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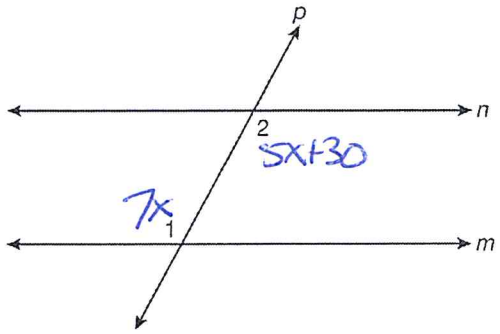
Date _____
Geometry

Parallel Lines Cut By a Transversal with Algebra

1. In the diagram below, line p intersects line m and line n.



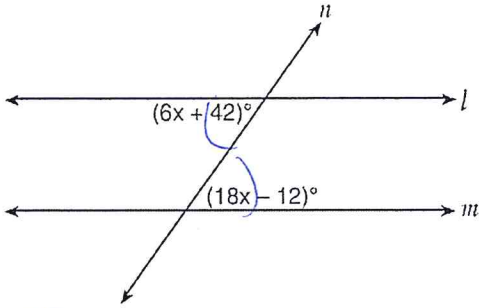
If $m\angle 1 = 7x$ and $m\angle 2 = 5x + 30$, lines m and n are parallel when x equals

1) 12.5
2) 15
3) 87.5
4) 105

both obtuse

$7x = 5x + 30$
$-5x \quad -5x$
$\frac{2x}{2} = \frac{30}{2}$
$x = 15$

2. Line n intersects lines l and m, forming the angles shown in the diagram below.



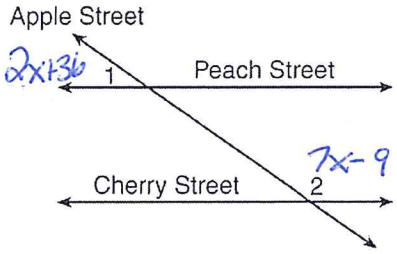
Which value of x would prove $l \parallel m$?

1) 2.5
2) 4.5
3) 6.25
4) 8.75

both acute

$6x + 42 = 18x - 12$
$-6x \quad -6x$
$42 = 12x - 12$
$+12 \quad +12$
$\frac{54}{12} = \frac{12x}{12}$
$x = 4.5$

3. Peach Street and Cherry Street are parallel. Apple Street intersects them, as shown in the diagram below.



If $m\angle 1 = 2x + 36$ and $m\angle 2 = 7x - 9$, what is $m\angle 1$?

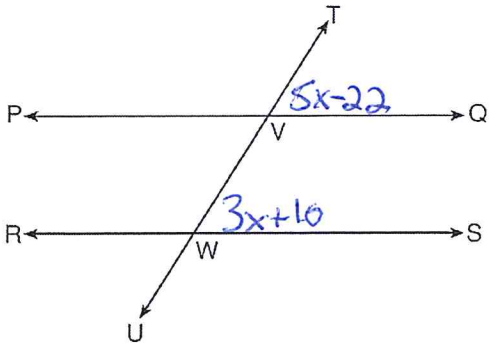
1) 9
2) 17
3) 54
4) 70

one acute and one obtuse

$2x + 36 + 7x - 9 = 180$
$9x + 27 = 180$
$-27 \quad -27$
$\frac{9x}{9} = \frac{153}{9}$
$x = 17$

$\angle 1 = 2(17) + 36$
$\angle 1 = 70$

4. In the diagram below, transversal $\overleftrightarrow{TU}$ intersects $\overleftrightarrow{PQ}$ and $\overleftrightarrow{RS}$ at V and W, respectively.



If $m\angle TVQ = 5x - 22$ and $m\angle VWS = 3x + 10$, for which value of x is $\overleftrightarrow{PQ} \parallel \overleftrightarrow{RS}$?

1) 6
2) 16
3) 24
4) 28

both acute

$5x-22 = 3x+10$

$-3x \quad -3x$

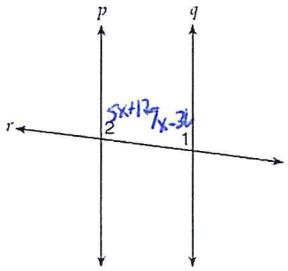
$2x-22 = 10$

$+22 \quad +22$

$\frac{2x}{2} = \frac{32}{2}$

$x = 16$

5. Lines p and q are intersected by line r, as shown below.



If $m\angle 1 = 7x - 36$ and $m\angle 2 = 5x + 12$, for which value of x would $p \parallel q$?

1) 17
2) 24
3) 83
4) 97

One acute and one obtuse

$5x+12+7x-36 = 180$

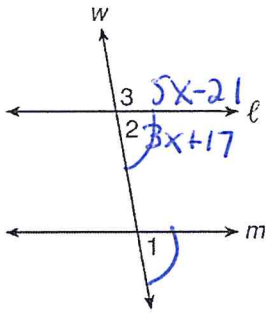
$12x-24 = 180$

$+24 \quad +24$

$\frac{12x}{12} = \frac{204}{12}$

$x = 17$

6. In the diagram below, line ℓ is parallel to line m, and line w is a transversal.



(Not drawn to scale)

If $m\angle 2 = 3x + 17$ and $m\angle 3 = 5x - 21$, what is $m\angle 1$?

1) 19
2) 23
3) 74
4) 86

One acute and one obtuse

$5x-21+3x+17 = 180$

$8x-4 = 180$

$+4 \quad +4$

$\frac{8x}{8} = \frac{184}{8}$

$x = 23$

$\angle 1 \cong \angle 2$

$3(23)+17$

$69+17$

$86°$