ANGLES IN RECTILINEAR FIGURES

Form 1

Vol 8

Part 1 – Angles in intersecting lines

1. (a) $43° + a + 38° = 180°$ (adj. ∠s on st. line)
   $a = 99°$
   (b) $90° + 24° + b = 180°$ (adj. ∠s on st. line)
   $b = 66°$

2. $a + 68° + 3a – 10° + 90° = 360°$ (∠s at a pt.)
   $4a + 148° = 360°$
   $a = 53°$

3. $(67° – 2x) + (7x – 11°) + (5x – 6°) = 180°$ (adj. ∠s on st. line)
   $10x + 50° = 180°$
   $x = 13°$
   $\angle AOE = \angle BOD = 7x – 11° + 5x – 6° = 139°$ (vert. opp. ∠s)
   $\angle DOF = \angle AOC = 67° – 2x + 7x – 11° = 121°$ (vert. opp. ∠s)

4. $33° – 4x = 9x – 7°$ (vert. opp. ∠s)
   $x = \frac{40°}{13}$

   $7y + 5° + 9x + 7° + 106° – 3y = 180°$ (adj. ∠s on st. line)
   $4y + 9x = 76°$
   $y = \frac{157°}{13}$

5. $220° + 75° + 100° – \angle BOC = 360°$ (∠s at a pt.)
   $\angle BOC = 35°$

6. $\angle BOF = \angle COE$ (vert. opp. $\angle$s)
$68° - 9x + 17x - 8° = 52° - 5x + 8x + 23°$
$5x = 15°$
$x = 3°$

On straight line COF,
$52° - 5x + 8x + 23° + 5y - 19° = 180°$ (adj. $\angle$s on st. line)
$5y = 115°$
$y = 23°$

7. (a) $\angle COD + 90° + 40° = 180°$ (adj. $\angle$s on st. line)
$\angle COD = 50°$
$\angle EOF = \angle FOG = \angle COD = 50°$ (given)
$50° + 50° + \angle AOG + 40° = 180°$ (adj. $\angle$s on st. line)
$\angle AOG = 40°$
$\angle AOG + \angle AOB + \angle BOC = 170° \neq 180°$
Thus, COG is not a straight line. The claim is disagreed.

(b) $\angle AOG = 40° = \angle AOB$
Thus, AO bisects $\angle BOG$. The claim is agreed.

(c) $\angle AOF = \angle AOG + \angle FOG = 40° + 50° = 90°$
Thus, OF is perpendicular to AD. The claim is agreed.

8. (a) (i) $\angle AOE = 7x + 5x = 12x$
$\angle COE = \angle AOE \div 2 = 6x$
$\angle COD = \angle COE - \angle DOE = 6x - 5x = x$

(ii) $\angle BOD = \angle DOE = 5x$
$\angle BOC = \angle BOD - \angle COD = 5x - x = 4x$

(b) $\angle BOC = 4x = 44°$
$x = 11°$
$\angle EOF = \angle AOC = \angle COE = x + 5x = 66°$
$\angle COE + \angle EOF = 132° \neq 180°$
Thus, COF is not a straight line. The claim is disagreed.

Part 2A – Parallel lines (A)

1. (a) $x = 47°$ (corr. $\angle$s, MN // XY)
   $y = 180° - x = 133°$ (adj. $\angle$s on st. line)
   (b) $a + (a - 50°) = 180°$ (int. $\angle$s, AB // CD)
   $a = 115°$
   $b = a = 115°$ (alt. $\angle$s, AB // CD)

2. $\angle DRF = \angle CRP$ (vert. opp. $\angle$s)
   $\angle CRP = \angle APE$ (corr. $\angle$s, AB // CD)
   Thus, $3x + 1° = 43°$
   $x = 14°$

3. $\angle ABC = \angle BCF$ (alt. $\angle$s, AB // CF)
   $120° = y + 70°$
   $y = 50°$

   $x° + 70° + y = 180°$ (adj. $\angle$s on st. line)
   $x = 60$

4. $\angle CIH = 126°$ (vert. opp. $\angle$s)
   $x = 180° - 126° = 54°$ (int. $\angle$s, AB // CD)
   $\angle IHJ = y$ (vert. opp. $\angle$s)
   $\angle AHJ = x + y = 112°$ (alt. $\angle$s, AB // CD)
   $y = 58°$

5. $a = 75°$ (alt. $\angle$s, AB // CD)
   $b = 110°$ (alt. $\angle$s, AB // CD)
   $c = 180° - b = 70°$ (adj. $\angle$s on st. line)