Georgia Milestones
Assessment System

Assessment Guide

Analytic Geometry

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Analytic Geometry Formula Sheet

Below are the formulas you may find useful as you work the problems. However, some of the formulas may not be used. You may refer to this page as you take the test.

Area

Rectangle/Parallelogram $A = bh$

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

Circle $A = \pi r^2$

Circumference

$C = \pi d \quad \pi \approx 3.14$

$C = 2\pi r$

Volume

Rectangular Prism/Cylinder $V = Bh$

Pyramid/Cone $V = \frac{1}{3}Bh$

Sphere $V = \frac{4}{3}\pi r^3$

Surface Area

Rectangular Prism $SA = 2lw + 2wh + 2lh$

Cylinder $SA = 2\pi r^2 + 2\pi rh$

Sphere $SA = 4\pi r^2$

Trigonometric Relationships

$$\sin(\theta) = \frac{\text{opp}}{\text{hyp}}; \quad \cos(\theta) = \frac{\text{adj}}{\text{hyp}}; \quad \tan(\theta) = \frac{\text{opp}}{\text{adj}}$$

Quadratic Equations

Standard Form: $y = ax^2 + bx + c$

Vertex Form: $y = a(x - h)^2 + k$

Quadratic Formula

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

Conic Sections

Parabola: $y - k = \frac{1}{4p}(x - h)^2$

$x - h = \frac{1}{4p}(y - k)^2$

Circle: $(x - h)^2 + (y - k)^2 = r^2$

Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Conditional Probability

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

Additional Sample Item Keys

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
1	MCC9-12GCO10	2	A	The correct answer is (A) because each line is an example of alternate interior angles being congruent. Choice (B) is incorrect because the angles shown are not corresponding angles. Choice (C) is incorrect because the angles shown are not vertical angles. Choice (D) is incorrect because the angles shown are not alternate exterior angles.
2	MCC9-12FBF1a	2	A	The correct answer is choice (A) $y = -x^2 + 4$. Choice (A) is correct because the equation is true for all input-output pairs. Choices (B), (C), and (D) are incorrect because they are not true for all input-output pairs.
3	MCC9-12GC2	1	C	The correct answer is choice (C) because an inscribed angle is one-half the measure of the arc it creates. Choice (A) is incorrect because it is one-quarter the measure of the arc it creates. Choice (B) is incorrect because it is one-third the measure of the arc it creates. Choice (D) is incorrect because it is the full measure of the arc it creates.
4	MCC9-12NCN1	1	D	The correct answer is choice (D) i^2. This is correct because i is defined such that i^2 is –1, which is a real number. Choices (A), (B), and (C) are incorrect because they are all imaginary numbers.
5	MCC9-12GSRT8	3	C	The correct answer is choice (C) 23 ft. The ratio of the distance from the short ladder to the wall to the length of the short ladder is equal to the cosine of the angle the ladder forms with the ground. So, the short ladder is 8cos(70°) = 2.736 feet from the wall, and the long ladder is 7.736 feet from the wall. Similarly, the ratio of the distance from the long ladder to the wall to the length of the long ladder is equal to the cosine of the angle the ladder forms with the wall. So, the long ladder is 7.736/cos(70°) ≈ 22.62 feet. Choice (B) is incorrect because it is the sum of the lengths in the figure. Choices (A) and (D) are incorrect because they use incorrect trigonometric ratios.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
6	MCC9-12GGPE2	2	A	The correct answer is choice (A) because the vertex must lie halfway between the focus and directrix. The distance between focus and directrix in this case is $p = 4$, which means the vertex must be at (3, 1). Choice (B) is incorrect because its vertex is at the point (3, 3). Choice (C) is incorrect because its vertex is at point (3, 2). Choice (D) is incorrect because its vertex is at point (3, 3).
7	MCC9-12AAPR1	2	C	The correct answer is choice (C) $x^2 - 2x - 3$. This indicates a correct calculation of $P(x) - Q(x) = x^2 - x - 6 - (x - 3) = x^2 - x - 6 - x + 3 = x^2 - 2x - 3$. Choice (A) is incorrect due to a sign error on the term x. Choice (B) is incorrect due to adding $P(x)$ and $Q(x)$. Choice (D) is incorrect due to a sign error on the number 3.
8	MCC9-12SID6a	2	C	The correct answer is choice (C). The data in the graph represents a quadratic trend. The graphs in (A) and (D) represent a correlation to linear trends. The graph in (B) represents data with no clear correlation.
9	MCC9-12GC5	2	N/A	See scoring rubric and exemplar responses on page 29.
10	MCC9-12GSRT8	3	N/A	See scoring rubric and exemplar responses beginning on page 30.

Example Scoring Rubrics and Exemplar Responses

Item 9

Scoring Rubric

Points	Description
2	The response achieves the following: • Student demonstrates full understanding of deriving the area of a sector of a circle. Award 2 points for a student response that contains both the following elements: ○ An explanation of a valid process for determining the area of one section of the garden. ○ A final answer of 4.5 π or 14.13 feet^2
1	The response achieves the following: • Student shows partial understanding of deriving the area of a sector of a circle. Award 1 point for a student response that contains only one of the following elements: ○ An explanation of a valid process for determining the area of one section of the garden. ○ A final answer of 4.5 π or 14.13 feet^2
0	The response achieves the following: • Student demonstrates little to no understanding of deriving the area of a sector of a circle.

Exemplar Response

Points Awarded	Response
2	I can find the area of the entire circle and divide by 8. This equals 4.5π.
1	4.5π feet^2
0	*Student does not produce a correct response or a correct process.*

Item 10

Scoring Rubric

Points	Description
4	The response achieves the following: • Response demonstrates a complete understanding of using trigonometric ratios and the Pythagorean Theorem to solve real-world problems. Give 4 points for correct responses to both Part A and Part B with valid work shown. **Scoring Note**: There are other valid ways of solving. Accept any valid method.
3	The response achieves the following: • Response demonstrates a nearly complete understanding of using trigonometric ratios and the Pythagorean Theorem to solve real-world problems. Give 3 points for correct responses to both Part A and Part B with valid work shown for only 1 part. **Scoring Note**: There are other valid ways of solving. Accept any valid method.
2	The response achieves the following: • Response demonstrates a partial understanding of using trigonometric ratios and the Pythagorean Theorem to solve real-world problems. Give 2 points for any of the following response types: • Correct responses to both Part A and Part B with no valid work shown. • Correct response for Part A with valid work shown with no correct work in Part B. • Correct response for Part B with valid work shown with no correct work in Part A. (Incorrect results in Part A can be used in a correct method in Part B.) **Scoring Note**: There are other valid ways of solving. Accept any valid method.
1	The response achieves the following: • Response demonstrates a minimal understanding of using trigonometric ratios and the Pythagorean Theorem to solve real-world problems. Give 1 point for either of the following: • Correct response to either Part A or Part B with no valid work shown for either. • Correct method to one part shown, but it contains a computational error that results in an incorrect solution. **Scoring Note**: There are other valid ways of solving. Accept any valid method.
0	The response achieves the following: • Response demonstrates no understanding of using trigonometric ratios and the Pythagorean Theorem to solve real-world problems.

Item 10

Exemplar Response

Points Awarded	Response
4	Part A Jane's ramp's horizontal length: 14cos(30) = 12.12 inches. Mark's ramp's horizontal length: 10cos(45) = 7.1 inches. Part B Jane's car is launched from 14sin(30) = 7 Mark's car is launched from 10 sin(45) = 7.1 inches So, Mark's car is launched from a higher point.
3	Part A - Jane's ramp's horizontal length = 14cos(30) = 12.1 inches and Mark's ramp = 10cos(45) = 7.1 inches. Part B - Mark's car is launched from a higher point.
2	Part A - Jane's ramp's horizontal length = 12.1 inches and Mark's ramp = 7.1 inches. Part B - Mark's car is launched from a higher point.
1	Part A - Jane's ramp's horizontal length = 12.1 inches and Mark's ramp = 7.1 inches.
0	*Student does not produce a correct response or a correct process.*