

PRECALCULUS - REVIEW FOR FINAL EXAM

1. Solve: $x^3 - 3x^2 = 0$
 [A] 3, -3 [B] 0, 3 [C] 0, -3 [D] 3, -4

2. Divide: $(-2x^3 + 2x - 3) \div (x + 1)$
 [A] $-2x^2 + 2x + 4 - \frac{5}{x+1}$
 [B] $-2x^2 + 2x - \frac{3}{x+1}$
 [C] $-2x^2 + 4x - 7 + \frac{7}{x+1}$
 [D] $-2x^2 + 4x + 4 - \frac{7}{x+1}$

3. Use long division: $(5x^4 - 3x^2 + 4) \div (x^2 + 2)$

4. One zero of the function $f(x) = x^4 + 2x^3 - 7x^2 - 8x + 12$ is $x = -3$ find the other zeros of the function.

5. Find all real zeros of the function.
 $g(x) = 2x^3 - x^2 - 10x + 5$

6. Find all the zeros of the function:
 $f(x) = 6x^4 - 11x^3 - 3x^2 + 11x - 3$

7. The number of bacteria present in a culture after t minutes is given as $B = 100e^{kt}$. If there are 4252 bacteria present after 13 minutes, find k .
 [A] 0.276 [B] 0.288 [C] 3.75 [D] 48.75

8. Find an equation for the inverse of the relation $y = 5x + 4$.

9. Graph: $f(x) = 3^x$

10. You are given a piece of cardboard 14 inches long and 10 inches wide. You want to create an open topped box by cutting x -inch squares out of the corners and folding up the sides so the edges you just cut form right angles. What is the maximum volume of the box (rounded to the nearest tenth of a cubic inch)? What are the approximate dimensions of the box (rounded to the nearest quarter-inch)?
 (Remember: $0 < x < 5$)

11. Find the value of \$1000 deposited for 10 years in an account paying 7% annual interest compounded yearly.

12. Find the value of \$1000 deposited for 10 years in an account paying 6% annual interest compounded monthly.

13. If there are initially 1500 bacteria in a culture, and the number of bacteria double each hour, the number of bacteria after t hours can be found using the formula $N = 1500(2^t)$. How many bacteria will be present after 6 hours?
 [A] 96,000 [B] 18,000
 [C] 48,000 [D] 192,000

14. A company had total sales of \$2,300,000 in 1980. Each year between 1980 and 1986 the sales increased by 14%. Approximate the sales for 1986 to the nearest \$100,000.

15. Write an exponential function to model the situation. Then estimate the value of the function after 5 years (to the nearest whole number). A population of 250 animals that decreases at an annual rate of 9%.

16. Use the formula $A = Pe^{rt}$. If \$9200 is deposited in an account at the bank and earns 9% annual interest, compounded continuously, what is the amount in the account, rounded to the nearest dollar, after 12 years?

17. Write the equation $\log_{243} 27 = \frac{3}{5}$ in exponential form.

18. Find the inverse of the function. $y = \log_8 x$

19. Evaluate without using a calculator. $\log_2 16$

Graph the function. State the domain and range.

20. $y = \log_2(x+1)$

21. $y = \ln(x+2)$

22. Use the change-of-base formula to evaluate the expression. $\log_3 5$

23. Expand using the properties of logarithms:

$$\log_7 \frac{x(x+4)}{x^6}$$

24. Condense the expression.

$$\frac{1}{2} \log_5 16 - 3 \log_5 x + 4 \log_5 y$$

25. Solve for x to four decimal places: $e^{-6x} = 7.7$

26. Solve for x . $\log_7 3 - \frac{1}{2} \log_7 x = \log_7 \frac{1}{2}$

27. Solve: $\frac{1}{64} = 16^{9x+5}$

[A] $-\frac{8}{9}$ [B] $-\frac{4}{9}$

[C] $-\frac{13}{18}$ [D] $-\frac{7}{18}$

28. Solve the equation. $35 \log_6 x = 18$

29. Locate the asymptotes and graph the rational function $f(x) = \frac{5}{x^2 - 9}$.

30. Identify all horizontal and vertical asymptotes of the graph of the function. $f(x) = \frac{x^2}{x^2 - 4}$

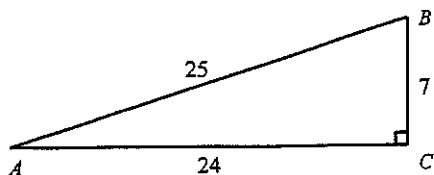
Evaluate without using a calculator.

31. $\csc 45^\circ$

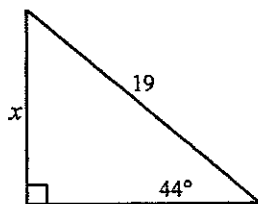
Evaluate without using a calculator.

32. $\cos 60^\circ$

33. Write $\sin A$ as a fraction in lowest terms.



34. Evaluate x . Round the result to the nearest hundredth.



- [A] $x = 18.35$ [B] $x = 19.68$
[C] $x = 13.2$ [D] $x = 13.67$

35. A ladder 18 feet long makes an angle of 67° with the ground as it leans against a barn. How far up the side of the barn does the ladder reach?

36. Convert 60° to radians.

37. Convert $\frac{13}{20}\pi$ to degrees.

38. Find the reference angle for 113° .

39. Evaluate the function. $\sin \frac{\pi}{2}$

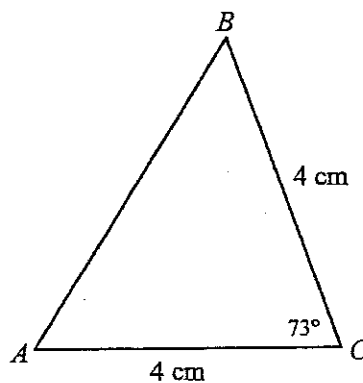
- [A] $\frac{\sqrt{2}}{2}$ [B] 0 [C] $-\frac{\sqrt{2}}{2}$ [D] 1

40. The point $(-3, 3)$ is on the terminal side of an angle θ . Find $\cos \theta$.

41. Given triangle ABC with $a = 10$, $b = 11$, and $A = 35^\circ$, find c . Round your answer to two decimal places.

- [A] $c = 16.77$ or 1.25 [B] $c = 14.87$
[C] $c = 7.70$ [D] $c = 16.77$ or 2.13

42. Find the area of $\triangle ABC$. The figure is not drawn to scale.



43. Given triangle ABC with $b = 10$, $c = 6$, and $A = 102^\circ$, find a . Round the answer to two decimal places.

44. Find the *amplitude* and *period* of the graph.
 $y = 3 \sin 2\pi x$

45. Write an equation of the form $y = a \sin bx$, where $a > 0$ and $b > 0$, with amplitude $\frac{2}{3}$ and period 12.

46. An airplane, flying at an altitude of 6.11 mi above the ground, has a horizontal speed of 325 mi/h and is descending at a rate of 28 mi/h. Use parametric equations to find the airplane's altitude after it has traveled 20 mi as measured along the ground. Round your answer to the nearest .01 mi.

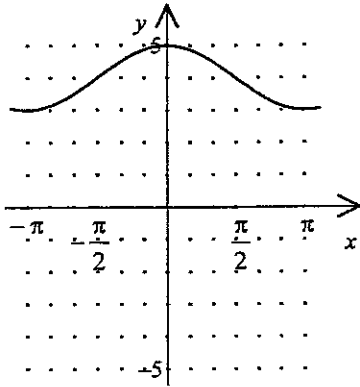
[A] 0.44 mi above ground

[B] 3.29 mi above ground

[C] 4.39 mi above ground

[D] 6.39 mi above ground

47. Write the equation for the sine function below. (The period is 2π .)



48. Given that $\sin \theta = \frac{4}{9}$ and $\frac{\pi}{2} < \theta < \pi$, find the values of the other five trigonometric functions of θ .

49. Solve $6\cos x - 2 = 0$ in the interval $0^\circ \leq x \leq 360^\circ$.

50. The table shows the number of hybrid cottonwood trees planted in tree farms in Oregon since 1987. Find a cubic function to model the data and use it to estimate the number of cottonwoods planted in 1998.

Years since 1987	1	3	5	7	9
Trees planted (in thousands)	-0.1	15.1	69.5	187.1	391.9

51. Early in the 1900s, an airplane manufacturer was able to increase the time its planes could stay aloft by constantly refining its techniques. Using a graphing calculator, determine which exponential equation best models the data.

Years after 1910	1	2	3	4	5	6
Time aloft (hrs)	0.73	1.3	2.5	3.8	4.4	5.8

[A] $y = 1.511(0.584)^x$

[B] $y = 0.73(5.8)^x$

[C] $y = 0.584(1.511)^x$

[D] $y = 0.584x^{1.511}$

Pre Calculus Final Exam Review

1) if $A = (1, -3)$ and $B = (-6, -8)$
Find the position vector $\vec{v} = \overrightarrow{AB}$

1. _____

2) Find the magnitude of \overrightarrow{AB}

2. _____

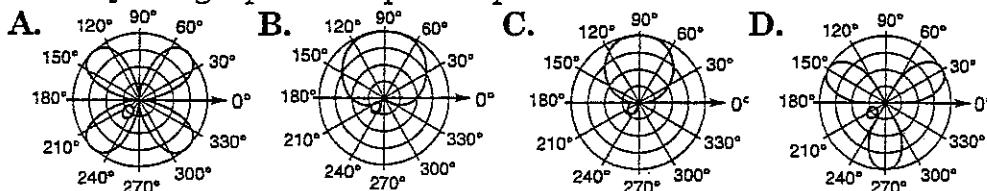
3) Solve $\frac{6}{x-4} + 2 > \frac{1}{3}$.

A. $x > 4$ B. $\frac{2}{5} < x < 4$ C. $x < \frac{2}{5}, x > 4$ D. $x > \frac{2}{5}$

3. _____

4. Identify the graph of the polar equation $r = 4 \sin 2\theta$.

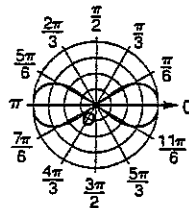
4. _____



5. Find the equation whose graph is given.

5. _____

- A. $r = 4 \cos 2\theta$
 B. $r = 2 + 2 \cos \theta$
 C. $r = 4 \cos \theta$
 D. $r^2 = 16 \cos 2\theta$



6. Find the polar coordinates of the point with rectangular coordinates $(-2, 2\sqrt{3})$.

6. _____

- A. $(4, \frac{\pi}{3})$ B. $(4, \frac{2\pi}{3})$ C. $(4, \frac{5\pi}{6})$ D. $(2, \frac{2\pi}{3})$

7. Find the rectangular coordinates of the point with polar coordinates $(4, \frac{5\pi}{4})$.

7. _____

- A. $(-2\sqrt{2}, -2\sqrt{2})$ B. $(2, 2\sqrt{3})$
 C. $(2\sqrt{2}, 2\sqrt{2})$ D. $(-2\sqrt{3}, -2)$

8. Write the rectangular equation $x^2 + y^2 - 2x = 0$ in polar form.

8. _____

- A. $r = 2 \sin \theta$ B. $r^2 - 2r \sin \theta = 0$
 C. $r = \cos 2\theta$ D. $r = 2 \cos \theta$

9. Write the polar equation $r^2 - 2r \sin \theta = 0$ in rectangular form.

9. _____

- A. $x + y - 2 = 0$ B. $x^2 + y^2 - 2x = 0$
 C. $x^2 + y^2 - 2y = 0$ D. $x = 2y$