Pre-Calculus
Quiz Review: Means/Summation/Sigma Notation

Name: _____
Period: _____ Date: _____

Find the indicated arithmetic or geometric means for each set of non-consecutive terms.

1. 6 arithmetic means between 12.4 and -24.7

$d = \frac{-24.7-12.4}{8-1} = -5.3$

7.1, 1.8, -3.5, -8.8, -14.1, -19.4

2. 2 geometric means between -4 and 13.5

$13.5 = -4r^{4-1}$
$\sqrt[3]{-3.375} = \sqrt[3]{r^3}$
$-1.5 = r$

6, -9

3. 3 geometric means between 10 and .016

$0.016 = 10r^{5-1}$
$\sqrt[4]{.0016} = \sqrt[4]{r^4}$
$0.2 = r$

2, 0.4, 0.08

Find the indicated sum of the following arithmetic series.

4. 211 + 193 + 175 + . . . + (-455)

$d = -18$
$-455 = 211 + (n-1)(-18)$
$-455 = 211 - 18n + 18$
$-455 = -18n + 229$
$-684 = -18n \quad n = 38$

$S_{38} = \frac{38}{2}(211 + -455)$

$S_{38} = -4636$

5. 19th partial sum of -19 + 23 + 65 + . . .

$d = 42$

$S_{19} = \frac{19}{2}[2(-19) + (19-1)(42)]$

$S_{19} = 6821$

Find the sum of the first 11 terms of the following geometric series.

6. 7 + (-24.5) + 85.75 + . . .

$r = \frac{85.75}{-24.75} = -3.5$

$S_{11} = 7\left(\frac{1-(-3.5)^{11}}{1-3.5}\right) = 1501877.337$

7. Find the sum of the first *n* terms of the geometric series with $a_1 = -8$, $a_n = 131072$ and $r = -4$

$S_n = \frac{-8 - 131072(-4)}{1-(-4)} = 104856$

Find the indicated sum for the following series. * plug into calculator

8. $\sum_{n=1}^{9}\left(\frac{2}{3}n + 16\right) = 174$

9. $\sum_{x=1}^{25}\left(\frac{5}{4}x - 71\right) = -1368.75$

10. $\sum_{k=23}^{37}(2k+3) = 945$

11. $\sum_{x=12}^{18}(-2x+57) = 189$

12. $\sum_{k=1}^{6}24\left(\frac{3}{2}\right)^{k-1} = 498.75$

13. $\sum_{g=1}^{10}3(-4)^{g-1} = -629145$

14. $\sum_{n=16}^{31}\frac{1}{2}(2)^{n-1} = 1073725440$

15. $\sum_{z=4}^{11}120\left(\frac{1}{2}\right)^{z-1} = 29.8828125$

Find the sum of the infinite geometric series.

16. $10 + (-5) + 2.5 + \ldots$ $r = -0.5$

$$S = \frac{10}{1-(-0.5)} = \boxed{6.67}$$

17. $\sum_{k=1}^{\infty} 120\left(\frac{4}{5}\right)^{k-1}$ $a_1 = 120$ $r = 4/5$

$$S = \frac{120}{1-4/5} = \boxed{600}$$

18. $20 + 15 + 11.25 + \ldots$ $r = 0.75$ ← change to 11.25

$$S = \frac{20}{1-0.75} = \boxed{80}$$

19. $\sum_{k=1}^{\infty} 62(-2)^{k-1}$ $a_1 = 62$, $r = -2$

$|-2| < 1$

$2 \not< 1$ **DNE**

Write the series in sigma notation.

20. $3 + 12 + 48 + \ldots + 3072$ $r = 4$

$$\sum_{n=1}^{6} 3(4)^{n-1}$$

21. $1152 + 576 + 288 \ldots + .5625$ $r = 0.5$

$$\sum_{n=1}^{12} 1152(0.5)^{n-1}$$

22. $250.2 + 250.4 + 250.6 \ldots + 254.8$ $d = 0.2$

$a_n = 250.2 + (n-1)(0.2)$

$a_n = 250.2 + 0.2n - 0.2$

$a_n = 250 + 0.2n$

$$\sum_{n=1}^{24} (0.2n+250$$

23. $9 + 6 + 3 \ldots + (-36)$ $d = -3$

$a_n = 9 + (n-1)(-3)$

$a_n = 9 - 3n + 3$

$a_n = -3n + 12$

$$\sum_{n=1}^{16} (-3n+12)$$

24. Selma is playing a video game. She scores 50 points if she clears the first level. Each following level is worth 50 more points than the previous level. Thus, she scores 100 points for clearing the second level, 150 points for the third level and so on. What is the total amount of points Selma will score after she clears the ninth level?

$a_1 = 50$

$a_2 = 100$

$a_3 = 150$

Find a_9 $d = 50$

$a_n = a_1 + (n-1)d$

$a_9 = 50 + (9-1)(50$

$a_9 = 450$

Total points (Find sum) = $S_9 = \frac{9}{2}(50+450)$

$$\boxed{S_9 = 2250}$$