Precalculus Name_____

Final Exam Review

Date_____

Convert each pair of polar coordinates to rectangular coordinates.

1) $(3, 315°)$

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

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

3) $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

4) $(\sqrt{2}, -\sqrt{2})$

Convert each equation from rectangular to polar form.

5) $(x+3)^2 + (y-1)^2 = 10$

6) $x^2 + (y-2)^2 = 4$

7) $(x-2)^2 + (y+1)^2 = 5$

8) $(x+2)^2 + (y-1)^2 = 5$

Convert each equation from polar to rectangular form. Identify the conic section.

9) $r = \frac{2}{3 + 2\cos\theta}$

10) $r = -2\sin\theta$

11) $r = \frac{6}{2 - \sin\theta}$

12) $r = 2\cos\theta + 6\sin\theta$

Write each pair of parametric equations in rectangular form.

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

14) $x = 5\cos t + 1,\ y = 4\sin t - 1$

15) $x = -2t - 2,\ y = t^2 - 4$

16) $x = 2t - 3,\ y = \frac{2t^2}{3} - 2t + \frac{3}{2}$

Identify the conic then find all applicable applicable information (center, vertices, foci, asymptotes, covertices, directrix, vertex, etc).

17) $x^2 + y^2 - 4y - 60 = 0$

18) $9x^2 + 16y^2 + 72x - 320y + 448 = 0$

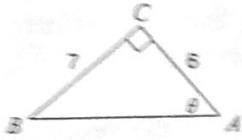
19) $x^2 - y^2 + 8x - 18y - 114 = 0$

20) $-3x^2 - 60x + 7y - 307 = 0$

Find the measure of each angle indicated. Round to the nearest tenth.

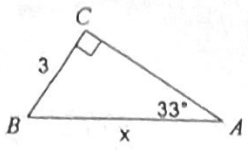
21)

22)

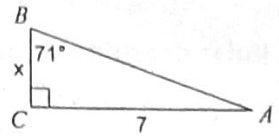


Find the measure of each side indicated. Round to the nearest tenth.

23)

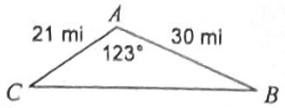


24)



Solve each triangle. Round your answers to the nearest tenth.

25)



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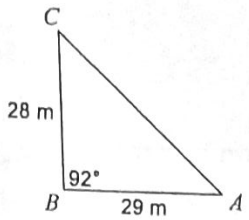
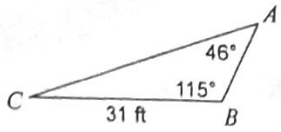
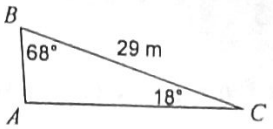


27)



28)



State the number of possible triangles that can be formed using the given measurements.

29) $m\angle A = 15°$, $c = 29$ in, $a = 18$ in

30) $m\angle C = 89°$, $b = 16$ yd, $c = 32$ yd

Solve each equation for $0 \le \theta < 2\pi$.

31) $2\sin\theta = \sqrt{3}$

32) $3\cot\theta = -3$

33) $4\cos\left(\theta + \frac{3\pi}{4}\right) = 2$

34) $\tan\theta + \sqrt{2}\tan\theta\sin\theta = 0$

35) $-2\cos^2\theta + \cos\theta + 2 = 1$

36) $4 = -\tan^2\theta + 7$

Find the exact value of each expression.

37) $\cos^{-1} -\frac{\sqrt{2}}{2}$

38) $\csc^{-1}\left(-\sqrt{2}\right)$

39) $\sec^{-1}\left(\tan\frac{\pi}{4}\right)$

40) $\tan^{-1}\left(\csc -\frac{\pi}{2}\right)$

41) From a cliff 150 feet above a lake, Julio saw a boat sailing directly toward him. The angle of depression was 5°. A few minutes later, he measured it to be 11°. Find the distance the boat sailed between the two observations.

Find the component form of the resultant vector. Then find the magnitude.

42) $\mathbf{f} = \langle -12, -5\rangle$
Find: $-5\mathbf{f}$

43) Given: $T = (-5, -1)$ $X = (-3, -10)$
Find: $\sqrt{2} \cdot \overrightarrow{TX}$

44) Given: $T = (1, -6)$ $X = (-10, 9)$
$Y = (4, 2)$ $Z = (-10, 8)$
Find: $-\overrightarrow{TX} + \overrightarrow{YZ}$

45) $\mathbf{f} = \langle -3, 10 \rangle$
$\mathbf{g} = \langle 3, -6 \rangle$
Find: $-\mathbf{f} - \mathbf{g}$

Find the dot product of the given vectors.

46) $\mathbf{u} = \langle 3, -3 \rangle$
$\mathbf{v} = \langle 1, -8 \rangle$

47) $\mathbf{u} = -8\mathbf{i} + 5\mathbf{j}$
$\mathbf{v} = -8\mathbf{i}$

Find the component form of the resultant vector.

48) $\mathbf{a} = \langle -8, 1 \rangle$
Unit vector in the direction of $\mathbf{a}$

49) $\mathbf{f} = \langle -12, 16 \rangle$
Unit vector in the opposite direction of $\mathbf{f}$

Write the recursive & explicit formula for each sequence.

50) $\frac{6}{5}, \frac{18}{25}, \frac{54}{125}, \frac{162}{625}, \frac{486}{3125}, \ldots$

51) $0, -2, -4, -6, -8, \ldots$

Evaluate each series.

52) $\sum_{n=1}^{7} (4n^2 - 4)$

53) $\sum_{a=2}^{6} (a + 300)$

Determine if each geometric series converges or diverges. Then find the sum of able.

54) $4 - \frac{4}{5} + \frac{4}{25} - \frac{4}{125} \ldots$

55) $45 + 15 + 5 + \frac{5}{3} \ldots$

56) $-4 - 12 - 36 - 108 \ldots$

57) $3 + \frac{3}{2} + \frac{3}{4} + \frac{3}{8} \ldots$

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

58) $18 + 23 + 28 + 33 \ldots$, $S_n = 986$ (Arithmetic)

59) $-2 - 12 - 72 \ldots$, $S_n = -3110$ (Geometric)

Rewrite each series using sigma notation.

60) $4 + 16 + 64 + 256 + 1024$

61) $10 + 15 + 20 + 25 + 30 + 35$

Evaluate each limit.

62) $\lim_{x \to 3^-} -\frac{3x}{x - 3}$

63) $\lim_{x \to -1^+} -\frac{x + 1}{x^2 - 1}$

64) $\lim_{x \to 2} \frac{1}{x - 2}$

65) $\lim_{x \to -4} \frac{x + 4}{x^2 + 7x + 12}$

66) $\lim_{x \to 1^+} \frac{2x - 2}{|x - 1|}$

67) $\lim_{x \to -1^-} f(x), f(x) = \begin{cases} -x^2 - 6x - 9, & x \le -1 \\ 0, & x > -1 \end{cases}$

68) $\lim_{x \to 4} \frac{-x + 4}{|-x + 4|}$

69) $\lim_{x \to 2} f(x), f(x) = \begin{cases} \frac{x}{2} + \frac{3}{2}, & x < 2 \\ -x + 6, & x \ge 2 \end{cases}$

44) Given: $T = (1, -6)$ $X = (-10, 9)$
$Y = (4, 2)$ $Z = (-10, 8)$
Find: $-\overrightarrow{TX} + \overrightarrow{YZ}$

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