Name: _____ Date: _____

Probability and Statistics Sections 11.3 & 11.4 Quiz Review Worksheet

Find the nth term of each GEOMETRIC sequence described:

1. $a_1 = -10$, $r = 4$, $n = 2$

$a_1 = -10$

$a_2 = -10 \cdot 4 = \boxed{-40}$

2. $a_3 = 9$, $r = -3$, $n = 7$

$a_3 = 9$

$a_4 = 9(-3) = -27$

$a_5 = -27(-3) = 81$

$a_6 = 81(-3) = -243$

$a_7 = -243(-3) = \boxed{729}$

3. $a_1 = 5$, $r = 3$, $n = 4$

$a_n = a_1 r^{n-1}$

$= (5)(3)^{4-1}$

$= (5)(3)^3$

$= (5)(27)$

$a_4 = \boxed{135}$

$a_1 = 5$

$a_2 = 5(3) = 15$

$a_3 = 15(3) = 45$

$a_4 = 45(3) = \boxed{135}$

4. $a_4 = -54$, $r = -3$, $n = 6$

$a_4 = -54$

$a_5 = -54(-3) = 162$

$a_6 = 162(-3) = \boxed{-486}$

5. $a_1 = -4$, $r = -2$, $n = 6$

$a_n = a_1 r^{n-1}$

$= (-4)(-2)^{6-1}$

$= (-4)(-2)^5$

$= (-4)(-32)$

$\boxed{a_6 = 128}$

6. $a_1 = 2$, $r = 2$, $n = 5$

$a_n = a_1 r^{n-1} = (2)(2)^{5-1}$

$= (2)(2)^4 = (2)(16)$

$\boxed{a_5 = 32}$

Find S_n of each geometric series described:

7. $6 + 18 + 54 + \ldots$ for 6 terms

$a_1 = 6$, $n = 6$, $r = \frac{18}{6} = 3$

$S_n = \frac{a_1(1-r^n)}{1-r} = \frac{6(1-(3)^6)}{1-3} = \frac{6(1-729)}{-2}$

$= \frac{6(-728)}{-2} = -3(-728) = \boxed{2184}$

8. $a_1 = 2$, $r = -3$, $a_n = 162$

$S_n = \frac{a_1 - a_n r}{1-r}$

$= \frac{2-(162)(-3)}{1+3}$

$= \frac{2+486}{4} = \frac{488}{4}$

$\boxed{S_n = 122}$

$a_1 = 160 \quad n = 6 \quad r = \frac{80}{160} = \frac{8}{16} = \frac{1}{2}$

9. $160 + 80 + 40 + \ldots$ for 6 terms

$$S_n = \frac{a_1(1-r^n)}{1-r} = \frac{160\left(1-\left(\frac{1}{2}\right)^6\right)}{1-\frac{1}{2}}$$

$$= \frac{160\left(1-\frac{1}{64}\right)}{1/2} = \frac{160\left(\frac{63}{64}\right)}{1/2} = \frac{10080/64}{1/2}$$

$$= \boxed{315}$$

10. $a_1 = 8$

$r = -2$

$n = 7$

$$S_n = \frac{a_1(1-r^n)}{1-r} = \frac{8\left(1-(-2)^7\right)}{1--2} = \frac{8(1--128)}{3}$$

$$= \frac{8(129)}{3} = 8(43) = \boxed{344}$$

Find S for each infinite geometric series (if it exists):

11. $a_1 = 35$

$r = \frac{2}{7}$

$$S = \frac{a_1}{1-r} = \frac{35}{1-\frac{2}{7}} = \frac{35}{5/7}$$

$$= \frac{35}{1} \cdot \frac{7}{5} = \boxed{49}$$

12. $a_1 = 26$

$r = \frac{1}{2}$

$$S = \frac{a_1}{1-r} = \frac{26}{1-\frac{1}{2}} = \frac{26}{1/2}$$

$$= \frac{26}{1} \cdot \frac{2}{1} = \boxed{52}$$

13. $a_1 = 50$

$r = \frac{2}{5}$

$$S = \frac{a_1}{1-r} = \frac{50}{1-\frac{2}{5}} = \frac{50}{3/5}$$

$$= \frac{50}{1} \cdot \frac{5}{3} = \boxed{\frac{250}{3}}$$

14. $6 + 4 + \frac{8}{3} + \ldots$

$$S = \frac{a_1}{1-r} = \frac{6}{1-\frac{2}{3}} = \frac{6}{1/3}$$

$$r = \frac{4}{6} = \frac{2}{3} \qquad = \frac{6}{1} \cdot \frac{3}{1} = \boxed{18}$$

15. $a_1 = 42$

$r = \frac{6}{5} = 1\frac{1}{5}$

$$\boxed{\text{DNE}}$$

Find a_1 for each infinite geometric series described:

16. $S = 64$

$r = \frac{-3}{4}$

$$S = \frac{a_1}{1-r} \cdot (1-r)$$

$$a_1 = S(1-r) = 64\left(1--\frac{3}{4}\right)$$

$$= \frac{16}{64}\left(\frac{7}{4}\right) = 16(7)$$

$$\boxed{a_1 = 112}$$

17. $S = 90$

$r = \frac{-1}{2}$

$$a_1 = S(1-r) = 90\left(1--\frac{1}{2}\right)$$

$$= \frac{45}{90}\left(\frac{3}{2}\right) = 45(3) = \boxed{135}$$