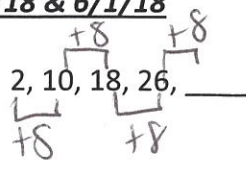


FINAL REVIEW #7: PATTERNS AND SUMMATIONS

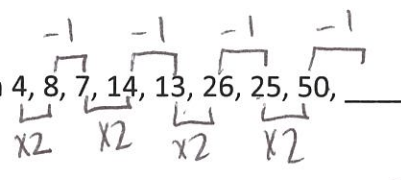
FINAL EXAM: 5/31/18 & 6/1/18

TOPIC #1: PATTERNS

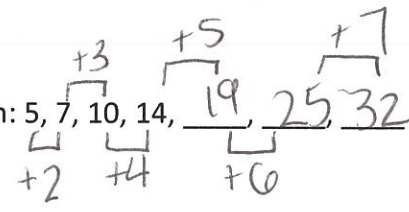
- 1) Determine the next term according to the pattern 2, 10, 18, 26, ____
- a) 130
b) 34
c) 28
d) 36



- 2) Determine the next term according to the pattern 4, 8, 7, 14, 13, 26, 25, 50, ____
- a) 75
b) 51
c) 49
d) 100



- 3) Determine the next 3 terms according to the pattern: 5, 7, 10, 14, 19, 25, 32



- 4) Teresa's five friends began an exercise group. They decided to walk along a trail each day. On the first day, they walked $\frac{1}{3}$ of the trail. On the second day, they walked $\frac{2}{5}$ of the trail. On the third day, they walked $\frac{3}{7}$ and on the fourth day $\frac{4}{9}$ of the trail. If this pattern continues, what fraction of the trail will Teresa and her friends walk on the tenth day?

| | | | | | | | | | | |
|-------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Trail | $\frac{1}{3}$ | $\frac{2}{5}$ | $\frac{3}{7}$ | $\frac{4}{9}$ | $\frac{5}{11}$ | $\frac{6}{13}$ | $\frac{7}{15}$ | $\frac{8}{17}$ | $\frac{9}{19}$ | $\frac{10}{21}$ |

- 5) Robert began writing a book. At the end of the first week, he'd written 9 pages. By the end of the second week, he'd written 3 more pages, for a total of 12 pages. At the end of the third week, he had a total of 17 pages and by the end of the fourth week he had 24 pages completed in his book. If he continues writing at this same rate, how many pages will his book have at the end of the ninth week?

| | | | | | | | | | |
|-------|---|----|----|----|----|-----|-----|-----|-----|
| week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| pages | 9 | 12 | 17 | 24 | 33 | 44 | 57 | 72 | 89 |
| | | +3 | +5 | +7 | +9 | +11 | +13 | +15 | +17 |

89 pages

- 6) Josh began a weight-training program. The first week, he lifted 30 pounds. For the following three weeks, he lifted 34.5, 39.5, and 45 pounds. If he continues this pattern, during which week will he lift more than 70 pounds?

| week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------|----|------|------|------|----|------|------|------|
| lbs | 30 | 34.5 | 39.5 | 45 | 51 | 57.5 | 64.5 | 72 |
| | | +4.5 | +5 | +5.5 | +6 | +6.5 | +7 | +7.5 |

8 weeks

- 7) If you have 15 coins consisting of only dimes and nickels and you have a total of \$1.10, how many of each coin do you have?

- 8) Leslie has \$.25 in her pocket but does not have a quarter. If you can tell her all the possible combinations of coins that she could have that add up to \$.25 consisting of dimes, nickels and pennies, she will give you the \$.25. Show all the combinations with a systematic list.

| DIMES | NICKELS | PENNIES | TOTAL |
|-------|---------|---------|-------|
| 2 | 1 | 0 | 25 |
| 2 | 0 | 5 | 25 |
| 1 | 3 | 0 | 25 |
| 1 | 2 | 5 | 25 |
| 1 | 1 | 10 | 25 |
| 1 | 0 | 15 | 25 |
| 0 | 5 | 0 | 25 |
| 0 | 4 | 5 | 25 |
| 0 | 3 | 10 | 25 |
| 0 | 2 | 15 | 25 |
| 0 | 1 | 20 | 25 |
| 0 | 0 | 25 | 25 |

TOPIC #2: SUMMATION

For each of the following examples, write out in expanded form and evaluate:

$$1) \sum_{i=0}^4 i$$

$$0 + 1 + 2 + 3 + 4 = \boxed{10}$$

$$2) \sum_{k=2}^7 k$$

$$2 + 3 + 4 + 5 + 6 + 7 = \boxed{27}$$

$$3) \sum_{j=3}^6 j^2$$

$$3^2 + 4^2 + 5^2 + 6^2$$
$$9 + 16 + 25 + 36 =$$
$$\boxed{86}$$

$$4) \sum_{k=0}^5 3^k$$

$$3^0 + 3^1 + 3^2 + 3^3 + 3^4 + 3^5$$
$$1 + 3 + 9 + 27 + 81 + 243$$
$$\boxed{364}$$

$$5) \sum_{k=1}^5 3k$$

$$3(1) + 3(2) + 3(3) + 3(4) + 3(5)$$
$$3 + 6 + 9 + 12 + 15$$

$$\boxed{45}$$

$$6) \sum_{x=-2}^4 x^2 + 1 \quad \star \text{ negatives in } () \}$$

$$((-2)^2 + 1) + ((-1)^2 + 1) + (0^2 + 1) + (1^2 + 1) + (2^2 + 1)$$
$$5 + 2 + 1 + 2$$

$$(2^2 + 1) + (3^2 + 1) + (4^2 + 1)$$
$$5 + 10 + 17$$

$$\boxed{42}$$

calc ↓

$$7) \sum_{k=0}^6 2k = \boxed{42}$$

$$8) \sum_{i=1}^5 (i+1) = \boxed{20}$$

$$9) \sum_{j=0}^4 j^2 = \boxed{30}$$

$$10) \sum_{j=1}^3 j^3 = \boxed{36}$$

Name: Keely
DISCRETE

Date: 5/24
TROICI/GOSSE

FINAL REVIEW #7: EXIT TICKET

- 1) Determine the next term according to the pattern 2, 3, 6, 11, ____

$$\begin{array}{cccc} & & +1 & +3 & +5 & +7 \\ \hline 2 & 3 & 6 & 11 & & \end{array}$$
 a) 66 c) 36
 b) 18 d) 22

- 2) Determine the next term according to the pattern 2, 6, 5, 15, 14, 42, 41, 123, ____

$$\begin{array}{ccccccc} & & -1 & & & \times 2 & \\ & & \times 2 & & -1 & & -1 \\ \hline 2 & 6 & 5 & 15 & 14 & 42 & 41 & 123 & & \end{array}$$
 a) 122 c) 100
 b) 369 d) 146

3) Craig's four friends began an exercise group. They decided to walk along a trail each day. On the first day, they walked 1/6 of the trail. On the second day, they walked 2/12 of the trail. On the third day, they walked 3/24 and on the fourth day 4/48 of the trail. If this pattern continues, what fraction of the trail will Craig and his friends walk on the tenth day?

| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-------|---------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|------------------|-------------------|
| Trail | $\frac{1}{6}$ | $\frac{2}{12}$ | $\frac{3}{24}$ | $\frac{4}{48}$ | $\frac{5}{96}$ | $\frac{6}{192}$ | $\frac{7}{384}$ | $\frac{8}{768}$ | $\frac{9}{1536}$ | $\frac{10}{3072}$ |

- 4) To help Sarah learn to read, Sarah's mom reads to her for 5 minutes on Monday, 10 minutes on Tuesday, 20 minutes on Wednesday and 40 minutes on Thursday. If the pattern continues, how many minutes will Sarah's mom read to her on Sunday?

| Day | M | T | W | TH | F | S | SU |
|-----|---|----|----|----|----|-----|-----|
| min | 5 | 10 | 20 | 40 | 80 | 160 | 320 |

- 5) Expand and Evaluate:

$$\sum_{n=2}^6 (n-6)^2 = (2-6)^2 + (3-6)^2 + (4-6)^2 + (5-6)^2 + (6-6)^2$$

$$= 16 + 9 + 4 + 1 + 0$$

$$= \boxed{30}$$

