

SUMMER REVIEW FOR AP CALCULUS

Give the domain of the function.

1) $f(x) = \sqrt{3-x}$

Evaluate the function.

2) Find $f(a+2)$ when $f(x) = x^2 + 5$.

Find the average rate of change for the function over the given interval.

3) $f(x) = \frac{3}{x+2}$ between $x = 1$ and $x = 4$

Determine if the given function is even, odd, or neither.

4) $f(x) = x^3 + x^2 + 1$

Find the requested function value.

5)
If $f(x) = \begin{cases} x^3 & \text{if } x < 0 \\ 4x + 2 & \text{if } x \geq 0 \end{cases}$ find $f(-4)$

Tell whether the graph of the function opens upward or downward and whether the graph is wider, narrower, or the same as $f(x) = x^2$.

6) $f(x) = \frac{1}{8}x^2 - 2$

Find the requested value.

7) $f(x) = 9x + 9$, $g(x) = 6x - 8$
Find fg .

Find the indicated composite for the pair of functions.

8) $(f \circ g)(x)$: $f(x) = \frac{2}{x+2}$, $g(x) = \frac{5}{4x}$

Solve the problem.

- 9) The owner of a video store has determined that the profits P of the store are approximately given by $P = -x^2 + 130x + 69$, where x is the number of videos rented daily. Find the maximum profit to the nearest dollar.

Find the x -intercepts and y -intercepts (if they exist).

10) $f(x) = x^2 - 5$

For the polynomial, list each real zero and its multiplicity.

Determine whether the graph crosses or touches the x -axis at each x -intercept.

11) $f(x) = 4(x-4)(x-2)^2$

Decide whether the graph has an asymptote, a hole, or neither at $x = t$.

12) $\frac{t}{x-t}$

Give the equation of the specified asymptote(s).

13) Vertical asymptote(s): $f(x) = \frac{x-5}{x^2-36}$

Answer the question.

14) Is there y -axis symmetry for the rational function $f(x) = \frac{-4x^2}{-2x^4 - 20}$?

If the following defines a one-to-one function, find the inverse.

15) $4y = 5x - 6$

Decide whether or not the functions are inverses of each other.

16) $f(x) = 5 - 3x$; $g(x) = -\frac{x}{3}(x-5)$

Approximate each value using a calculator. Express answer rounded to three decimal places.

17) $3.43.07$

Solve the equation.

18) $2^{(1+2x)} = 32$

Convert to logarithmic form.

19) $e^x = 17$

Solve the equation.

20) $3^{-x} = \frac{1}{81}$

Solve the problem.

21) $\log_3 x = -2$

- 22) The formula $D = 7e^{-0.04h}$ can be used to find the number of milligrams D of a certain drug in a patient's bloodstream h hours after the drug has been given. When the number of milligrams reaches 4, the drug is to be given again. What is the time between injections?

Write as the sum and/or difference of logs. Do not use exponents.

23) $\log_{16} \frac{5}{9}$

Use a calculator and the base conversion formula to find the logarithm, correct to three decimal places.

24) $\log_{2.8} 244$

Solve the equation.

25) $\log(4+x) - \log(x-5) = \log 2$

Convert the degree measurement to radians. Express answer as multiple of π .

26) 144°

Convert the radian measure to degrees. (Round to the nearest hundredth when necessary)

27) $\frac{11\pi}{4}$

Find the exact value of the requested trigonometric function of θ .

28) $\sin \theta = -\frac{2}{5}$ and $\tan \theta > 0$

Find $\sec \theta$.

If s denotes the length of the arc of a circle of radius r subtended by a central angle θ , find the missing quantity.

29) $r = \frac{1}{5}$ feet, $s = 4$ feet, $\theta = ?$

In the problem, t is a real number and $P=(x,y)$ is the point on the unit circle that corresponds to t . Find the exact value of the given trigonometric function.

30) $\left(-\frac{\sqrt{55}}{8}, \frac{3}{8}\right)$; find $\cos t$

Find the exact value of the expression. Do not use a calculator.

31) $\sin \frac{11\pi}{3}$

Use the fact that the trigonometric functions are periodic to find the exact value of the expression.

32) $\cot \frac{13\pi}{4}$

Find the amplitude or period as requested.

33) Find the period of $y = -3 \sin(6x + \frac{\pi}{2})$.

Name the quadrant in which the angle θ lies.

34) $\cot \theta < 0$ and $\cos \theta > 0$

Solve.

35) For what numbers x , $-2\pi \leq x \leq 2\pi$, does the graph of $y = \sec x$ have vertical asymptotes.?

Find the value of the expression.

36) $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

Complete the identity.

37) $\tan \theta(\cot \theta - \cos \theta) = ?$

38) $\frac{1}{\cos^2 \theta} - \frac{1}{\cot^2 \theta} = ?$

Find the exact value by using a sum or difference identity.

39) $\sin \frac{\pi}{12}$

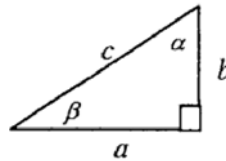
Use trigonometric identities to find the exact value.

40) $\sin 25^\circ \cos 35^\circ + \cos 25^\circ \sin 35^\circ$

Solve the equation for solutions in the interval $[0, 2\pi)$.

41) $2 \cos \theta + 1 = 0$

42) Solve the right triangle given that $\alpha = 35^\circ$ and $a = 8$.



- 1) Answer: $x \leq 3$
- 2) Answer: $a^2 + 4a + 9$
- 3) Answer: $-\frac{1}{6}$
- 4) Answer: Neither
- 5) Answer: -64
- 6) Answer: Upward, wider
- 7) Answer: $54x^2 - 18x - 72$
- 8) Answer: $\frac{8x}{5 + 8x}$
- 9) Answer: \$4294
- 10) Answer: x-intercepts $(\sqrt{5}, 0)$ and $(-\sqrt{5}, 0)$;
y-intercept $(0, -5)$
- 11) Answer: 4, multiplicity 1, crosses x-axis; 2,
multiplicity 2, touches x-axis
- 12) Answer: Asymptote
- 13) Answer: $x = 6, x = -6$
- 14) Answer: Yes
- 15) Answer: $f^{-1}(x) = \frac{4x + 6}{5}$
- 16) Answer: No
- 17) Answer: 42.819
- 18) Answer: {2}
- 19) Answer: $\ln 17 = x$
- 20) Answer: {4}
- 21) Answer: $\{\frac{1}{9}\}$
- 22) Answer: 13.99 hrs
- 23) Answer: $\log_{16} 5 - \log_{16} 9$
- 24) Answer: 5.339
- 25) Answer: {14}
- 26) Answer: $\frac{4\pi}{5}$
- 27) Answer: 495°
- 28) Answer: $-\frac{5\sqrt{21}}{21}$
- 29) Answer: 20 radians
- 30) Answer: $-\frac{\sqrt{55}}{8}$
- 31) Answer: $-\frac{\sqrt{3}}{2}$
- 32) Answer: 1
- 33) Answer: $\frac{\pi}{3}$
- 34) Answer: Quadrant IV
- 35) Answer: $-\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$
- 36) Answer: $\frac{3\pi}{4}$
- 37) Answer: $1 - \sin \theta$
- 38) Answer: 1
- 39) Answer: $\frac{\sqrt{2}(\sqrt{3} - 1)}{4}$
- 40) Answer: $\frac{\sqrt{3}}{2}$
- 41) Answer: $\frac{2\pi}{3}, \frac{4\pi}{3}$
- 42) Answer: $\beta = 55^\circ$
 $b = 11.43$
 $c = 13.95$