SOLUTIONS=>

1 - 2 Cumulative Review

MULTIPLE CHOICE

1. Kari is studying the number of handshakes among groups of people. Based on groups of 2, 3, and 4 people with 1, 3, and 6 handshakes, she conjectures that the number of handshakes follows the sequence of triangular numbers. Kari then discovers that there are 10 handshakes among 5 people and 15 handshakes among 6 people. What can you say, based only on the new evidence, about Kari's conjecture?

   A. The conjecture is valid.

   B. The new evidence supports the conjecture.

   C. The conjecture is not valid.

   D. The new evidence does not support the conjecture.

2 people
1-2
1 handshake

3 people
1-2 2-3 1-3
3 handshakes

4 people
1-2 2-3 3-4
1-3 2-4
1-4
6 handshakes

Original Evidence (Valid)

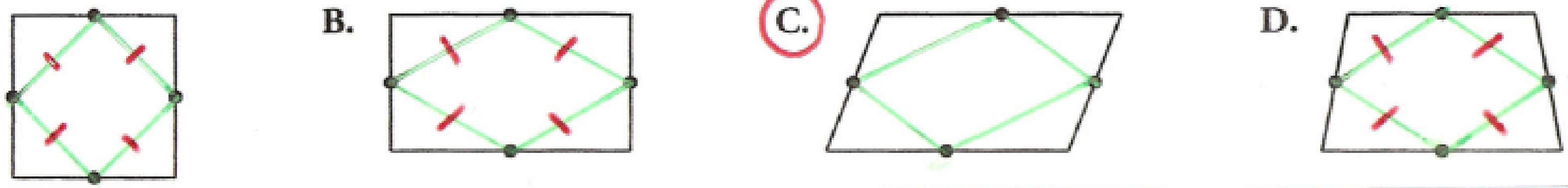
5 people
1-2 2-3 3-4 4-5
1-3 2-4 3-5
1-4 2-5
1-5
10 handshakes

6 people
1-2 2-3 3-4 4-5 5-6
1-3 2-4 3-5 4-6
1-4 2-5 3-6
1-5 2-6
1-6
15 handshakes

New Evidence (Supports Conjecture)

2. Kevin claims that the midpoints of any quadrilateral, when joined, form a rhombus. Which of the following is a counterexample to Kevin's conjecture?

A. B. C. D.



Note: A rhombus is an equilateral parallelogram.

4. This proof seems to show that $4 = 2$. Where is the error?

Let $a = 2b$, $b \neq 0$.

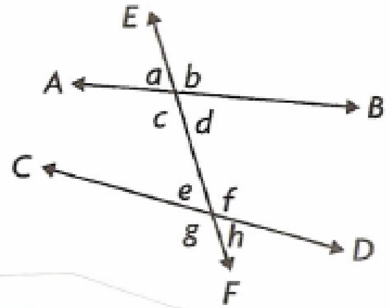
$a^2 = 2ab$	**A.** Multiply by a.
$a^2 - 4b^2 = 2ab - 4b^2$	(Subtract $4b^2$.)
$(a + 2b)(a - 2b) = 2b(a - 2b)$	**B.** Factor.
$a + 2b = 2b$	**C.** Divide by $(a - 2b)$.
$4b = 2b$	(Substitute $a = 2b$.)
$4 = 2$	**D.** Divide by b.

*If $a=2b$, then $a-2b=0$. (You cannot divide by 0)

5. Which of the following pairs of angles are corresponding angles?

A. $\angle a$ and $\angle e$ **B.** $\angle b$ and $\angle h$ **C.** $\angle a$ and $\angle d$ **D.** $\angle b$ and $\angle c$

but they are not equal :)



7. What is the measure of each interior angle of a regular nonagon?

A. 280° B. 40° C. 147.3° D. 140°

↳ nonagon ⇒ 9 sides

Measure of each interior angle $= \frac{180°(n-2)}{n}$

$= \frac{180°(9-2)}{9}$

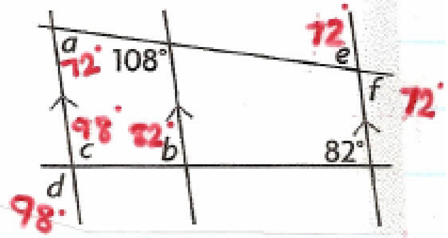
$= \frac{180°(7)}{9}$

$= 140°$

10. Determine each angle measure.

$\angle a = \underline{72}°$ $\angle b = \underline{82}°$ $\angle c = \underline{98}°$

$\angle d = \underline{98}°$ $\angle e = \underline{72}°$ $\angle f = \underline{72}°$



11. Determine the following angle measures in the regular pentagon *ABCDE*.

$\angle EAB = \underline{108}°$ $\angle AEF = \underline{36}°$ $\angle EAF = \underline{72}°$ $\angle FAB = \underline{36}°$

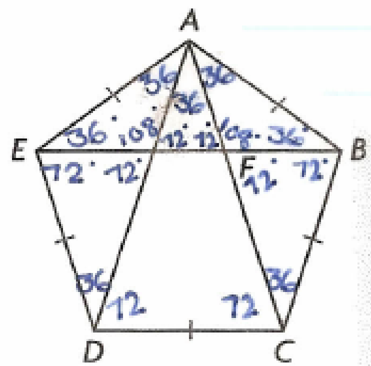
$\angle EFA = \underline{72}°$

$\angle AFB = \underline{108}°$ $\angle EBA = \underline{36}°$ $\angle DAC = \underline{36}°$ $\angle ADC = \underline{72}°$

$\angle ACD = \underline{72}°$

Use your results to identify two pairs of similar triangles within *ABCDEF*.

$\triangle ACD \sim \triangle \underline{EAF}$ $\triangle \underline{ABE} \sim \triangle FAB$



* In a pentagon, each interior angle $= \dfrac{180°(n-2)}{n}$

$= \dfrac{180°(5-2)}{5}$

$= \dfrac{180°(3)}{5}$

$= 108°$

13. a) Make a conjecture about the sum of two consecutive perfect squares.

The sum of two consecutive perfect squares is always an odd number.

b) List evidence that supports or disproves your conjecture.

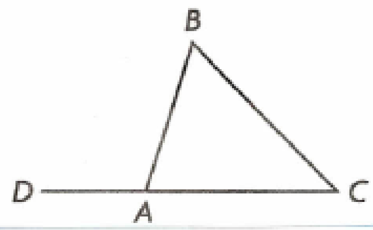
2^2+3^2	3^2+4^2	20^2+21^2
$=4+9$	$9+16$	$=400+441$
$=13$ (odd)	$=25$ (odd)	$=841$ (odd)

c) If possible, prove your conjecture.

Let $S=$ sum
Let $x=$ any integer.

$S=x^2+(x+1)^2$
$S=x^2+(x+1)(x+1)$
$S=x^2+x^2+1x+1x+1$
$S=2x^2+2x+1$
$S=\underbrace{2(x^2+x)}_{\text{Even}}+1$ (This is always an odd #)

14. The measure of an exterior angle of a triangle is the sum of the measures of the two non-adjacent interior angles. Use this fact and $\triangle ABC$ to prove that the sum of the interior angle measures of a triangle is $180°$.



$< DAB = < B + < C$ (Given)

$< DAB + < BAC = 180°$ (Supplementary Angles)

$< DAB = 180° - < BAC$

$(180° - < BAC) = < B + < C$

$180° = < BAC + < B + < C$ (Substitution)