

Item 18

Selected-Response

Study this equation of a circle.

$$x^2 - 6x + y^2 + 2y + 6 = 0$$

Which of these represents the center and radius of the circle?

A.   center: (3, –1), radius: 4
B.   center: (–3, 1), radius: 4
C.   center: (3, –1), radius: 2
D.   center: (–3, 1), radius: 2

Item 19

Drop-Down Technology-Enhanced

A function is shown.

$$f(x) = x^2 - 6x - 27$$

Use the drop-down menus to make a true statement about $f(x)$.

The graph of $f(x)$ has a minimum value of [▼] and has zeros at [▼] and [▼].

➲ Use a mouse, touchpad, or touchscreen to click the arrow beside each of the three blank boxes. When you click the arrow, a drop-down menu will appear, showing you all the possible options for that blank box. Each drop-down menu with its options is shown below.

The graph of $f(x)$ has a minimum value of [▼] and has zeros at [▼] and [▼].

−42	−9	−9
−36	−3	−3
−33	0	0
−27	3	3
	9	9

Item 20

Drop-Down Technology-Enhanced

Some probabilities are listed below.

- $P(A) = 0.3$
- $P(B) = 0.5$
- $P(C) = 0.25$
- $P(A \text{ and } B) = 0.15$
- $P(B \text{ and } C) = 0$
- $P(C \text{ and } A) = 0.1$

Use the drop-down menus to complete the statements.

The expression $\dfrac{P(A \text{ and } C)}{P(C)}$ describes the [_____▼] of [_____▼].

The independent events are [_____▼]. This is demonstrated by the fact that the conditional probability of [_____▼] is [____▼].

➔ Use a mouse, touchpad, or touchscreen to click the arrow beside each of the five blank boxes. When you click the arrow, a drop-down menu will appear, showing you all the possible options for that blank box. Each drop-down menu with its options is shown below.

The expression $\dfrac{P(A \text{ and } C)}{P(C)}$ describes the [_____▼] of [_____▼].

The independent events are [_____▼]. This is demonstrated by the fact that the conditional probability of [_____▼] is [____▼].

complement	A and C
conditional probability	A given C
union	
intersection	

| A and B |
| B and C |
| C and A |

A given B	0
B given C	0.1
C given A	0.15
	0.25
	0.3
	0.5

Item 21

Drag-and-Drop Technology-Enhanced

An ice-cream shop is finding the amount of ice cream used for each serving. The ice-cream shop fills the serving container completely with ice cream and then places a scoop on top. A diagram with measurements of a typical ice-cream serving from the shop is shown.
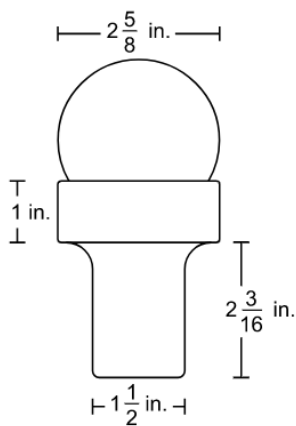
Move shapes into the box to create a combination that could be used to estimate the total volume of the ice cream in a typical ice-cream serving from the shop. Each measurement is in inches.

Cone: $h = 3\frac{3}{16}$, $r = 2\frac{5}{8}$

Cone: $h = 3\frac{3}{16}$, $r = 1\frac{5}{16}$

Cylinder: $h = 2\frac{3}{16}$, $r = 1\frac{1}{2}$

Cylinder: $h = 2\frac{3}{16}$, $r = \frac{3}{4}$

Cylinder: $h = 1$, $r = 2\frac{5}{8}$

Cylinder: $h = 1$, $r = 1\frac{5}{16}$

Sphere: $r = 2\frac{5}{8}$

Sphere: $r = 1\frac{5}{16}$

→ Use a mouse, touchpad, or touchscreen to move shapes into the box. Each shape may be used once. Not all shapes will be used.

Item 22

Drag-and-Drop Technology-Enhanced

A quadratic expression is shown.

$$3x^2 - 2x - 5$$

Move an expression into each box to show the factored form of the given quadratic expression.

$$3x^2 - 2x - 5 = \boxed{}\ \boxed{}$$

$(3x - 5)$	$(x + 5)$	$(3x - 1)$
$(x + 1)$	$(3x + 5)$	$(x - 1)$

➲ Use a mouse, touchpad, or touchscreen to move the expressions into the boxes. Each expression may be used 2 times.

Item 23

Selected-Response

One bag of lawn fertilizer can cover approximately 5,000 square feet. Mike's lawn is about 500 square feet. Mike fertilizes his lawn an average of 4 times per year. How many full years will he be able to fertilize his lawn with one bag of fertilizer?

A. 2 years
B. 3 years
C. 9 years
D. 10 years

Item 24

Selected-Response

When rolling a number cube with sides labeled 1 through 6, what is the probability of rolling an even number or a number less than 3?

A. $\dfrac{5}{6}$

B. $\dfrac{2}{3}$

C. $\dfrac{1}{2}$
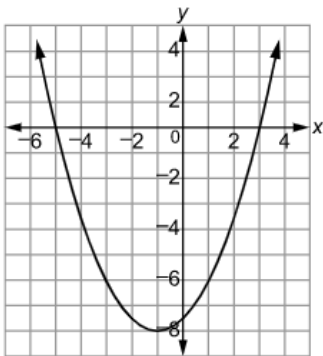
D. $\dfrac{1}{3}$

Item 25

Selected-Response

What is the probability of having rolled a 5 on a number cube with sides labeled 1 through 6 if you know that you rolled an odd number?

A. $\dfrac{1}{6}$

B. $\dfrac{1}{3}$

C. $\dfrac{1}{2}$
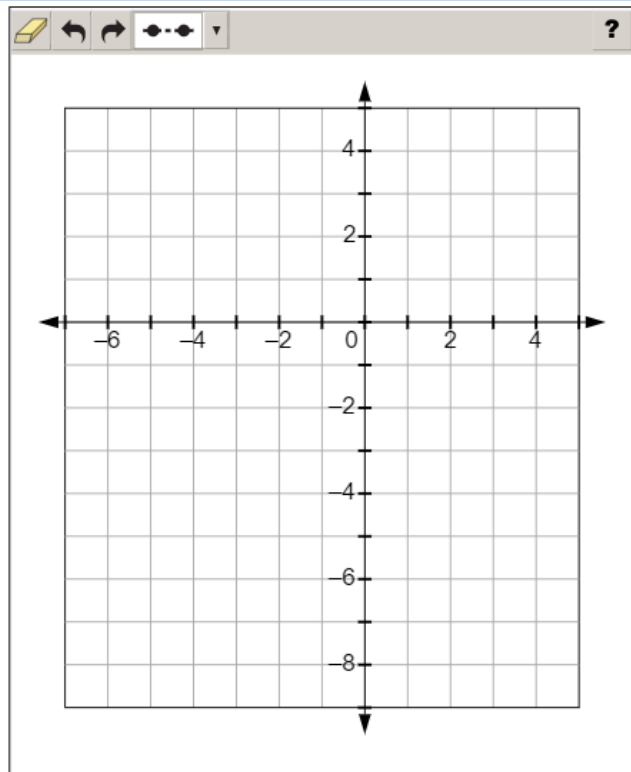
D. $\dfrac{2}{3}$

Item 26

Coordinate-Graph Technology-Enhanced

The graph of the function $y = 0.5x^2 + x - 7.5$ is shown.

Draw the axis of symmetry for this function.

➲ Use a mouse, touchpad, or touchscreen to graph a line on the coordinate grid. At most 1 line can be graphed.