

ANGLES IN RECTILINEAR FIGURES

Form 1

Vol 8

Part 2B – Parallel lines (B)

- $\angle BEF = 2x$ (alt. \angle s, $AB \parallel EF$)
 $\angle CDE = \angle DEF$ (alt. \angle s, $CD \parallel EF$)
 $90^\circ = x + 2x$
 $x = 30^\circ$
- $\angle CDE = \angle DEF = 111^\circ$ (alt. \angle s, $CD \parallel EF$)
 $\angle BCD = \angle CDE = 111^\circ$ (alt. \angle s, $BC \parallel DE$)
 $\angle ABG = \angle BCD = 111^\circ$ (corr. \angle s, $AB \parallel DC$)
- $x = 60^\circ$ (alt. \angle s, $AB \parallel CD$)
 $\angle EGH = 75^\circ$ (corr. \angle s, $EF \parallel GH$)
 $x + 75^\circ + y = 180^\circ$ (adj. \angle s on st. line CGD)
 $y = 45^\circ$
- $\angle VST = 65^\circ$ (corr. \angle s, $VS \parallel PR$)
 $x = \angle QST = 55^\circ + 65^\circ = 120^\circ$ (corr. \angle s, $PT \parallel QS$)
- $\angle ABE = 50^\circ$ (alt. \angle s, $AF \parallel EB$)
 $\angle ABC = y$ (alt. \angle s, $AB \parallel CD$)
 $255^\circ + 50^\circ + y = 360^\circ$ (\angle s at a point B)
 $y = 55^\circ$
- $\angle ACE = 180^\circ - 150^\circ = 30^\circ$ (int. \angle s, $AB \parallel CE$)
 $\angle BDE = 30^\circ$ (corr. \angle s, $AC \parallel BD$)
 $\angle EDG = \angle CDH$ (vert. opp. \angle s)
 $2a + 30^\circ = 90^\circ + a$
 $a = 60^\circ$

Part 3 – Add line

1. (a) Let G a point below E such that $AB \parallel EG$.

$$\angle BEG = 25^\circ \text{ (alt. } \angle\text{s, } AB \parallel EG)$$

$$\angle DEG = 180^\circ - 140^\circ = 40^\circ \text{ (int. } \angle\text{s, } EG \parallel CF)$$

$$x = 360^\circ - 25^\circ - 40^\circ = 295^\circ \text{ (}\angle\text{s at a pt.)}$$

- (b) Let F a point below C such that $AB \parallel FC$.

$$\angle BCF = 180^\circ - 30^\circ = 145^\circ \text{ (int. } \angle\text{s, } AB \parallel FC)$$

$$\angle CED = 360^\circ - 8x \text{ (}\angle\text{s at a pt.)}$$

$$\angle ECF = 180^\circ - \angle CED = 8x - 180^\circ \text{ (int. } \angle\text{s, } DE \parallel FC)$$

$$\angle BCF + \angle ECF = 8x - 35^\circ = 7x + 3^\circ$$

$$x = 38^\circ$$

- (c) Let F a point to the right of D such that $AE \parallel DF \parallel BC$.

$$\angle CDF = 54^\circ \text{ (alt. } \angle\text{s, } BC \parallel DF)$$

$$\angle AED = 180^\circ - 3x \text{ (int. } \angle\text{s, } BA \parallel DE)$$

$$\angle EDF = 180^\circ - 3x \text{ (alt. } \angle\text{s, } AE \parallel DF)$$

$$\angle EDF + \angle CDF = 234^\circ - 3x = 3x$$

$$x = 39^\circ$$

- (d) Let E a point to the right of G such that $AB \parallel GE \parallel CD$.

Let F a point to the left of H such that $AB \parallel FH \parallel CD$.

$$\angle CHF = 30^\circ \text{ (alt. } \angle\text{s, } FH \parallel CD)$$

$$\angle CHG = 360^\circ - 310^\circ = 50^\circ \text{ (}\angle\text{s at a point)}$$

$$\angle FHG = 50^\circ - 30^\circ = 20^\circ$$

$$\angle EGH = 20^\circ \text{ (alt. } \angle\text{s, } GE \parallel FH)$$

$$\angle BGE = 30^\circ \text{ (alt. } \angle\text{s, } AB \parallel GE)$$

$$x = \angle BGE + \angle EGH = 50^\circ$$

(e) Let P a point to the right of C such that $AB \parallel CP \parallel EF$.

Let Q a point to the left of D such that $AB \parallel QD \parallel EF$.

$$\angle BCP = x + 25^\circ \text{ (alt. } \angle\text{s, } AB \parallel CP)$$

$$\angle PCD = 130^\circ - \angle BCP = 105^\circ - x$$

$$\angle CDQ = 105^\circ - x \text{ (alt. } \angle\text{s, } CP \parallel QD)$$

$$\angle QDE = 120^\circ - \angle CDQ = x + 15^\circ$$

$$\angle QDE = 2x - 30^\circ \text{ (alt. } \angle\text{s, } QD \parallel EF)$$

$$x + 15^\circ = 2x - 30^\circ$$

$$x = 45^\circ$$

(f) Let P a point below C such that $CP \parallel DE \parallel AB$.

$$\angle BCD = 360^\circ - 310^\circ = 50^\circ$$

$$\angle BCP = 110^\circ \text{ (alt. } \angle\text{s, } AB \parallel CP)$$

$$\angle DCP = 110^\circ - 50^\circ = 60^\circ$$

$$\angle CDE = 180^\circ - 60^\circ = 120^\circ \text{ (int. } \angle\text{s, } CP \parallel DE)$$

$$x = 180^\circ - 120^\circ = 60^\circ \text{ (int. } \angle\text{s, } CD \parallel FE)$$

(g) Let P a point above C such that $CP \parallel BA \parallel EF$.

Let Q a point above D such that $BA \parallel DQ \parallel EF$.

$$\angle BCP = 180^\circ - 110^\circ = 70^\circ \text{ (int. } \angle\text{s, } CP \parallel BA)$$

$$\angle CDQ = 180^\circ - \angle DCP = 110^\circ - x \text{ (int. } \angle\text{s, } CP \parallel DQ)$$

$$\angle EDQ = 180^\circ - 144^\circ = 36^\circ \text{ (int. } \angle\text{s, } DQ \parallel EF)$$

$$\angle CDQ + \angle EDQ = 146^\circ - x = 122^\circ$$

$$x = 24^\circ$$

(h) Let P a point on the left of E such that $AC \parallel PE \parallel DF$.

$$\angle DEP = 49^\circ \text{ (alt. } \angle\text{s, } PE \parallel DF)$$

$$\angle ACE = 360^\circ - 217^\circ = 143^\circ \text{ (}\angle\text{s at a pt.)}$$

$$\angle CEP = 180^\circ - 143^\circ = 37^\circ \text{ (int. } \angle\text{s, } AC \parallel PE)$$

$$x = \angle CEP + \angle DEP = 86^\circ$$

$$\angle BCE = 180^\circ - 86^\circ = 94^\circ \text{ (int. } \angle\text{s, } BC \parallel DE)$$

$$y = \angle ACE - 94^\circ = 49^\circ$$

2. Let $\angle BCD = x$.

Let P a point on the left of C such that $AB \parallel CP \parallel FE$.

Let Q a point on the right of D such that $AB \parallel QD \parallel FE$.

$\angle BCP = a$ (alt. \angle s, $AB \parallel CP$)

$\angle PCD = x - a$

$\angle CDE = \angle BCD = x$ (alt. \angle s, $BC \parallel DE$)

$\angle EDQ = 180^\circ - b$ (int. \angle s, $DQ \parallel EF$)

$\angle CDQ = x - (180^\circ - b) = x - 180^\circ + b$

$\angle PCD = \angle CDQ$ (alt. \angle s, $PC \parallel DQ$)

$x - a = x - 180^\circ + b$

$a + b = 180^\circ$