PreCalculus Honors Final Review

Concepts: Polar, Sequences, Series, Limits, Conics, Vectors, and Parametric

1. Name the rectangular coordinates of (-6, 240°)

(3, 5.196) or (3, $3\sqrt{3}$)

2. Graph and state two other ordered pairs A) $\left(4, \frac{5\pi}{6}\right)$ B) $(-3, \frac{2\pi}{3})$

A) $(-4, -\pi/6)$, $(4, -7\pi/6)$ B) $(3, 5\pi/3)$ $(3, -\pi/3)$

3. Graph $r = 2 - 3\sin\theta$

4. Find the sum of the first 11 terms of the series $-\frac{1}{4} + 1 - 4 + 16 - \cdots$

$S_{11} = -209{,}715.25$

5. Find the sum of the first 17 terms of the sequence $-21, -16, -11, -6, \ldots$

$S_{17} = 323$

6. Find the sum $\sum_{k=3}^{8} 5k + 6$

201

7. Find the 8th term of the geometric sequence whose initial term is -3 and common ratio is 4.

$a_8 = -49152$

8. Find the sum of the first 15 terms $8 + 6 + \frac{9}{2} + \frac{27}{8} \ldots$.

$S_{15} = 31.5723$

9. Find the sum $\sum_{n=0}^{\infty} \left(\frac{1}{2}\right)^n$

2

10. Find the sum $\sum_{n=1}^{\infty} 3\left(\frac{1}{4}\right)^n$

1

11. Given a_1=18 and $a_{k+1} = \frac{5}{3}a_k$ Write the nth term of the sequence as a function of n

$a_n = 18\,(5/3)^{n-1}$

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12. Use your calculator to find the value of the $\lim_{x\to 9} \frac{8-5\sqrt{x}}{3x-27}$ Hint use your calculator.

DNE

13. The profit is given by $P = .0002x^2 + 140x - 250000$. What is the value of x that yields the max profit?

$x = -350{,}000$ $y = -24{,}350{,}000$

14. A farmer has 1700 feet of fencing. He wishes to enclose a rectangular area and plans to have a dividing fence in the middle. What is the max area and the dimensions?

$A = 120{,}446.53\ ft^2$ $w = 283.33$ Ft $\ell = 425.005$ Ft

15. Write the equation with roots -6, 4, and -3

$x^2 + 5x^2 - 18x - 72 = 0$

16. Is (x+3) a factor of $x^3 - 6x^2 + 3x - 4$

NO

17. Find the domain of $f(x) = \frac{x^2+4x-21}{x^2+5x-81}$ and state the asymptotes.

Domain is $\mathbb{R}$ except $x = 6.84$
$x = -11.84$