Accuplacer Advanced Algebra and Functions Practice Exam (Sample)

Study Guide

BY EXAMZIFY

Everything you need from our exam experts!

Copyright © 2025 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain from reliable sources accurate, complete, and timely information about this product.

SAMPLE

Questions

SAMPLE

1. **What is the area formula for an equilateral triangle?**

   A. $A = (s^2\sqrt{3})/2$

   B. $A = (s^2\sqrt{3})/4$

   C. $A = 1/2bh$

   D. $A = s^2$

2. **Find the angular coefficient of the line represented by $2y - 3x = 6$.**

   A. $-\frac{3}{2}$

   B. $\frac{1}{2}$

   C. $-\frac{3}{4}$

   D. $\frac{3}{2}$

3. **What is the formula for the sum of cubes?**

   A. $a^3 + b^3 = (a + b)(a^2 + ab + b^2)$

   B. $a^3 + b^3 = (a - b)(a^2 + ab + b^2)$

   C. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

   D. $a^3 + b^3 = (a - b)(a^2 - ab + b^2)$

4. **What are the degrees of Quadrant III in the unit circle?**

   A. 120, 135, 150

   B. 270, 300, 315

   C. 210, 225, 240

   D. 0, 30, 45

5. **Which of the following represents the factored form of the quadratic equation $x^2 - 5x + 6$?**

   A. $(x - 3)(x - 2)$

   B. $(x - 1)(x - 6)$

   C. $(x + 5)(x - 1)$

   D. $(x + 3)(x + 2)$

SAMPLE

6. Which of the following is a characteristic of a quadratic function?

A. It has only one real root

B. It is always increasing

C. Its graph is a parabola

D. It is a linear function

7. Using the sine angle difference formula, what is sin(A - B)?

A. sinA + sinB

B. sinAcosB + cosAsinB

C. sinAcosB - cosAsinB

D. cosAsinB + sinAcosB

8. Which Pythagorean identity relates sine and cosine?

A. $\sin^2 x + \cos^2 x = 0$

B. $\sin^2 x + \cos^2 x = 1$

C. $\sin^2 x - \cos^2 x = 1$

D. $\sin^2 x + \cos^2 x = 2$

9. Which of the following represents the concept of exponential decay?

A. P = A(1+r)^t

B. y = a(1-r)^t

C. y = A(b)^x

D. y = A(1+r)^x

10. What is the domain of the function \(h(x) = \frac{1}{x - 6}\)?

A. All real numbers except x = 6

B. All real numbers

C. x ≥ 6

D. x ≤ 0

SAMPLE

Answers

SAMPLE

1. **B**
2. **D**
3. **A**
4. **C**
5. **A**
6. **C**
7. **C**
8. **B**
9. **B**
10. **A**

SAMPLE

Explanations

SAMPLE

1. What is the area formula for an equilateral triangle?

A. $A = (s^2\sqrt{3})/2$

<u>**B. $A = (s^2\sqrt{3})/4$**</u>

C. $A = 1/2bh$

D. $A = s^2$

**The area formula for an equilateral triangle is derived from its unique properties. An equilateral triangle has all three sides of equal length, denoted by s. To find the area, you can use the general triangle area formula $A = \frac{1}{2} \times \text{base} \times \text{height}$. In the case of an equilateral triangle, the height can be calculated using the Pythagorean theorem. The height divides the triangle into two 30-60-90 right triangles. The height h corresponds to the side length s as follows: 1. The altitude (height) forms a right triangle with the base (which is half of s, or $\frac{s}{2}$) and the hypotenuse (which is s). 2. Using the properties of a 30-60-90 triangle, the height can be calculated as $h = \frac{\sqrt{3}}{2}s$. Substituting this height back into the area formula gives: \[A = \frac{1}{2} \times s \times \frac{\sqrt{3}}{2}s = **

2. Find the angular coefficient of the line represented by $2y - 3x = 6$.

A. $-\frac{3}{2}$

B. $\frac{1}{2}$

C. $-\frac{3}{4}$

<u>**D. $\frac{3}{2}$**</u>

To find the angular coefficient (or slope) of the line represented by the equation $2y - 3x = 6$, we need to first rearrange this equation into the slope-intercept form, which is $y = mx + b$, where m is the angular coefficient. Starting with the given equation: $$2y - 3x = 6$$ We can isolate y by following these steps: 1. Add $3x$ to both sides: $$2y = 3x + 6$$ 2. Next, divide every term by 2 to solve for y: $$y = \frac{3}{2}x + 3$$ From this form, we can clearly see that the angular coefficient, or slope m, is $\frac{3}{2}$. This coefficient tells us how much y changes for a unit change in x: for every increase of 1 in x, y increases by $\frac{3}{2}$. Thus, the angular coefficient of the line represented by the equation \(2y -

3. What is the formula for the sum of cubes?

<u>**A. $a^3 + b^3 = (a + b)(a^2 + ab + b^2)$**</u>

B. $a^3 + b^3 = (a - b)(a^2 + ab + b^2)$

C. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

D. $a^3 + b^3 = (a - b)(a^2 - ab + b^2)$

The sum of cubes formula, $a^3 + b^3$, can be expressed as the product of a binomial and a trinomial: $(a + b)(a^2 - ab + b^2)$. This relationship arises from polynomial identities and can be verified through algebraic expansion. When you take the binomial $(a + b)$ and multiply it by the trinomial $(a^2 - ab + b^2)$, you utilize the distributive property, also known as the FOIL method (First, Outside, Inside, Last). This multiplication yields: 1. The first term: $a(a^2) = a^3$ 2. The outer term: $a(-ab) = -a^2b$ 3. The inner term: $b(a^2) = ab^2$ 4. The last term: $b(-ab) = -ab^2$ Combining these results, the terms $-a^2b + ab^2$ cancel each other when collected with $-ab$. Thus you only keep $a^3 + b^3$ from the first term.

SAMPLE

4. What are the degrees of Quadrant III in the unit circle?

- A. 120, 135, 150
- B. 270, 300, 315
- C. 210, 225, 240
- D. 0, 30, 45

In the unit circle, Quadrant III is defined as the region where both the x and y coordinates are negative. This quadrant encompasses angles ranging from 180 degrees to 270 degrees. The angles represented in option C—210 degrees, 225 degrees, and 240 degrees—are all within this range. To further elaborate, 210 degrees is located exactly 30 degrees past 180 degrees, 225 degrees is at the midpoint between 210 degrees and 240 degrees, and 240 degrees is 60 degrees into Quadrant III from 180 degrees. Each of these angles is indeed in the correct area of the unit circle that represents Quadrant III, thereby confirming that option C accurately lists angles that belong to that quadrant. The other options include angles that either fall into Quadrant II, IV, or are not in the range of Quadrant III at all, hence, they do not meet the criteria for angles in that specific quadrant.

5. Which of the following represents the factored form of the quadratic equation $x^2 - 5x + 6$?

- A. (x - 3)(x - 2)
- B. (x - 1)(x - 6)
- C. (x + 5)(x - 1)
- D. (x + 3)(x + 2)

To determine the factored form of the quadratic equation $x^2 - 5x + 6$, we begin by identifying the numbers that multiply to the constant term (6) and add up to the coefficient of the linear term (-5). In this case, we are seeking two numbers that when multiplied together give us 6 and when added together yield -5. The pair of numbers that satisfy both of these conditions is -2 and -3. This is because: - $(-2) \times (-3) = 6$ - $(-2) + (-3) = -5$ Using these two numbers, we can express the quadratic in its factored form as $(x - 2)(x - 3)$. Note how the factors correspond directly to the roots of the equation: if x is equal to 2 or 3, the original equation will yield zero, confirming they are the correct factors. When we compare this factorization to the provided answer choices, the form $(x - 3)(x - 2)$ matches the correct factorization of the quadratic. This shows that the expression

SAMPLE

6. Which of the following is a characteristic of a quadratic function?

A. It has only one real root

B. It is always increasing

C. Its graph is a parabola

D. It is a linear function

A quadratic function is defined by an equation in the form of $f(x) = ax^2 + bx + c$, where a, b, and c are constants, and $a \neq 0$. One of the most distinctive features of a quadratic function is its graph, which forms a parabola. These parabolas can open upwards or downwards depending on the sign of the coefficient a. If a is positive, the parabola opens upwards, and if a is negative, it opens downwards. This characteristic shape is essential to understanding how quadratic functions behave and can be used to analyze their properties, such as vertex, axis of symmetry, and intercepts. Recognizing that the graph of a quadratic function is indeed a parabola helps to distinguish it from linear functions, which have graphs that are straight lines, as well as from other polynomial functions of different degrees.

7. Using the sine angle difference formula, what is sin(A - B)?

A. sinA + sinB

B. sinAcosB + cosAsinB

C. sinAcosB - cosAsinB

D. cosAsinB + sinAcosB

The sine angle difference formula expresses the sine of the difference between two angles, A and B, in terms of the sine and cosine of those angles. Specifically, the formula is: $$\sin(A - B) = \sin A \cos B - \cos A \sin B$$ This formula arises from the more general properties of sine and cosine functions as well as their geometric interpretations involving right triangles and the unit circle. In the correct option, we see that it correctly follows this formula structure. The term $\sin A \cos B$ corresponds to the first part of the equation, which captures the interaction of the sine of the first angle with the cosine of the second angle. The second part, $- \cos A \sin B$, accounts for the negative sign in the formula, which reflects the subtraction in the angle difference and establishes how the cosine of the first angle modifies the sine of the second angle. This correct answer is essential in trigonometry, especially when simplifying expressions or solving equations that involve angles. Understanding this formula allows students to approach problems related to angle differences with greater confidence and accuracy.

SAMPLE

8. Which Pythagorean identity relates sine and cosine?

A. $\sin^2 x + \cos^2 x = 0$

B. $\sin^2 x + \cos^2 x = 1$

C. $\sin^2 x - \cos^2 x = 1$

D. $\sin^2 x + \cos^2 x = 2$

The correct relationship between sine and cosine is expressed by the identity that states the sum of the squares of sine and cosine of an angle equals one. This foundational identity, $\sin^2 x + \cos^2 x = 1$, is pivotal in trigonometry and appears frequently in various mathematical contexts, including calculus, geometry, and algebra. This identity implies that for any angle x, when you square the sine of that angle and add it to the square of the cosine of the same angle, the result will always be one. This reflects a fundamental relationship where sine and cosine are linked through a circular representation, such as the unit circle, where the radius is always one. Consequently, this identity can be visualized geometrically, with the x-coordinate represented by cosine and the y-coordinate represented by sine. In contrast, other relationships offered do not accurately portray the linkage between sine and cosine, either proposing incorrect values or misrepresenting their relationship. For instance, the equation stating that their squares sum to zero does not hold true for real angles, and the assertion that their squares might equal two is not possible since both sine and cosine can only take values between -1 and 1.

9. Which of the following represents the concept of exponential decay?

A. P = A(1+r)^t

B. y = a(1-r)^t

C. y = A(b)^x

D. y = A(1+r)^x

The concept of exponential decay is characterized by a quantity decreasing at a rate that is proportional to its current value over time. The correct choice, represented by \(y = a(1 - r)^t \), clearly reflects this behavior. In this equation, \(a \) signifies the initial amount, \(r \) is a positive rate of decay (indicating that the quantity is decreasing), and \(t \) represents time. As \(t \) increases, the term \((1 - r) \) is raised to a higher power. Since \(1 - r \) is less than 1 (because \(r \) is positive), the overall value of \(y \) diminishes, illustrating the nature of exponential decay. This structure is distinct from the other options. For instance, options presenting the form \(A(1 + r)^t \) or \(A(1 + r)^x \) would represent growth rather than decay, as they describe scenarios where the quantity increases over time. Meanwhile, the expression \(y = A(b)^x \) can denote either growth or decay depending on the value of \(b \). If \(b \) is less than 1, it resembles decay,

SAMPLE

10. What is the domain of the function $h(x) = \frac{1}{x - 6}$?

A. All real numbers except x = 6

B. All real numbers

C. x ≥ 6

D. x ≤ 0

The domain of the function $h(x) = \frac{1}{x - 6}$ consists of all the values of x for which the function is defined. Since the function is a rational expression, it is crucial to identify any values that would make the denominator zero. The denominator in this case is $x - 6$. When $x - 6 = 0$, solving this gives $x = 6$. At this point, the function becomes undefined because division by zero is not permitted in mathematics. Therefore, the value $x = 6$ must be excluded from the domain. Thus, the domain of the function is all real numbers except $x = 6$. This captures every real number that can be substituted into the function without causing the denominator to equal zero. Since the only restriction is that x cannot equal 6, the correct representation of the domain is indeed all real numbers except for this particular value.

SAMPLE