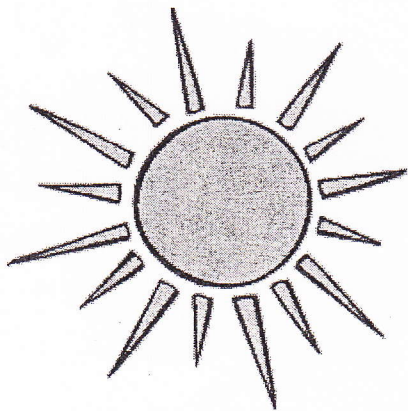


PRECALCULUS HONORS SUMMER



Precalculus Honors - Prerequisites

1. Find an equation for the line passing through $\left(-\frac{1}{2}, 1\right)$ and $(3, 8)$.

2. Find the quadratic function $y = a(x-h)^2 + k$ whose graph has vertex at $(-8, 5)$ and passes through $(-4, -7)$.

3. Given $f(x) = x^2 - 1$ and $g(x) = \sqrt{2x+1}$.
 - a) Find $g(f(5))$

 - b) Sketch a graph of $g(x)$

 - c) Give the domain of $f(x)$

 - d) Give the domain of $g(x)$

4. Find all positive two-digit numbers with the property that if the digits are interchanged and 36 is subtracted from the result, the difference is equal to the original number.
5. At 1:00 pm two planes leave Rome to fly to Paris. One flies 46 mi/hr faster than the other. One plane lands at 2:30 pm and the other, ten minutes later. Find the distance between Rome and Paris.
6. A company offers its salespersons a monthly salary of \$1400 plus a 10% commission on all sales over \$5000. If a salesman wants to earn at least \$2000 per month, his sales must be at least how much?

7. Solve the system:

$$\frac{3}{a} + \frac{2}{b} = 16$$
$$\frac{2}{a} - \frac{1}{b} = -1$$

8. Simplify: $\frac{\sqrt{3}}{i} + \frac{i}{\sqrt{3}} - \frac{\sqrt{3}}{3i}$

9. Simplify: $\frac{x^{n+3} - x^n}{x^{n+2} - x^n}$

10. Factor completely: $3x^3 - 12x$

11. Evaluate: $f(x) = \frac{3-x}{3+x}$ for $f(1-i)$

12. Find y in terms of x : $x^{-1} + 4x^{-2} + 4x^{-3} = x^{-3}y$

13. Simplify: $\sqrt[3]{\frac{-7x^5}{56x^2y^6}}$

14. Solve: $\left(\frac{x+3}{x-1}\right)^2 = 2 + \frac{x+3}{x-1}$

15. Solve: $\sqrt{x-6} + \sqrt{x} = 6$

16. An airplane climbs at takeoff with slope $m = 4/9$. How far in the horizontal direction will the airplane fly to reach an altitude of 20,000 ft above the takeoff point?

17. A store bought a \$1000 shipment of sweaters and offered them for sale after a \$15 markup on each sweater. All but 10 sweaters were sold, and the store made a \$400 profit on the sweaters. How many sweaters did the store buy?
18. The numerator of a fraction is 4 greater than the denominator. This fraction is added to the fraction obtained by adding 3 to both the numerator and the denominator. If the resulting sum is equal to 4, find the original fraction.
19. Solve the inequality $2x^2 - 2x - 1 > 0$.
20. A positive number is exactly one less than its reciprocal. Find the number in simplest radical form.

21. Simplify: $\sqrt{\frac{16}{3y^5}}$

22. The Adams family averaged 70 mi/hr on a trip of 175 mi. For the last 75 mi they were slowed down so that their speed was 20 mi/hr less than on the first 100 mi.

a) What was their speed on the last 75 mi?

b) What was their speed on the first 100 mi?

23. Simplify: $\frac{\frac{1}{x-y}}{\frac{1}{x} + \frac{1}{y}}$

24. The sides of a square were extended to form a rectangle 8 cm longer and 3 cm wider than the square. The area of the rectangle is 204 sq. cm. What was the area of the original square?

25. Find an equation in standard form of the line with the same x -intercept as the line whose equation is $y = -\frac{3}{4}x + 3$ and parallel to the line whose equation is $x - 2y - 3 = 0$.