Patterns & Algebra

Unit Test

Name: _____

Date: _____

1. Extend the following patterns.

a) 2 , 16 , 30 , ____ , ____ , ____

b) 6.7 , 6.1 , 5.5 , ____ , ____ , ____

c) 2 , 8 , 16 , 22 , 30 , ____ , ____

d) 43 , 29 , 37 , 23 , 31 , ____ , ____

e) 3 , 13 , 33 , 63 , ____ , ____ , ____

f) 4 , 6 , 10 , 18 , 34 , ____ , ____

2. **75, 67, 59, 51, 43, ...**

Kate says the pattern rule is: "Start at 75 and subtract 7 each time."

Helen says the rule is: "Subtract 8 each time."

Natalie says the rule is: "Start at 75 and subtract 8 each time."

a) Whose rule is correct? _____

b) What mistakes did the others make? _____

_____

_____

3. Use the first numbers in the pattern to find the rule. Continue the sequence, and then find the rule.

a) 614, 627, 640, _____, _____, _____ The rule is: _____

b) 621, 607, 593, _____, _____, _____ The rule is: _____

c) 84, 86, 81, 83, 78, 80, _____, _____, _____ The rule is: _____

d) 2, 6, 18, 54, _____, _____, _____ The rule is: _____

4. Describe each linear pattern below in <u>two</u> ways.

(i) Give a **stepwise rule** that tells you the first term of the sequence and what you need to add or subtract to each term to get the next term.

(ii) Give a **general rule** that tells you how to calculate any term from the term number.

a) 13, 19, 25, 31, 37

Stepwise rule: _____

_____

General rule: _____

_____

b) 3, 15, 27, 39, 51

Stepwise rule: _____

_____

General rule: _____

_____

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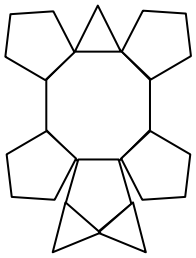
5. Wendy has 25 triangles, 49 pentagons and 10 octagons.



a) Does she have enough triangles and pentagons to make 7 broaches using the design here?

b) Write rules to calculate the number of octagons, pentagons and triangles from the number of broaches.

c) What is the largest number of broaches she can make with her shapes?

d) How many triangles and pentagons will be left? Explain.

6. Diana draws a pattern with triangles.
   The smaller triangle has sides of 1.5 cm, 2.5 cm and 2 cm.
   The larger triangle has sides of 2.5 cm, 3 cm and 18 mm.

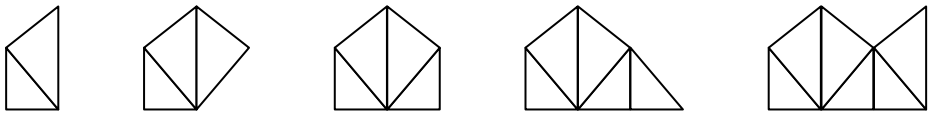


Figure 1 **Figure 2** **Figure 3** **Figure 4** **Figure 5**

a) Draw a picture to show the 6^{th} and 7^{th} terms of the pattern. Then fill in the table.

Figure Number	Perimeter

b) Describe the pattern in the perimeter. How does the step change?

c) Extend the number pattern to find the perimeter of the 10^{th} figure.