PATTERNS TAKS NAME_____CLASS PD_____

5PTS EACH 100

Tables of value problems are really just patterns for the correct equation and can be done by calculator.. Other pattern problems are handled without the calculator

- Y= method
- You have a table of x | y values. Even if they are called m and k, x is on the left and y is on the right, just change the letters.
- On a top bottom table, x is on top and y is on the bottom.
- Press the y= button. Type in your first answer. Press the yellow 2nd key and then the blue graph key. x, y tables will appear. Look up the x values and see if the y values match. If they do, it is the correct answer. If not, it is wrong.
- Yes, its that easy.
- Or, you can solve them by substitution.

1.

Which equation best describes the relationship between the corresponding values of x and y shown in the table?

x	y
−2	−12
0	−6
1	−3
4	6

F $y = x - 10$

G $y = 2x - 8$

H $y = 3x - 6$

J $y = x^2 - 8$

2.

Which expression can be used to find the values of $s(n)$ in the table below?

n	1	2	3	4	5	6
$s(n)$	5	8	11	14	?	?

F $3n$

G $5n$

H $n + 4$

J $3n + 2$

3.

13) Which function includes the data set {(2, 4), (6, 6), (12, 9)}?

A $y = 2x$

B $y = \frac{x}{2}$

C $y = 2x - 9$

D $y = \frac{x}{2} + 3$

4.

Rita put some hummingbird feeders in her backyard. The table shows the number of hummingbirds that Rita saw compared to the number of feeders.

Bird-Watching

Number of Feeders	Number of Hummingbirds
1	3
2	5
3	7
4	9
5	11

Which equation best describes the relationship between h, the number of hummingbirds, and f, the number of feeders?

F $h = 2f + 1$

G $f = 2h + 1$

H $h = f + 2$

J $f = \frac{h+1}{2} + 1$

These tables are like ordered pairs.

- x is on the left, y on the right. So, in this problem, **f is x** and **h is y**. Change all the letters in the answers to x and y.
- <u>You can eliminate G and J as they are x =, not y = answers.</u>

5.

Jerome received a gift card for $20 worth of video rentals from a video store. If the cost of renting a video is $2.50, which table best describes b, the balance remaining on the gift card after he rents n videos?

F

n	*b*
0	$20.00
1	$17.50
2	$15.00
4	$10.00
6	$5.00

H

n	*b*
1	$17.50
2	$15.00
3	$13.50
4	$11.00
5	$8.50

G

n	*b*
0	$20.00
2	$17.50
4	$15.00
6	$12.50
8	$10.00

J

n	*b*
0	$20.00
1	$15.00
4	$10.00
6	$2.50
8	$0.00

Write an equation. Starts with $20 and then subtracts 2.50 for each video rented

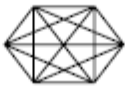
Y = 20 - _____ Then use y = program

Use Y= as a short cut

6. Which linear function contains the points (-3,10) and (-2,7) **F** $f(x) = 3x + 10$ **G** $f(x) = \frac{1}{3}x + 2$ **H** $f(x) = 3x - 6$ **J** $f(x) = -3x + 1$	• Hint- $f(x) = y$ • Make an x | y table of these 2 points: • Now solve.
7. Which equation is best represented by a line containing the points $(2, -5)$ and $(4, 3)$? **A** $x + 4y = 13$ **B** $y = 4x + 13$ **C** $y = -4x + 19$ **D** $-4x + y = -13$	Try the two that start with y =. If they don't work, you will need to use substitution or change the equation to y = form.
8. The figure below shows a partial view of Pascal's triangle. Pascal's Triangle Row 1: 1 Row 2: 1 1 Row 3: 1 2 1 Row 4: 1 3 3 1 Row 5: 1 4 6 4 1 Which row of numbers best represents the seventh row in Pascal's triangle? **F** 1 5 10 10 5 1 **G** 1 6 15 20 15 6 1 **H** 1 7 21 35 35 21 7 1 **J** 1 8 28 56 70 56 28 9 1	• How many numbers in row 1? ___ • Row 2?_____ • Row 3? _____ • So how many in row 7?_____ Answer_____ • That was quick. • Now, look at the other patterns in this triangle. • How do I know the answer will start with 1 6 and end in 6 1? _____

9.

The table below shows the number of sides and diagonals in certain polygons.

Number of Sides	Diagram	Number of Diagonals
3		0
4		2
5		5
6		9

}2-0=__

}5-2=__

}9-5=-__

}__-9=__

Based on the table, how many diagonals should a 9-sided convex polygon have?

___-___=___

___-___=___

Find the intervals between the values of the number of sides and the number of diagonals and see if you can see a pattern.

10.

A pattern exists as a result of raising i, an imaginary number, to n, an integer greater than or equal to 1.

Powers of i

i^n $(n \geq 1)$	Solution
i^1	$\sqrt{-1}$
i^2	-1
i^3	$-i$
i^4	1
i^5	$\sqrt{-1}$
i^6	-1

$i^7 =$ _____

$i^8 =$ _____

$i^9 =$ _____

- Who cares what "I" and all that stuff means.
- Look for the pattern. In fact, cross out the "I"s in the first column and look for the pattern in the second column.
- Make it easier, make the sq root of -1 a rectangle
- Make -1 a circle
- Make 1 a triangle
- Make – i a star.
- Now we are back to elementary school patterns.
- Question, what represents i to the 16th power?_____

11.

Sue wants to write an expression that will always produce an even integer. Which of the following will always produce an even integer for any given integer, n?

A $2n + 1$

B $2n - 1$

C $n + 2$

D $2n$

- "n' is a number. Always try an odd and an even.
- N = 1 (odd)
- A. (even?)____
- B. (even?)_____
- C. (even?)_____

D. (even?) _____

Remember it said ALWAYS an even integer

12.

Which sequence uses the algebraic expression $4n + 5$ to describe the relationship between a term in the sequence and its position, n, in the sequence?

A 4, 9, 14, 19, 24, ...

B 4, 8, 12, 16, 20, ...

C 9, 13, 17, 21, 25, ...

D 9, 10, 11, 12, 13, ...

On 12 and 13
Always start these with n=1.
Use y = and see which fits the patterns.

13.

Which algebraic expression best represents the relationship between a term in the sequence below and its position, n, in the sequence?

0, 3, 8, 15, 24, ...

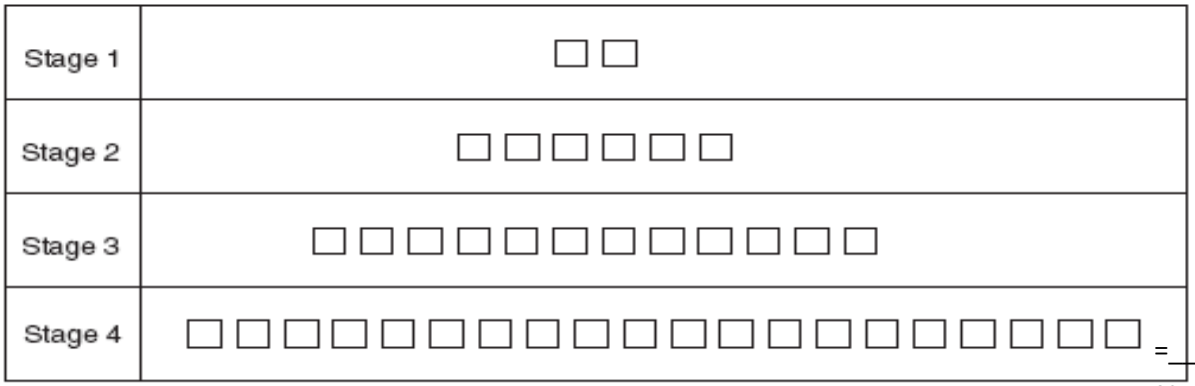
A $n - 1$

B $n^2 - 1$

C $3n - 1$

D $2n^2 - 2$

14.



=___ squares

Which expression can be used to determine the number of squares at stage n?

F $5n - 3$
G $4n - 2$
H $2n^2$
J $n^2 + n$

figure out what n is

15.

Linda owns a set of seven wrenches. The wrenches come in consecutive increments of $\frac{1}{8}$ inch. Linda has misplaced a wrench. The sizes she has are $\frac{1}{8}$ inch, $\frac{1}{4}$ inch, $\frac{1}{2}$ inch, $\frac{5}{8}$ inch, $\frac{3}{4}$ inch, and $\frac{7}{8}$ inch. Which size wrench is missing from Linda's set?

A $\frac{3}{16}$ in.

B $\frac{3}{8}$ in.

C $\frac{11}{16}$ in.

D Not here

Write your fractions to one by eights: 1/8,___,___,___,___,___,___,___
Now reduce them : ___,___,___,___,___,____,___, 1 What's missing?___

16.

The integers 1881, 353, 2002, and 787 are palindrome integers. Which of the following is also a palindrome integer?

F 1961
G 828
H 2525
J 783

Racecar, mom, dad are palindrome words. What is a palindrome number?

_____

Careful..is 2525 a palindrome or just a repeating number?_____

17.

0

A pattern exists for digits in the ones place of the value that results from raising 7 to the power of n, where n is an integer greater than or equal to 1.

Digits in Ones Place of 7^n

7^n	Value	Digit in Ones Place
7^1	7	7
7^2	49	9
7^3	343	3
7^4	2,401	1
7^5	16,807	7
7^6	117,649	9
7^7	823,543	3

Which digit is in the ones place of the value of 7^{50}?

F 7
G 9
H 3
J 1

- That is 7^{50} Your calculator won't give you an answer for that. Try it

So what is the pattern?_____ How often does it repeat? _____

Ok, So how many times will the pattern repeat in 50? $\left(\frac{50}{4}\right)$ =?_____ So on 49, the pattern will start fresh: _____, _____, _____, _____, ……

49 50 51 52 ……

18.

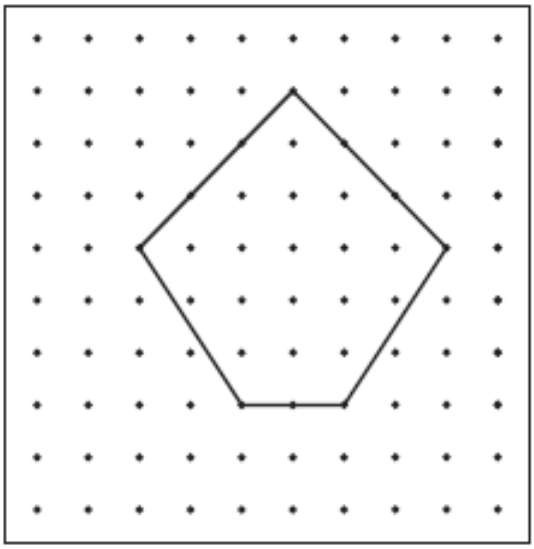
Lee, Kelly, Linda, and Madison all took the same math test. Linda earned a lower score than Kelly, but she did not earn the lowest score. The highest test-scorer's name does not begin with an L. Madison earned a higher score than Kelly. Which person earned the lowest score on the math test?

A Kelly
B Lee
C Linda
D Madison

This is a "game" problem. 1/3 of the entrance exams for law school are game problems. Order these kids.

19.

The horizontal distance and the vertical distance between the pegs on the geoboard shown below each represent 1 unit.



Which is closest to the area of the polygon modeled on the geoboard?

A 34 units^2

B 27 units^2

C 21 units^2

D 17 units^2

- Connect the dots inside the pentagon that make complete squares and count them. Shade them in. . _____
- Now, how many half squares are there?_____ Shade them in. _____
- Total _____
- Now estimate the remaining area and decide which is closest.

20.

Write an equation for the following table using a linear regression.

Round to Hundredths Place.

y=_____

x	y
-6	-3
-1	-2
2	2
3	4
5	5
7	8