

## 國中第五冊

### 立即練習二

p.6(1)

圖中紙片有 10 張  $10 \times 3^2 = 90$

p.6(2)

邊長比 = 5 : 3

面積比 =  $5^2 : 3^2 = 25 : 9$

設實際面積分別為  $25k$ 、 $9k$   $25k + 9k = 306$   $k = 9$

$\therefore$  大面積為  $25 \times 9 = 225$

p.6(3)

全等：

第一、二排，第二、三排，第三、四排，第四、五排

$\Rightarrow 6 \times 4 = 24$

二倍：

一到四排，二到五排  $\Rightarrow 5 \times 2 = 10$

$24 + 10 = 34$  (個)

### 立即練習三

p.17(1)

$\because$  四邊形 ADEF 為平行四邊形  $\therefore \overline{AF} = \overline{DE} = 3$

$\therefore \overline{CD} : \overline{CA} = 3 : 5$

$\overline{CA} = 2x + 5 + 4x - 2 = 6x + 3$   $3 : 5 = 2x + 5 : 6x + 3$

$x = 2$   $\overline{AD} = 4x - 2 = 6$   $3 \times 2 + 6 \times 2 = 18$

p. 17(2)

$$\text{設 } \overline{BC} \text{ 爲 } x \quad 1 : x = \frac{1}{2}x : 1 \quad x = \sqrt{2}$$

p. 17(3)

$$\angle DAE = \angle BAC \quad \overline{DA} : \overline{AE} = 2 : 3 \quad \overline{AC} : \overline{AB} = 4 : 6 = 2 : 3$$

$$\triangle DAE \sim \triangle BAC \quad (\text{SAS}) \quad 4 \times 2 = \overline{BC} = 8$$

p. 17(4)

$$\triangle ABF \sim \triangle FEC \quad \overline{12} : \overline{6} = AF : FC = 2 : 1 = 2R : 1R$$

$$3R = 12 \quad R = 4 \quad 4 \times 1 = 4$$

p. 17(5)

$$\triangle ABG \sim \triangle DFG \quad (\text{對})$$

$$\triangle ADG \not\sim \triangle BGE \quad (\text{對})$$

$$\triangle EAB \not\sim \triangle AFD \quad (\text{錯})$$

$$\triangle ABE \not\sim \triangle ADF \quad (\text{對})$$

p. 18(6)

①

p. 18(7)

$$\text{設 } \overline{BC} \text{ 爲 } x \quad \overline{BD} : \overline{BA} = 3 : 5 = \overline{DG} : \overline{AH}$$

$$\text{內接正方形邊長爲 } 3 \quad \overline{AD} : \overline{AB} = 2 : 5 = \overline{DE} : \overline{BC}$$

$$DE : BC = 3 : x = 2 : 5 \quad x = 7.5$$

p. 18(8)

$$20 \div 2 = 10$$

p. 18(9)

$$A(0, 3) \quad B(-4, 0) \quad \overline{AB} = 5$$

$$15 : \overline{CD} = 5 : 3, \overline{CD} = 9 \quad 9 : \overline{BD} = 3 : 4, \overline{BD} = 12$$

$$12 - 4 = 8 \quad \therefore C(8, 9)$$

p. 18(10)

將 B 點與 B' 點垂直與 x 軸相交，形成 D 與 D' 點形成

$\triangle OBD$  與  $\triangle OB'D'$

$$\overline{OD} = 6, \quad \overline{OD'} = \overline{OD} \times 2 = 12$$

$$\overline{BD} = 8, \quad \overline{BD'} = \overline{BD} \times 2 = 16 \quad \therefore B'(12, 16)$$

**立即練習三**

p. 29(1)

$$\textcircled{1} \overline{DC} \parallel \overline{AB} \quad (\angle EDG = \angle EBA \quad \angle EGD = \angle EAB)$$

$$\angle AEB = \angle DEG \quad \triangle AEB \sim \triangle GED$$

$$\textcircled{2} \text{又 } \triangle AED \sim \triangle BEF$$

$$\text{故 } \frac{\overline{AE}}{\overline{EG}} = \frac{\overline{BE}}{\overline{DE}} = \frac{\overline{EF}}{\overline{AE}} \Rightarrow \overline{AE}^2 = \overline{EF} \times \overline{EG}$$

$$\textcircled{3} 6^2 = \overline{EF} \times (\overline{EF} + 5) \Rightarrow 36 = \overline{EF}^2 + 5\overline{EF} \quad \overline{EF} = 4 \text{ (負不合)} \quad 4 + 5 = 9$$

p. 30(2)

$$\text{設 } \overline{BP} = x$$

$$(9 - x)^2 = 3^2 + x^2 \quad x = 4 \quad \therefore \overline{BP} = 4$$

p. 30(3)

設樹高  $x$  公尺

$$0.24 : x = 0.6 : 15 \quad x = 6$$

p. 30(4)

$$\text{設地面樹影高 } x \text{ 公尺} \quad \frac{1}{1.2} = \frac{x}{4.5} \quad x = \frac{15}{4} \quad \frac{15}{4} + \frac{5}{4} + \frac{20}{4} = 5$$

p. 30(5)

①設 $\overline{ED}$ 為  $x$  公分  $(12 + x)^2 = 81 + 144x + x^2 + 24x - 81 = 0$

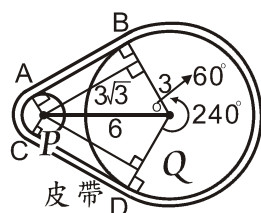
$x = 3$ (負不合)  $12 + 3 = 15 = \overline{BD}$

②設 $\overline{CF} = \overline{EF} = y$  公分

$3^2 + (9 - y)^2 = y^2$   $y = 5 = \overline{CF}$

**立即練習三**

p. 55(1)



過  $P$  點作 $\overline{PE} \perp \overline{BD}$   $\therefore$   $APEB$  為矩形 則 $\overline{BE} = \overline{AP} = 1$

$\overline{EQ} = 3$ ,  $\overline{AB} = \overline{PE} = \sqrt{6^2 - 3^2} = 3\sqrt{3}$

$\therefore \angle EPQ = 30^\circ$ ,  $\angle EQP = 60^\circ$

$\therefore$  皮帶長 =  $(\overline{AB} + \overline{CD}) + \widehat{AC}$ 長 +  $\widehat{BD}$ 長

$= 6\sqrt{3} + \frac{2}{3}\pi + \frac{16}{3}\pi = 6\sqrt{3} + 6\pi$

p. 55(2)

將 $\triangle CDE$ 中不規則灰色圖形，補至 $\triangle ABC$ 中

$(5^2 - 3^2) \times \pi = 16\pi$

p. 55(3)

③

**立即練習五**

p. 73(1)

$\therefore \overline{AD} \parallel \overline{BC}$   $\therefore \widehat{AB} = \widehat{CD}$ , 又 $\angle APB = \frac{1}{2}(\widehat{AB} + \widehat{CD})$

$$\therefore \widehat{AB} = \widehat{CD} = 100^\circ \quad \text{而} \widehat{ADC} = 2 \times 75^\circ = 150^\circ$$

$$\text{故} \widehat{BC} = 360^\circ - 150^\circ - 100^\circ = 110^\circ$$

p. 73(2)

$$\frac{1}{2}(\widehat{AD} - \widehat{BC}) = \angle O = \frac{1}{2}(\widehat{QR} - \widehat{PS}) \quad \widehat{AD} + \widehat{PS} - \widehat{BC} + \widehat{QR} = 180^\circ$$

p. 73(3)

設小圓半徑  $x$ ，大圓半徑  $y$  環狀面積為  $(y^2 - x^2)$

$$\therefore \frac{1}{2}\overline{AB} = \overline{PB} = \overline{AP} = \sqrt{y^2 - x^2}$$

但不知  $\overline{EF}$  長  $\therefore$  丙的想法錯誤

p. 73(4)

$$\therefore \overline{OM} \perp \overline{PM} \quad \therefore \overline{PM} = 5\sqrt{3} \quad \text{作} \overline{MN} \perp \overline{OP}$$

$$\triangle OMN \sim \triangle OPM \quad \therefore \overline{OM} : \overline{ON} = \overline{OP} : \overline{OM}$$

$$\therefore \overline{ON} = \frac{5}{2}, \quad \overline{MN} = \frac{5}{2}\sqrt{3}$$

$$\therefore M\left(-\frac{5}{2}, -\frac{5}{2}\sqrt{3}\right)$$

### 立即練習四

p. 97(1)

$$\textcircled{1} \overline{BE} = \overline{FC} \quad \angle ABE = \angle BCF = 90^\circ \quad \overline{BC} = \overline{AB} \quad \triangle ABE \cong \triangle BCF$$

$$\textcircled{2} \overline{AE} = \overline{BF} \quad (\text{由上可證})$$

$$\textcircled{3} 90^\circ$$

p. 97(2)

$$\text{連接} \overline{PA} \quad \therefore \overline{AB} = \overline{AC} \quad \overline{PE} \perp \overline{AB} \quad \overline{PD} \perp \overline{AC} \quad \overline{BF} \perp \overline{AC}$$

$$\text{又} \triangle ABC = \triangle ABP + \triangle ACP$$

$$\Rightarrow \frac{1}{2}\overline{AC} \times \overline{BF} = \frac{1}{2}\overline{AB} \times \overline{PE} + \frac{1}{2}\overline{AC} \times \overline{PD} \quad \therefore \overline{PE} + \overline{PD} = \overline{BF}$$

p. 97(3)

$$\overline{AD} = \overline{BD} = 8 \quad \overline{AE} = 10 \quad \overline{DE} = \sqrt{10^2 - 8^2} = 6$$

$$\triangle ACD \text{ 中, } \overline{AD} = 8 \quad \overline{CD} = 8 + 6 = 14$$

$$\therefore \overline{AC} = \sqrt{8^2 + 14^2} = 2\sqrt{65}$$

$$\text{故 } \triangle ABC \text{ 周長} = \overline{AC} + \overline{BC} + \overline{AB} = 16 + 4\sqrt{65} \text{ (公分)} \cdots \square$$

$$\triangle AEC \text{ 面積} = \frac{1}{2} \times 8 \times 8 = 32 \text{ (平方公分)}$$

p. 97(4)

$$180 + 500 = 680 \cdots \text{總面積} \quad \text{連接 } \overline{PC}、\overline{AP}$$

$$\frac{1}{2}(\overline{AB} \times \overline{EP} + \overline{AD} \times \overline{HP} + \overline{BC} \times \overline{FP} + \overline{CD} \times \overline{PG}) = 680$$

$$\Rightarrow \frac{1}{2}(30 \times \overline{EP} + 30 \times \overline{HP} + 50 \times \overline{FP} + 50 \times \overline{PG}) = 680$$

$$\Rightarrow 15\overline{EP} + 15\overline{HP} = 180 \Rightarrow \overline{EP} + \overline{HP} = 12$$

$$25\overline{FP} + 25\overline{PG} = 500 \Rightarrow \overline{FP} + \overline{PG} = 20$$

$$\therefore 12 + 20 = 32$$

p. 97(5)

作  $\overline{EF} \perp \overline{AB}$  交於 F  $\triangle AEF \cong \triangle CAB$

$$\Rightarrow \overline{AF} = \overline{BC} = 7, \overline{EF} = \overline{AB} = 5$$

$$\Rightarrow \overline{BE} = \sqrt{\overline{BF}^2 + \overline{EF}^2} = 13 \quad \therefore \overline{CM} = \overline{ME}, \overline{MN} \parallel \overline{BE}$$

$$\therefore \overline{MN} = \frac{1}{2}\overline{BE} = \frac{13}{2}$$

### 立即練習五

p. 113(1)

$$360 - (100 + 60 + 80) = 120 \quad 120 \div 2 = 60 \text{ (角平分線)}$$

p. 113(2)

D 點為直角  $\triangle BCH$  斜邊上的中點

$$\therefore D \text{ 為 } \triangle BCH \text{ 的外心} \quad \therefore \overline{DH} = \overline{BD} = \overline{CD} = 5$$

p. 114(3)

②

p. 114(4)

$$\textcircled{1} \because G \text{ 為 } \triangle ABC \text{ 之重心} \quad \therefore \overline{GB} = \frac{2}{3}\overline{BE} = \frac{2}{3} \times 15 = 10$$

$$\therefore \overline{BD} = \overline{CD}, \overline{DK} = \overline{GD} \quad \therefore \text{四邊形 BKCG 為平行四邊形}$$

$$\therefore \overline{BK} = \overline{CG} = \frac{2}{3}\overline{CF} = \frac{2}{3} \times 12 = 8$$

$$\overline{KG} = \overline{AG} = \frac{2}{3}\overline{AD} = \frac{2}{3} \times 9 = 6$$

$$\textcircled{2} \because \overline{BK}^2 + \overline{KG}^2 = 100 = 10^2 = \overline{GB}^2$$

$$\therefore \triangle BGK \text{ 為直角三角形, } \angle GKB = 90^\circ$$

$$\therefore \overline{AB} = \sqrt{\overline{BK}^2 + \overline{AK}^2} = 4\sqrt{13}$$

$$\textcircled{3} \triangle ABK = \frac{4}{3} \triangle ABD = \frac{4}{3} \times \frac{1}{2} \times \triangle ABC = \frac{2}{3} \triangle ABC$$

$$\triangle ABK = \frac{1}{2} \times 8 \times (2 \times 6) = 48 \quad \therefore \triangle ABC = 48 \times \frac{3}{2} = 72$$

p. 114(5)

$$\textcircled{1} \overline{GB} = \overline{GC} = \frac{\overline{BC}}{\sqrt{2}} = 5\sqrt{2} \quad \triangle GBC = \frac{1}{2} \times 5\sqrt{2} \times 5\sqrt{2} = 25$$

$$\therefore \triangle ABC = 3 \times 25 = 75 \quad (\text{平方公分})$$

$$\textcircled{2} \overline{BD} = \overline{CE} = 5\sqrt{2} \div \frac{2}{3} = 5\sqrt{2} \times \frac{3}{2} = \frac{15\sqrt{2}}{2}$$

$$\overline{GH} = \triangle GBC \text{ 的高} = \frac{5\sqrt{2} \times 5\sqrt{2}}{10} = 5$$

$$\therefore AH = 5 \times 3 = 15$$

$$\therefore \text{三中線和} = \frac{15\sqrt{2}}{2} + \frac{15\sqrt{2}}{2} + 15 = 15 + 15\sqrt{2}$$