Number Sequences Review **Date:** ____________________

$t_n = a + (n-1)d$	$S_n = \frac{n}{2}(a + t_n)$	$S_n = \frac{n}{2}(2a + (n-1)d)$

1. Determine the 65th term for the arithmetic sequence: $-11, -5, 1, 7, \ldots$

$t_{65} = -11 + (65-1)(6) = -11 + 64(6) = 373$ $\therefore t_{65} = 373$

2. How many terms are in the following arithmetic sequence? -5, 4, 13, …, 283.

$283 = -5 + (n-1)(9)$ $297 = 9n$ $\therefore$ 33 terms

$288 = 9n - 9$ $33 = n$

3. Given the following sequence: 2, 23, 44, 65, 86, 107, find the missing terms.

$2 + 5d = 107$ $d = 21$

$5d = 105$

4. Determine the value of x such that the following is an arithmetic sequence.

$x - 2, 2x - 1, 2x + 5$ $d = (2x-1) - (x-2)$

$d = x + 1$

* Any term minus the previous term *

5. Determine the sum of the first 100 terms for the following arithmetic series: $2 + 5 + 8 + \ldots$

$t_{100} = 2 + (100-1)(3)$ $S_{100} = \frac{100}{2}(2 + 299)$ $S_{100} = 15050$

$t_{100} = 2 + 99(3)$ $S_{100} = 50(301)$

$t_{100} = 299$

6. Give the first four terms of the following sequence: $t_n = 12 - 5n$

$t_1 = 12 - 5(1)$ $t_2 = 12 - 5(2)$ $t_3 = 12 - 5(3)$ $t_4 = 12 - 5(4)$

$t_1 = 7$ $t_2 = 2$ $t_3 = -3$ $t_4 = -8$

7. Determine the sum for the following arithmetic series: $98 + 92 + 86 + \ldots + 44$.

$44 = 98 + (n-1)(-6)$ $\underline{\underline{n = 10}}$ $S_{10} = \frac{10}{2}(98 + 44)$

$-54 = -6n + 6$ $S_{10} = 5(142)$

$-60 = -6n$ $\therefore S_{10} = 710$

8. Rewrite the following into radical form: $x^{\frac{4}{5}}$

$\sqrt[5]{x^4}$ or $\left(\sqrt[5]{x}\right)^4$

9. Evaluate the following: $\left(\frac{27}{8}\right)^{-\frac{2}{3}}$ $= \left(\frac{8}{27}\right)^{2/3} = \frac{\left(\sqrt[3]{8}\right)^2}{\left(\sqrt[3]{27}\right)^2} = \frac{2^2}{3^2} = \frac{4}{9}$

Tough

FOIL

10. Simplify: $\left(a^{\frac{1}{2}}+b^{\frac{1}{2}}\right)^2$ $= a^{\frac{1}{2}}\cdot a^{\frac{1}{2}} + a^{\frac{1}{2}}b^{\frac{1}{2}} + a^{\frac{1}{2}}b^{\frac{1}{2}} + b^{\frac{1}{2}}b^{\frac{1}{2}}$

$= a + 2a^{\frac{1}{2}}b^{\frac{1}{2}} + b$

11. Simplify the following: No radical answers, no negative exponents and no decimal answers.

a) $(4x)^{-2} = \frac{1}{16x^2}$	b) $\left(\frac{x^2}{y^2}\right)^{\frac{1}{2}} = \frac{x}{y}$ $\quad 2\left(\frac{1}{2}\right)=1$
c) $\left(\frac{x^2}{y^2}\right)^{-\frac{1}{2}} = \left(\frac{y^2}{x^2}\right)^{\frac{1}{2}}$ $= \frac{y}{x}$	d) $\left(\frac{x^6}{y^6}\right)^{\frac{1}{2}} = \frac{x^3}{y^3}$
e) $\left(\sqrt[3]{a}\right)^4 = a^{4/3}$	f) $\left(\sqrt[3]{a}\right)^{\frac{1}{4}} = \left(a^{\frac{1}{3}}\right)^{\frac{1}{4}}$ $= a^{1/12}$
g) $\left(a^{\frac{1}{4}}\right)^3 = a^{3/4}$	h) $\left(\sqrt[3]{\sqrt{a}}\right)^4 = \left(a^{\frac{1}{2}}\right)^{4/3}$ $= a^{2/3}$
i) $\left(\frac{x^3}{8}\right)^{\frac{2}{3}} = \frac{x^2}{(\sqrt[3]{8})^2} = \frac{x^2}{4}$	j) $\left(\frac{x^4}{16}\right)^{-\frac{1}{4}} = \frac{x}{2}$ $\quad \sqrt[4]{16}=2$
k) $\sqrt{x^5}\times\sqrt{x^7} = x^{5/2}\cdot x^{7/2}$ $= x^{12/2}$ $= x^6$	l) $\sqrt[3]{x^2}\times\sqrt[4]{x^3} = x^{2/3}\cdot x^{3/4}$ $= x^{\frac{8+9}{12}}$ $= x^{17/12}$
m) $\left(\frac{4x^2y^{-3}}{2x^{-1}y^2}\right)^2 = \frac{16x^4y^{-6}}{4x^{-2}y^4}$ $= 4x^6y^{-10}$ $= \frac{4x^6}{y^{10}}$	n) $\left(\frac{5x^{-2}y^4}{25x^5y^{-4}}\right)^2 = \frac{25x^{-4}y^8}{625x^{10}y^{-8}}$ $= \frac{1x^{-10}y^{16}}{25}$ $= \frac{y^{16}}{25x^{10}}$