

Mr. C's Study Guide # 5

Name: _____

1.) Determine which type of sequence you have and write an explicit rule for the n th term of the sequence. Find a_{10} for each sequence:

a.) 3.5, 3, 2.5, 2, 1.5, ...

b.) 64, 32, 16, 8, 4, ...

c.) 6, 12, 24, 48, ...

type: _____

type: _____

type: _____

rule: _____

rule: _____

rule: _____

$a_{10} =$ _____

$a_{10} =$ _____

$a_{10} =$ _____

2.) Find the explicit rules for the arithmetic sequences with the following attributes:

a.) $d = -2$, $a_4 = 3$

b.) $a_4 = 20$, $a_{13} = 65$

c.) $a_5 = 17$, $a_{15} = 77$

rule: _____

rule: _____

rule: _____

3.) Find the explicit rules for the geometric sequences with the following attributes:

a.) $r = 3$, $a_1 = 6$

b.) $r = -1/4$, $a_4 = 1$

c.) $a_2 = 50$, $a_6 = 0.005$

rule: _____

rule: _____

rule: _____

4.) Write the first 6 terms of the following sequences:

a.) $a_1 = 3$, $a_n = 2a_{n-1} - 5$

b.) $a_1 = 1$, $a_n = (na_1)^2 + 7$

c.) $a_1 = -1$, $a_n = a_{n-1} - 4$

a.) _____

b.) _____

c.) _____

5.) Find the sum of the following series:

a.) $\sum_{i=1}^{100} i$

b.) $\sum_{i=1}^{20} (3i + 2)$

c.) $\sum_{i=1}^{\infty} 64 \left(-\frac{1}{2}\right)^{i-1}$

d.) $\sum_{i=2}^5 \frac{1}{2} i^2$

a.) _____

b.) _____

c.) _____

d.) _____

6.) For part (i), find the sum of the first n terms of the series. For part (ii), find n for the given sum, S_n :

a.) $50 + 42 + 34 + 26 + 18 + \dots$

b.) $1 + 9 + 81 + 729 + \dots$

i.) $n = 12$

i.) $n = 10$

$S_{12} = \underline{\hspace{2cm}}$

$S_{10} = \underline{\hspace{2cm}}$

ii.) $S_n = 182$

ii.) $S_n = 820$

$n = \underline{\hspace{2cm}}$

$n = \underline{\hspace{2cm}}$

7.) For the given configuration, determine how many different license plates are possible if (i.) digits and letters can be repeated and if (ii.) digits and letters can't be repeated. NOTE: you do not need to solve this; just set up the equations!

a.) 3 letters followed by 5 digits

b.) 2 digits followed by 3 letters

i.) $\underline{\hspace{2cm}}$ ii.) $\underline{\hspace{2cm}}$

i.) $\underline{\hspace{2cm}}$ ii.) $\underline{\hspace{2cm}}$

8.) Find the following:

a.) ${}_5P_3 = \underline{\hspace{2cm}}$ b.) ${}_5C_3 = \underline{\hspace{2cm}}$ c.) $\binom{8}{5} = \underline{\hspace{2cm}}$ d.) $P_5^8 = \underline{\hspace{2cm}}$

9.) Find the number of unique permutations of the letters in the word:

a.) BOB

b.) POOP

c.) CREEPY

d.) MATH

a.) $\underline{\hspace{2cm}}$

b.) $\underline{\hspace{2cm}}$

c.) $\underline{\hspace{2cm}}$

d.) $\underline{\hspace{2cm}}$

10.) Expand $(3 - 2x)^4$

Answer: $\underline{\hspace{4cm}}$

11.) Find the coefficient of x^5 in the expansion of $(3x - 2)^7$

Answer: $\underline{\hspace{2cm}}$

12.) If a card is chosen out of a deck of cards, find the probability that it will be one of the following:

a.) A diamond

b.) A red card

c.) A diamond or a Queen

a.) $\underline{\hspace{2cm}}$

b.) $\underline{\hspace{2cm}}$

c.) $\underline{\hspace{2cm}}$

13.) 6 cards numbered 1 through 6 are shuffled and placed from left to right. What is the probability that the cards will appear in descending order?

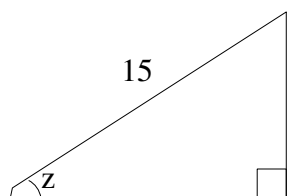
Answer: _____

14.) With a blindfold on, you toss a quarter onto a round table with a dish that has been randomly placed on the table. The table has a radius of 30 inches. The dish has a radius of 5 inches. What is the probability that the quarter will land on the dish?

Answer: _____

15.) Evaluate the 6 trigonometric functions of the marked angle (angle x, y, z or w):

a.)

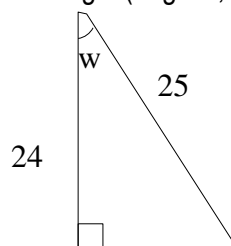


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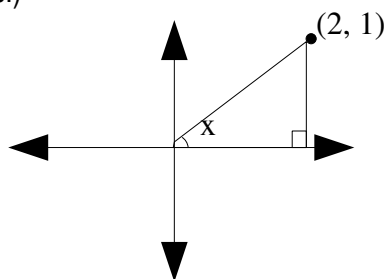
$$\sin z = \underline{\hspace{1cm}} \quad \cos z = \underline{\hspace{1cm}} \quad \tan z = \underline{\hspace{1cm}} \quad \sin w = \underline{\hspace{1cm}} \quad \cos w = \underline{\hspace{1cm}} \quad \tan w = \underline{\hspace{1cm}}$$

$$\cot z = \underline{\hspace{1cm}} \quad \sec z = \underline{\hspace{1cm}} \quad \csc z = \underline{\hspace{1cm}} \quad \cot w = \underline{\hspace{1cm}} \quad \sec w = \underline{\hspace{1cm}} \quad \csc w = \underline{\hspace{1cm}}$$

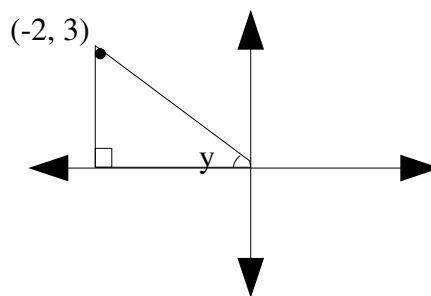
b.)



c.)



d.)



$$\sin x = \underline{\hspace{1cm}} \quad \cos x = \underline{\hspace{1cm}} \quad \tan x = \underline{\hspace{1cm}} \quad \sin y = \underline{\hspace{1cm}} \quad \cos y = \underline{\hspace{1cm}} \quad \tan y = \underline{\hspace{1cm}}$$

$$\cot x = \underline{\hspace{1cm}} \quad \sec x = \underline{\hspace{1cm}} \quad \csc x = \underline{\hspace{1cm}} \quad \cot y = \underline{\hspace{1cm}} \quad \sec y = \underline{\hspace{1cm}} \quad \csc y = \underline{\hspace{1cm}}$$

16.) Rewrite each degree measure in radians and each radian measure in degrees:

a.) $-\frac{3\pi}{4} = \underline{\hspace{2cm}}$ b.) $-55^\circ = \underline{\hspace{2cm}}$ c.) $-790^\circ = \underline{\hspace{2cm}}$ d.) $\frac{11\pi}{8} = \underline{\hspace{2cm}}$

17.) Find the arc length and area of a sector with the given radius r & central angle, x :

a.) $r = 10, x = 20^\circ$ b.) $r = 2, x = 80^\circ$ c.) $r = 12, x = 135^\circ$
length: $\underline{\hspace{2cm}}$ area: $\underline{\hspace{2cm}}$ length: $\underline{\hspace{2cm}}$ area: $\underline{\hspace{2cm}}$ length: $\underline{\hspace{2cm}}$ area: $\underline{\hspace{2cm}}$

18.) Evaluate the following functions:

a.) $\cos\left(-\frac{5\pi}{3}\right) = \underline{\hspace{2cm}}$ b.) $\csc\left(-\frac{3\pi}{4}\right) = \underline{\hspace{2cm}}$ c.) $\sin -300^\circ = \underline{\hspace{2cm}}$
d.) $\cot\frac{11\pi}{6} = \underline{\hspace{2cm}}$ e.) $\sec 270^\circ = \underline{\hspace{2cm}}$ f.) $\csc 270^\circ = \underline{\hspace{2cm}}$

19.) During the first heat of a bike race of 11 contestants, the first five cyclists will move on to the second heat (the main heat). The second heat will decide who places first, second, and third.

A.) How many ways can the cyclists be chosen for the first heat?

Answer: $\underline{\hspace{2cm}}$

B.) How many ways can the remaining cyclists be chosen first, second, or third in the main heat?

Answer: $\underline{\hspace{2cm}}$

20.) A.) In how many ways can 4 cards be chosen out of a deck of 52 cards?

Answer: $\underline{\hspace{2cm}}$

B.) In how many ways can 4 cards be chosen that are all Kings?

Answer: $\underline{\hspace{2cm}}$

C.) In how many ways can 4 cards be chosen that are all in the suit of hearts?

Answer: $\underline{\hspace{2cm}}$

21.) Using the information that you obtained from number 20, above, answer the following:

A.) If you draw four cards randomly from a deck, what's the probability that all four will be Kings?

Answer: _____

B.) If you draw four cards randomly from a deck, what's the probability that all four will be in the suite of hearts?

Answer: _____

22.) A friend of yours randomly chose a number from 1 to 20. What are the following probabilities for his number?

A.) The number is greater than 15 : _____ B.) The number is ≤ 12 : _____

C.) The number is not ≤ 12 : _____ D.) The number is ≤ 5 or > 9 : _____

23.) Find angles that are coterminal to the following:

A.) -237° : _____ B.) $\frac{-19\pi}{8}$: _____ C.) 940° : _____

24.) Find the values of the following functions. Provide answers in radians and degrees

A.) $\sin^{-1} \frac{\sqrt{2}}{2}$: _____ B.) $\sec^{-1} \frac{2\sqrt{3}}{3}$: _____ C.) $\cot^{-1} \frac{\sqrt{3}}{3}$: _____

25.) Solve the following (remember to check all solutions by plugging in x):

a.) $e^{3x} = e^{2x+7}$ b.) $\ln(5x-3) = 2$ c.) $5^{3x} - 2 = 8$

a.) _____ b.) _____ c.) _____

d.) $\log_x 125 - 1 = 2$ e.) $\log_2(\log_3 x) = 4$ f.) $x^2 5^x - 5^x = 8(5^x)$

d.) _____ e.) _____ f.) _____

26.) Classify the following conic section:

A.) $5x^2 + 5y^2 + 7x - 5y + 10 = 0$: type: _____

B.) $x^2 - 5x + 3y + 11 = 0$: type: _____

27.) Simplify the following:

a.) $\frac{\frac{10}{x+1}}{\frac{1}{2} + \frac{3}{x+1}}$

b.) $\frac{3x}{2x-3} + \frac{3x+6}{2x^2+x-6}$

c.) $\sqrt[4]{32x^5y^{10}}$

Answer: _____ Answer: _____ Answer: _____

28.) Solve the following rational equations; check for extraneous solutions:

a.) $\frac{5}{x} + x = 4$

b.) $\frac{8}{x+4} - \frac{8}{4} = 8$

c.) $\frac{10}{x^2-4x} + \frac{4}{x} = \frac{5}{x-4}$

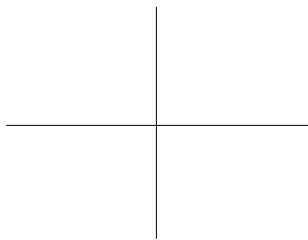
Answer: _____ Answer: _____ Answer: _____

29.) Graph the following functions and state their domain and range:

a.) $f(x) = 2|x+3| - 4$

b.) $g(x) = -3(x-5)^2 + 8$

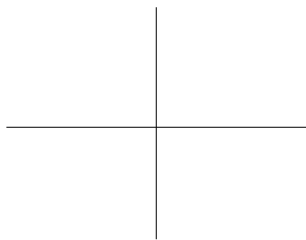
c.) $h(x) = 2x^2 + 12x - 9$



vertex: _____

domain: _____

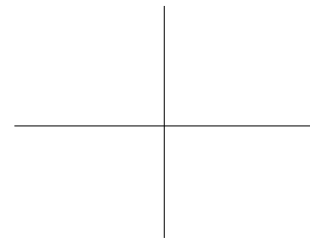
range: _____



vertex: _____

domain: _____

range: _____



vertex: _____

domain: _____

range: _____

30.) The Rocky Horror Picture Show is playing at midnight on Saturdays in the AMC theater. There are 200 seats for the show. Advanced tickets cost \$4, and tickets the day of the show cost \$6. If the box-office made \$860, how many advanced tickets did it sell?

Answer: _____ tickets.