

PreCalc 12 Final Review Pack Part 2 v1**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

Easy

- _____ 1. Consider the exponential function $y = a^x$, $a > 0$. Which of these statements is false?
- A. The graph has y -intercept 1.
 - B. The graph does not have an x -intercept.
 - C. The function has a horizontal asymptote with equation $y = a$.
 - D. The range of the function is $y > 0$.
- _____ 2. The expression $\log x$ represents the common logarithm of x .
What is the value of the base of $\log x$?
- A. 1
 - B. 0
 - C. e
 - D. 10
- _____ 3. An account pays 5.0% annual interest, compounded semi-annually (twice a year).
What is the interest rate per compounding period, as a decimal?
- A. 5.0
 - B. 0.025
 - C. 2.5
 - D. 0.05
- _____ 4. What is the length of the arc that subtends a central angle of 335° in a circle with radius 5 units?
- A. $\frac{67}{36}\pi$ units
 - B. $\frac{1}{36}\pi$ units
 - C. $\frac{335}{72}\pi$ units
 - D. $\frac{335}{36}\pi$ units
- _____ 5. In a circle with radius 8 cm, what is the length of the arc that subtends a central angle of 3.6 radians?
Give the answer to the nearest tenth.
- A. 0.5 cm
 - B. 90.5 cm
 - C. 3.6 cm
 - D. 28.8 cm

_____ 12. What is the y -intercept of the graph of $y = 2^{4x} + 3$?

- A. 1
B. 3
C. 4
D. 19

_____ 13. Solve: $256 = 16^{x+3}$

- A. $x = -1$
B. $x = 1$
C. $x = \frac{253}{2}$
D. $x = 253$

_____ 14. Write as a single logarithm: $4 \log_6 1 - \log_6 6 + 3$

- A. $\log_6 36$
B. $\log_6 \frac{500}{3}$
C. $\log_6 1$
D. $\log_6 2$

_____ 15. What is the x -intercept of the graph of $y = -5 \log_4(x + 3)$?

- A. -3
B. 1021
C. -2
D. 1

_____ 16. What is the domain of the function $y = \log_3(-2x) - 3$?

- A. $x > 0$
B. $x < -3$
C. $x < 0$
D. $x \in \mathbb{R}$

_____ 17. Solve: $356 = 4^{x+5}$

Give the solution to the nearest hundredth.

- A. $x \doteq 84$
B. $x \doteq 4.24$
C. $x \doteq 4.23$
D. $x \doteq -0.76$

- _____ 18. The pH scale measures the acidity or alkalinity of a solution. A solution that has a pH of 7 is neutral. For each increase of 1 pH, a solution is 10 times as alkaline. For each decrease of 1 pH, a solution is 10 times as acidic.

A sample of soap has a pH of 8.5. A sample of household ammonia has a pH of 11.3.
To the nearest whole number, how many times as alkaline as the soap is the ammonia?

- A. 3 times as alkaline
B. 631 times as alkaline
C. 13 times as alkaline
D. 232 times as alkaline

- _____ 19. Graph $y = \tan x$ using graphing technology.
Which of these equations is NOT the equation of an asymptote of $y = \tan x$?

- A. $x = \frac{3\pi}{4}$
B. $x = \frac{5\pi}{2}$
C. $x = \frac{-\pi}{2}$
D. $x = \frac{9\pi}{2}$

- _____ 20. What is the period of the function $y = 5 \sin \frac{\pi}{2}(x - 6) + 6$?

- A. $\frac{1}{4}$
B. 4
C. $-\frac{1}{3}$
D. -2

- _____ 21. What are the solutions of the equation $\sin x = -\frac{4}{5}$ for $0 \leq x \leq 2\pi$, to the nearest hundredth?

- A. $x \doteq 4.07$ or $x \doteq 5.36$
B. $x \doteq 0.93$ or $x \doteq 4.07$
C. $x \doteq -0.72$
D. $x \doteq 233.13$

- _____ 22. What are the solutions of the equation $\sin 5x = -\frac{1}{5}$ for $0 \leq x \leq \frac{2\pi}{5}$, to the nearest hundredth?

- A. $x \doteq 3.34$ or $x \doteq 6.08$
B. $x \doteq 0.04$ or $x \doteq 0.67$
C. $x \doteq 0.67$ or $x \doteq 1.22$
D. $x \doteq 38.31$

- _____ 23. What are the solutions of the equation $\tan 5\pi x = \frac{3}{5}$ for $0 \leq x \leq \frac{2}{5}$, to the nearest hundredth?

- A. $x \doteq 0.03$ or $x \doteq 0.13$
B. $x \doteq 0.54$ or $x \doteq 3.68$
C. $x \doteq 1.97$
D. $x \doteq 0.03$ or $x \doteq 0.23$

_____ 30. Write $\frac{\sqrt[3]{5}}{25}$ as a power of 5.

A. 5^{-6}

B. $5^{\frac{-2}{3}}$

C. $5^{\frac{7}{3}}$

D. $5^{\frac{-5}{3}}$

_____ 31. Evaluate: $\log_2 25 - 6 \log_2 5 + 4 \log_2 10$

A. 4

B. $\frac{50}{3}$

C. $\frac{35}{2}$

D. 16

_____ 32. What is the period of the function $y = \sin 6\left(x - \frac{\pi}{2}\right) + 2$?

A. $\frac{\pi}{2}$

B. 2π

C. 3π

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

_____ 33. Suppose the function $y = 17 \cos \frac{2\pi}{5}(x - 2.5) + 20$ models the height, y metres, of a seat on a Ferris wheel at any time x minutes after the wheel begins to rotate. After how many minutes is the seat at the top of the wheel for the first time?

A. 54 min

B. 2.5 min

C. 17 min

D. 5 min

_____ 34. What are the exact roots of the equation $\sqrt{3} \csc x = -2$ for $0 \leq x \leq 2\pi$?

A. $x = \frac{-\pi}{3}$ or $x = \frac{\pi}{6}$

B. $x = \frac{4\pi}{3}$ or $x = \frac{5\pi}{3}$

C. $x = \frac{-\pi}{3}$ or $x = \frac{4\pi}{3}$

D. $x = \frac{\pi}{6}$ or $x = \frac{5\pi}{6}$

____ 35. What is the exact value of the expression $\cos \frac{13\pi}{12} \cos \frac{5\pi}{6} + \sin \frac{13\pi}{12} \sin \frac{5\pi}{6}$?

A. $-\frac{1}{\sqrt{2}}$

C. 1

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

D. -1

____ 36. How many 5-digit combinations are there of the digits in the number 12 934 687?

A. 8

C. 40

B. 5

D. 56

____ 37. There are 9 points on the circumference of a circle. How many lines can be drawn to connect all possible pairs of points?

A. 18

C. 36

B. 81

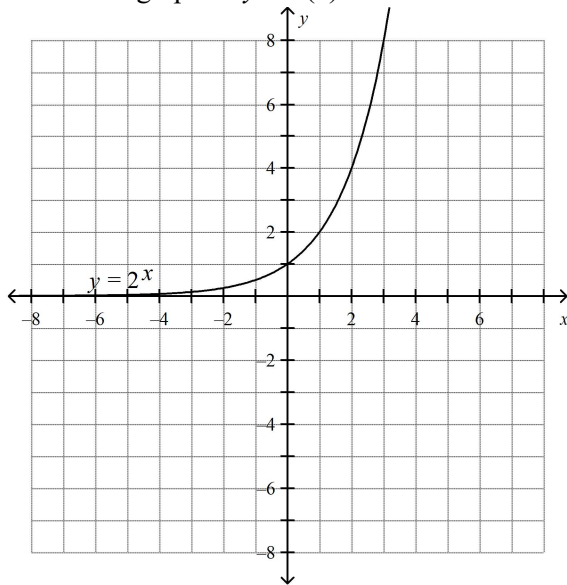
D. 72

Short Answer

Moderate (Show work for non-MC)

38. The graph of $y = 2^x$ is shown below.

Sketch the graph of $y = 2(2)^{-0.5x}$ without a calculator on the same grid.



39. Determine the exact value of $\cos\left(\frac{-13\pi}{6}\right)$.
40. Graph $y = \cos x$ using graphing technology.
Identify the exact zeros of the function $y = \cos x$ over the domain $7\pi \leq x \leq 10\pi$.
41. Solve the equation $\tan^2 x = 3$ over the domain $-4\pi \leq x \leq -3\pi$. Give exact answers.
42. How many 9-digit numbers can be created from the digits 8,8,2,2,2,2,6,6,6?
43. At a potluck, there are 5 different main dishes and 10 different desserts. Of the 10 desserts, 4 of them are different types of cookies. How many selections of 3 main dishes and 3 desserts could you make without taking any cookies?
44. Expand $(-3x - 2)^5$.

Difficult (Show work for non-MC)

45. A student club has 23 members, 11 of whom are boys. How many 4-member committees can the club choose if exactly 2 of the members must be boys?

Problem

Moderate (Show work for non-MC)

46. Explain why the graphs of $y = 2^{-3x+9}$ and $y = \left(\frac{1}{8}\right)^{x-3}$ coincide.
47. A principal of \$900 is invested at 2.5% annual interest, compounded monthly.
To the nearest year, when will the amount be \$1300?

48. A unicycle wheel has diameter 24 in. Suppose a positive angle of rotation corresponds to the wheel moving forward. Determine the distance and the direction the wheel will roll when it turns through an angle of -250° . Express the exact distance, in inches, in terms of π .
49. Given $\sec \theta = -3$, determine all possible measures of angle θ in the domain $-2\pi \leq \theta \leq 2\pi$. Give the answers to the nearest tenth of a radian.
50. Describe each transformation below.
- The graph of $y = a \cos x$ is a transformation image of the graph of $y = \cos x$.
 - The graph of $y = \tan x + d$ is a transformation image of the graph of $y = \tan x$.
51. a) Solve $-\frac{1}{6} = \frac{5}{3} \cos 5\pi x$ over the domain $0 \leq x < \frac{2}{5}$. Give the roots to the nearest hundredth.
b) Determine the general solution of the equation.
52. Prove the identity $-2 = \frac{\cot^2 \theta}{1 + \csc \theta} + \frac{\cot^2 \theta}{1 - \csc \theta}$.

Difficult (Show work for non-MC)

53. How is the graph of $y = \log_{(b^c)} x$, $b > 0$, $b \neq 1$, $c > 0$, related to the graph of $y = \log_b x$?
Use the change of base formula to justify your answer.
54. Prove the identity $\frac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta} = \frac{\cos 2\theta}{1 + \sin 2\theta}$.