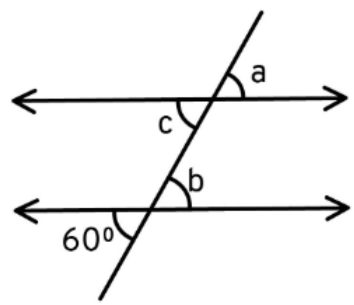
Grade 78 Math **Finding the missing angle Practice with Patterns 1**

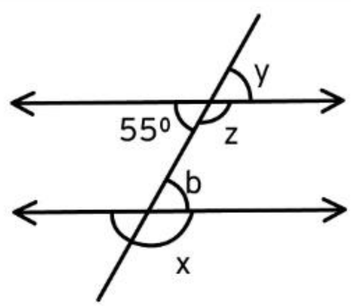
Name: ___________________________ Class: ______ Date: ___________________________________

For each of the diagrams, find the missing angles and name the pattern name to explain how you got it.

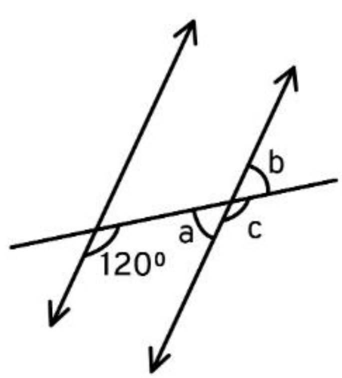
(i)



(ii)



(iii)



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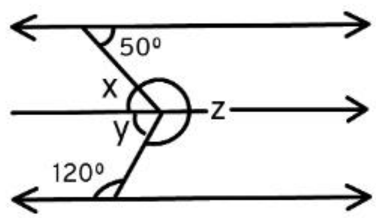

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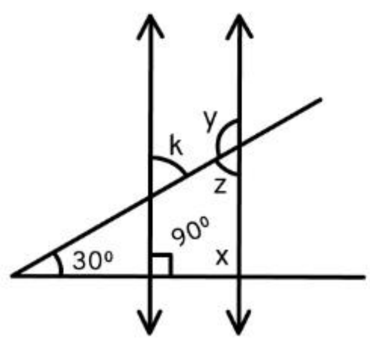

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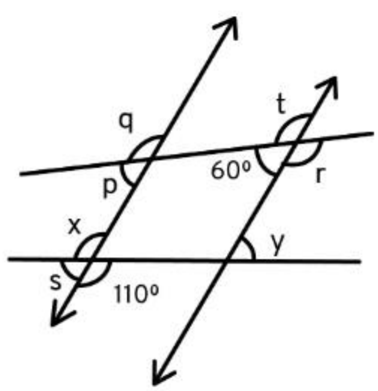

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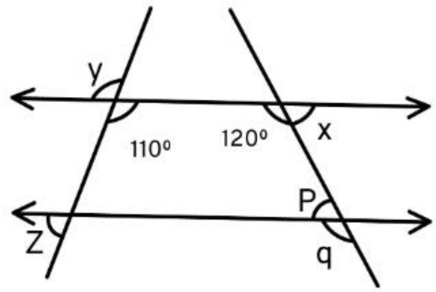
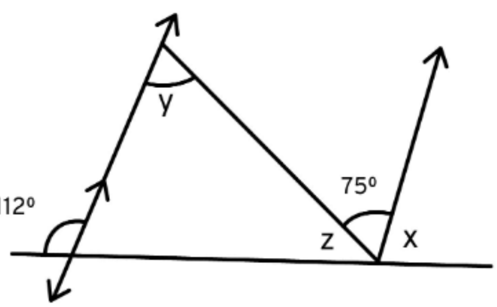
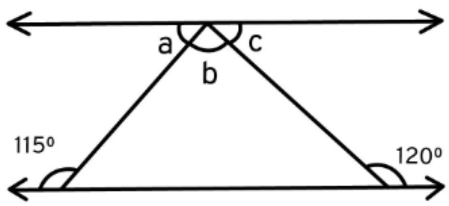


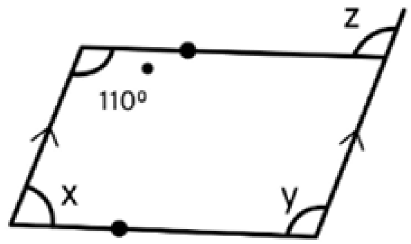
(viii)



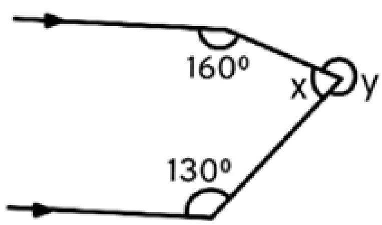
(ix)



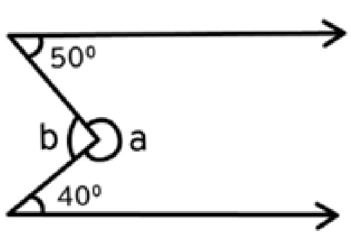
(x)



(xi)



(xii)



Answer:

Solution:

(i) ∵ Lines are parallel

∴ a = b (Corresponding angles)

a = c (vertically opposite angles)

∴ a = b = c

But b = 60° (Vertically opposite angles)

∴ a = b = c = 60°

(ii) ∵ Lines are parallel

∴ x = z (Corresponding angles)

But z + y = 180° (linear pair)

But y = 55° (Vertically opposite angles)

∴ z + 55° = 180°

⇒ z = 180° - 55° ⇒ z = 125°

But x = z

∴ x = 125°

Hence x = 125°, y = 55°, z = 125°

(iii) ∵ Lines are parallel

∴ c = 120°

a + 120° = 180° (co – interior angles)

∴ a = 180° - 120° = 60°

But a = b (vertically opposite angles)

∴ b = 60°

Hence a = 60°, b = 60° and c = 120°

(vii) ∵ Lines are parallel

∴ x = p

And p + 120° = 180° (alternate angles)

$\Rightarrow$ p = 180° - 120° = 60°

$\therefore$ x = 60°

q = 120° (Corresponding angles)

y = 110° (Vertically opposite angles)

and $\angle 1$ +110° = 180°

(co – interior angles)

$\therefore \angle 1$ = 180° - 110° = 70°

But z = $\angle 1$ (vertically opposite angles)

$\therefore \angle z$ = 70°

Hence x = 60°, y = 110°, z = 70°,

p = 60°, q = 120°

(viii) $\therefore$ Lines are parallel

$\therefore$ y = 75° (alternate angles)

$\angle 1$ +112° = 180° (linear pair)

$\angle 1$ = 180° - 112° = 68°

$\angle 1$ = x (Corresponding angles)

$\therefore$ x = 68°

But x + 75 + z = 180° (angles on a line)

$\Rightarrow$ 68° + 75° + z = 180°

$\Rightarrow$ z + 143° = 180°

$\Rightarrow$ z = 180° - 143° = 37°

Hence x = 68°, y = 75°, z = 37°

(ix) $\because$ Line is parallel

$\angle a = \angle I$ and $\angle c = \angle 2$ (alternate angles)

But $\angle 1$ + 115° = 180° (linear pair)

$\therefore \angle 1$ = 180° - 115° = 65°

Similarly $\angle 2 + 120° = 180°$

$\therefore \angle 2 = 180° - 120° = 60°$

$\angle a = \angle 1 = 65°$,

$\angle c = \angle 2 = 60°$,

But $a + b + c = 180°$ (angles on a line)

$\Rightarrow 65° + b + 60° = 180°$

$\Rightarrow b + 125° = 180°$

$b = 180° - 125° = 55°$

Hence $a = 65°$, $b = 55°$, $c = 60°$

(x) $\because$ Lines are parallel

$\therefore x + 110° = 180°$ (co – interior angles)

$x = 180° – 110° = 70°$

and $x + y = 180°$ (co – interior angles)

$\Rightarrow 70° + y = 180°$

$\Rightarrow y = 180° – 70° = 110°$

$Z = y$ (Corresponding angles)

$\therefore z = 110°$

Hence $x = 70°$, $y = 110°$, $z = 110°$

(xi) From 0, draw a line parallel to the given

Parallel lines

$\because$ Lines are parallel

$\therefore \angle 1 = 160°$ and $\angle 2 = 130°$

(Alternate angles)

$\therefore y = \angle 1 + \angle 2 = 160° + 130° = 290°$

But $x + y = 360°$ (angles at point)

$\Rightarrow 290° + x = 360°$

$\Rightarrow x = 360° - 290° = 70°$

Hence, $x = 70°$, $y = 290°$

(xii) From 0, draw a line parallel to the given parallel lines

$\therefore \angle 1 = 50°$ (alternate angles)

$\angle 2 = 40°$

$\therefore b = \angle 1 + \angle 2 = 50° + 40° = 90°$

But $a + b = 360°$

$\therefore a + 90° = 360°$

$\Rightarrow a = 360° - 90° = 270°$

Hence, $a = 270°$, $b = 90°$