Date: ______________________

Today's Learning Goal(s):

By the end of the class, I will be:

a) prepared for the Unit 7 Summative on Thursday.

Last day's work: pp. 466 #1 – 3, (4 – 5)ace, 6, 8, 10
& Begin Review

8, 4e, 6
2c, 5c, e

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$(2x-3)(2x-3)(2x-3) \Rightarrow (4x^2-12x+9)(2x-3)$

2 c) $(2x-3)^3$

$= 1(2x)^3 + 3(2x)^2(-3) + 3(2x)(-3)^2 + 1(-3)^3$

$= 8x^3 - 36x^2 + 54x - 27$

4. Expand and simplify each binomial power.

K
a) $(k+3)^4$
b) $(y-5)^6$
c) $(3q-4)^4$
d) $(2x+7y)^3$
e) $(\sqrt{2}x + \sqrt{3})^6$
f) $(2z^3 - 3y^2)^5$

e) $(\sqrt{2}x + \sqrt{3})^6$

$= (\sqrt{2}x)^6 + 6(\sqrt{2}x)^5(\sqrt{3})^1 + 15(\sqrt{2}x)^4(\sqrt{3})^2 + 20(\sqrt{2}x)^3(\sqrt{3})^3 + 15(\sqrt{2}x)^2(\sqrt{3})^4 + 6(\sqrt{2}x)(\sqrt{3})^5 + (\sqrt{3})^6$

$= (\sqrt{2})^2(\sqrt{2})^2(\sqrt{2})^2x^6$

$= 8x^6 + 6(4\sqrt{2}x^5)(\sqrt{3}) + 15(4x^4)(3) + 20(2\sqrt{2}x^3)(3\sqrt{3}) + 15(2x^2)(9) + 6\sqrt{2}x(9\sqrt{3}) + 27$

$= 8x^6 + 24\sqrt{6}x^5 + 180x^4 + 120\sqrt{6}x^3 + 270x^2 + 54\sqrt{6}x + 27$

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5. Expand and simplify the first three terms of each binomial power.

a) $(x-2)^{13}$ **c)** $(z^5-z^3)^{11}$ **e)** $\left(3b^2-\dfrac{2}{b}\right)^{14}$

b) $(3y+5)^9$ **d)** $\left(\sqrt{a}+\sqrt{5}\right)^{10}$ **f)** $(5x^3+3y^2)^8$

c) $(z^5-z^3)^{11}$

$=(z^5)^{11}+11(z^5)^{10}(-z^3)+55(z^5)^9(-z^3)^2+\ldots$

$=z^{55}-11z^{53}+55z^{51}-\ldots$

e) $\left(3b^2-\dfrac{2}{b}\right)^{14}$

$$\begin{array}{r}13\\ \times 7\\ \hline 91\end{array}$$

$$=1(3b^2)^{14}+14(3b^2)^{13}\left(-\frac{2}{b}\right)^1+\frac{14\cdot 13}{2}(3b^2)^{12}\left(-\frac{2}{b}\right)^2$$

$$=4782969b^{28}+14(1594323b^{26})\left(\frac{-2}{b}\right)+91(531441b^{24})\left(\frac{4}{b^2}\right)$$

$$=4782969b^{28}-44641044b^{25}+193444524b^{22}$$

p. 466 **6.** Using the pattern for expanding a binomial, expand each binomial power to describe a pattern in Pascal's triangle.

a) $2^n = (1 + 1)^n$

b) $0 = (1 - 1)^n$, where $n \geq 1$

6 a) $2^n = (1+1)^n$

$n=2$ $2^2 = (1+1)^2$
$= (1)^2 + 2(1)(1) + (1)^2$
$= 1+2+1$ ✱
$= 4$

$n=3$ $2^3 = (1+1)^3$
$= (1)^3 + 3(1)^2(1) + 3(1)(1)^2 + (1)^3$
$= 1+3+3+1$ ✱
$= 8$

$n=4$ $2^4 = (1+1)^4$
$= (1)^4 + 4(1)^3(1) + 6(1)^2(1)^2 + 4(1)(1)^3 + (1)^4$
$= 1+4+6+4+1$ ✱ these are the rows of Pascal's Triangle
$= 16$

$\therefore n=5 \Rightarrow 1+5+10+10+5+1$
$= 32$

$\therefore$ the row of the triangle has a sum of 2^n

b) $0 = (1-1)^n$

$n=2$ $\therefore 0 = (1)^2 + 2(1)(-1) + (-1)^2$
$= 1-2+1$
$= 0$

$n=3$ $\therefore 0 = (1)^3 + 3(1)^2(-1) + 3(1)(-1)^2 + (-1)^3$
$= 1-3+3-1$
$= 0$

$n=4$ $\therefore 0 = (1)^4 + 4(1)^3(-1) + 6(1)^2(-1)^2 + 4(1)(-1)^3 + (-1)^4$
$= 1-4+6-4+1$
$= 0$

$\therefore$ alternating the signs in any row has a sum of 0.

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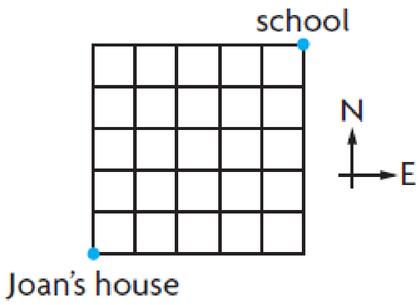
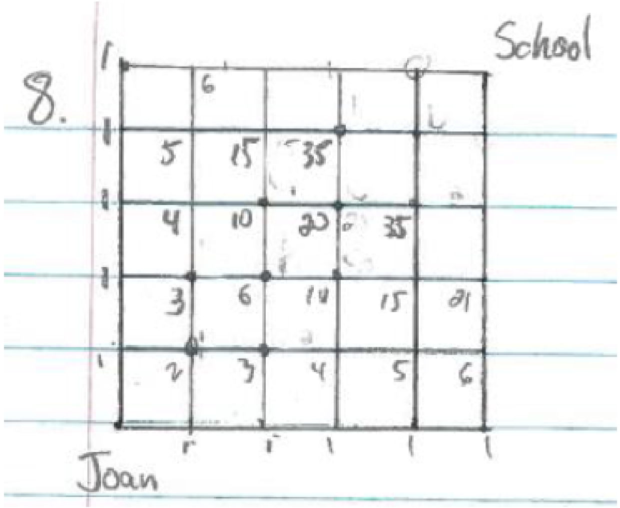
8. Using the diagram at the left, determine the number of different ways that Joan could walk to school from her house if she always travels either north or east.

A





Top left corner; only 1 way (North)
Bottom Right corner; only 1 way (East)
the points on that diagonal are: 1 5 10 10 5 1 (Row 5 for Pascal's Δ)

6 15 20 15 6

21 35 35 21

56 70 56

126 126

252

← School

∴ there are 252 ways for Joan to get to school, if travelling only North or East from her home.

SEQUENCES AND SERIES REVIEW (WHITE BOARD)

Formulas to remember:

Arithmetic Sequence

General Term: $t_n = a + (n-1)d$

Arithmetic series

$S_n = \frac{n[2a+(n-1)d]}{2}$ $S_n = \frac{n}{2}[t_1 + t_n]$

Recursive Formula: t_1, $t_n = t_{n-1} + d$, $n > 1$, $n \in N$

(n must be greater than 1) (n is a natural number)

Geometric Sequence

General Term: $t_n = ar^{n-1}$

Geometric Series

$S_n = \frac{a(r^n - 1)}{r-1}$

Recursive Formula: t_1, $t_n = rt_{n-1}$, $n > 1$, $n \in N$

Pascal's Triangle: Patterns and application of binomial expansion

$(a+b)^n$

1. Determine if the following sequence is arithmetic, geometric or neither.
   Determine the general term for the sequence.
   Write the recursive formula.

a) 29, 21, 13, ...

i) determine t_{10}

b) 23, -46, 92, ...

i) determine t_{10}

2. Determine the general term for the arithmetic sequence if...

a) $t_1 = 13$ and $d = -7$

b) $t_5 = 91$ and $t_7 = 57$

3. Determine the general term for the geometric sequence if ...

a) the first term is 144 and the second term is 36

b) $t_5 = 45$ and $t_8 = 360$

4. Calculate the sum of the first 10 terms in each series.

a) -103 - 110 - 117 - ...

b) 8 - 24 + 72 - ...

5. Determine the sum of the first 7 terms of the geometric series if ...

a) the third term is 18 and the terms increase by a factor of 3

b) $t_5 = 5$ and $t_8 = -40$

6. Determine the sum of the first 7 terms of the arithemetic series if ...

a) $t_1 = 31$ and $t_{20} = -102$

b) $t_7 = 43$ and $t_{13} = 109$

7. Determine the number of terms in the sequence

-63, -57, -51, - ... , 63

8. Determine the sum of the geometric series.

$17 - 51 + 153 - \ldots -334\ 611$

9. At a fish hatchery, fish hatch at different times even though the eggs were all fertilized at the same time. The number of fish that hatched on each of the first four days after fertilization was 2, 10, 50, and 250, respectively. If the pattern continues, calculate the total number of fish hatched during the first 10 days.

10. Use Pascal's triangle to expand $(3x - 2y)^4$.