AP Calculus BC
Summer Assignment Cover Letter

Hello!

I am very excited that you signed up for AP Calculus BC for next school year! The summer assignment package is attached to this letter, it is meant to be completed *gradually* over the course of the summer. I am not collecting it; however, you are responsible for the material contained in the packet. You should expect an assessment over the material at any time. We will not spend copious amounts of class time reviewing these concepts, so please take time to make sure your skills are solid.

The AP Calculus test is on Tuesday, May 14, 2019 in the morning. Information about registering for the AP exam will be distributed during the second semester.

Please text the message @kh8bb to the number 81010. This will allow you to sign up for Remind messages. The Remind system allows you to send me messages also! Please do not hesitate to contact me via Remind or via email (tess.rivero@bss.k12.oh.us) if you have questions.

I look forward to a terrific school year!

Sincerely,
Mrs. Rivero

P.S. Make sure you have one of the following types of graphing calculators: TI-83/84 or TI-Nspire.

Do not rely on a calculator to complete the summer assignment. Only use it if it is absolutely necessary!

BC Calculus

~~Precalculus~~ Summer Assignment Do not rely on a calculator!

Name_____ ID: 1

Date_____ Period____

Convert each pair of polar coordinates to rectangular coordinates.

1) $\left(1, \frac{5\pi}{3}\right)$

2) $\left(2, \frac{3\pi}{4}\right)$

3) $\left(2, \frac{\pi}{6}\right)$

4) $\left(1, \frac{7\pi}{4}\right)$

Convert each pair of rectangular coordinates to polar coordinates where $r > 0$ and $0 \le \theta < 2\pi$.

5) $\left(\sqrt{3}, -1\right)$

6) $\left(2\sqrt{3}, -2\right)$

7) $(0, 2)$

8) $(0, 1)$

Consider each polar equation over the given interval. Classify the curve; determine if the graph is symmetric with respect to the origin, polar axis, and line $\theta=\pi/2$; find the values of θ where r is zero; find the maximum $|r|$ value and the values of θ where this occurs; and sketch the graph.

9) $r = 3\theta,\ \theta > 0$

10) $r = 2\cos(3\theta),\ 0 \le \theta < \pi$

11) $r = -5\cos\theta,\ 0 \le \theta < \pi$

12) $r = 5\cos(5\theta),\ 0 \le \theta < \pi$

13) $r^2 = 25\cos(2\theta),\ 0 \le \theta < 2\pi$

14) $r = 4 - 3\sin\theta,\ 0 \le \theta < 2\pi$

Convert each equation from rectangular to polar form.

15) $y = -x\sqrt{3}$

16) $(x+2)^2 + (y+1)^2 = 5$

17) $x^2 + (y+1)^2 = 1$

18) $y = 4x$

19) $(x-1)^2 + (y-1)^2 = 2$

20) $y = 2x$

Convert each equation from polar to rectangular form.

21) $\cot\theta = 1$

22) $r = 2\cos\theta + 4\sin\theta$

23) $r = 3\tan\theta\sec\theta$

24) $\tan\theta = 1$

25) $\theta = \frac{5\pi}{6}$

26) $r = 4\tan\theta\sec\theta$

Write each pair of parametric equations in rectangular form.

27) $x = 4\sin t,\ y = 3\cos t$

28) $x = 3\sec t,\ y = \tan t$

29) $x = 3\sin t,\ y = 3\cos t$

30) $x = t,\ y = \frac{t^2}{2}$

Sketch the curve for each pair of parametric equations.

31) $x = 2\cos t,\ y = 5\sin t$

32) $x = 3\cos t,\ y = 3\sin t$

For each sequence, state if it is arithmetic, geometric, or neither.

33) $\frac{7}{4}, \frac{9}{4}, \frac{11}{4}, \frac{13}{4}, \frac{15}{4}, \ldots$

34) 9, 99, 999, 9999, 99999, ...

35) 26, 21, 16, 11, 6, ...

36) 3, 6, 12, 24, 48, ...

Find the next three terms in each sequence.

37) 2, 5, 10, 17, 26, ...

38) −10, −8, −5, −1, 4, ...

39) $-\frac{4}{5}, -\frac{2}{5}, -\frac{1}{5}, -\frac{1}{10}, -\frac{1}{20}, \ldots$

40) −2, −4, −12, −48, −240, ...

Write the explicit formula for each sequence.

41) $-12,\ 98,\ -1002,\ 9998,\ -100002, \ldots$

42) $4,\ 7,\ 12,\ 19,\ 28, \ldots$

43) $22,\ 28,\ 34,\ 40,\ 46, \ldots$

44) $-24,\ 12,\ -6,\ 3,\ -\frac{3}{2}, \ldots$

Determine if the sequence is geometric. If it is, find the common ratio.

45) $2,\ 4,\ 7,\ 11, \ldots$

46) $5,\ 7,\ 10,\ 14, \ldots$

47) $1,\ -4,\ 16,\ -64, \ldots$

48) $-4,\ 12,\ -36,\ 108, \ldots$

Find the explicit formula.

49) $-0.4,\ -2,\ -10,\ -50, \ldots$

50) $-0.2,\ 1,\ -5,\ 25, \ldots$

51) $-\frac{1}{5},\ \frac{1}{30},\ -\frac{1}{180},\ \frac{1}{1080}, \ldots$

52) $48,\ -12,\ 3,\ -\frac{3}{4}, \ldots$

Evaluate each series.

53) $\sum_{n=1}^{5} n$

54) $\sum_{k=1}^{5} (40 - k^2)$

55) $\sum_{m=1}^{6} m(m+2)$

56) $\sum_{m=1}^{7} m(m-2)$

57) $\sum_{k=1}^{7} (40 - k^2)$

58) $\sum_{m=1}^{7} (3m^2 - 1)$

Rewrite each series using sigma notation.

59) $5 + 25 + 125 + 625 + 3125$

60) $2 + 1 + \frac{2}{3} + \frac{1}{2} + \frac{2}{5}$

61) $5 + 25 + 125 + 625$

62) $1 + 2 + 3 + 4$

63) $4 + 16 + 64 + 256 + 1024 + 4096$

64) $2 + 4 + 6 + 8 + 10$

Evaluate the related series of each sequence.

65) $-4, -\frac{7}{2}, -3, -\frac{5}{2}$

66) 7, 16, 25, 34

67) $\frac{19}{10}, \frac{17}{5}, \frac{49}{10}, \frac{32}{5}, \frac{79}{10}, \frac{47}{5}, \frac{109}{10}$

68) $\frac{1}{2}, 1, \frac{3}{2}, 2$

Evaluate each arithmetic series described.

69) $\sum_{k=1}^{40} \frac{5}{3}k$

70) $\sum_{m=1}^{15} (10m - 10)$

71) $\sum_{i=1}^{10} (4i - 7)$

72) $\sum_{m=1}^{9} (2m - 10)$

Determine the number of terms *n* in each arithmetic series.

73) $\sum_{i=1}^{n} \left(-\frac{1}{2} - \frac{3i}{2}\right) = -\frac{69}{2}$

74) $\sum_{k=1}^{n} (11 - 9k) = -570$

75) $\sum_{i=1}^{n} (6i - 9) = 72$

76) $\sum_{k=1}^{n} (0.1k + 9.6) = 535.5$

Evaluate each geometric series described.

77) $-3 - 9 - 27 - 81..., n = 8$

78) $-1 + 6 - 36 + 216..., n = 7$

79) $-2 - 8 - 32 - 128..., n = 8$

80) $3 - 12 + 48 - 192..., n = 7$

81) $\sum_{i=1}^{7}\left(\frac{1}{2}\right)^{i-1}$

82) $\sum_{k=1}^{10} -3 \cdot 2^{k-1}$

83) $\sum_{m=1}^{7} -3^{m-1}$

84) $\sum_{m=1}^{8} 5^{m-1}$

Determine the number of terms *n* in each geometric series.

85) $a_1 = -2,\ r = 6,\ S_n = -3110$

86) $a_1 = -8,\ r = \frac{1}{2},\ S_n = -14$

Determine if each geometric series converges or diverges.

87) $2 + 4 + 8 + 16...$

88) $9375 + 1875 + 375 + 75...$

89) $\frac{9}{5} + \frac{18}{25} + \frac{36}{125} + \frac{72}{625}...$

90) $0.9 + 0.36 + 0.144 + 0.0576...$

Evaluate each infinite geometric series described.

91) $\sum_{n=1}^{\infty} 2048 \cdot \left(-\frac{1}{4}\right)^{n-1}$

92) $\sum_{m=1}^{\infty} \frac{1}{2} \cdot \left(\frac{1}{2}\right)^{m-1}$

93) $\sum_{m=1}^{\infty} -\frac{2}{3} \cdot \left(\frac{1}{4}\right)^{m-1}$

94) $\sum_{m=1}^{\infty} 0.4 \cdot 0.2^{m-1}$

Determine the common ratio of the infinite geometric series.

95) $a_1 = 1,\ S = 2$

96) $a_1 = 1,\ S = \frac{3}{2}$

97) $a_1 = 1,\ S = \frac{5}{8}$

98) $a_1 = 5,\ S = \frac{15}{2}$