第8期

3~4版

一、选择题

1~5.CBCDB　6~10.BDCDA

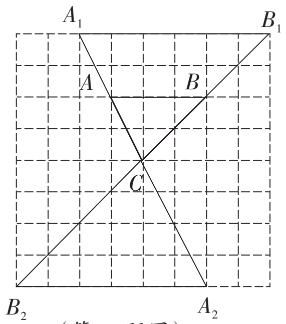
二、填空题

11. $\frac{1}{2}$　　12.9.7

13. $\frac{5}{2}$　　14.(1)2;(2)$y=\frac{1}{x-1}$

三、

15.**解**:如图,$\triangle A_1B_1C$和$\triangle A_2B_2C$为所求作图形.(画出一个即可)



(第15题图)

16.**解**:$\because DE\parallel BC$,

$\therefore \triangle ADE\backsim\triangle ABC$.

$\therefore \frac{S_{\triangle ABC}}{S_{\triangle ADE}}=\left(\frac{BC}{DE}\right)^2=\left(\frac{5}{2}\right)^2=\frac{25}{4}$.

又$\because S_{\triangle ABC}=20$,

$\therefore S_{\triangle ADE}=\frac{16}{5}$.

四、

17.(1)**证明**:$\because AB=2,BC=4,BD=1$,

$\therefore \frac{BD}{AB}=\frac{AB}{BC}=\frac{1}{2}$.

$\because \angle ABD=\angle CBA$,

$\therefore \triangle ABD\backsim\triangle CBA$.

(2)**解**:由(1)知,$\triangle ABD\backsim\triangle CBA$.

$\therefore \frac{BD}{AB}=\frac{AD}{AC}$.

$\because AD=2.5,AB=2,BD=1$,

$\therefore \frac{2.5}{AC}=\frac{1}{2}$.

$\therefore AC=5$.

18.**解**:40 cm=0.4 m,20 cm=0.2 m.

$\because \angle D=\angle D,\angle DEF=\angle DCB=90^\circ$,

$\therefore \triangle DEF\backsim\triangle DCB$.

$\therefore \frac{DE}{CD}=\frac{EF}{BC}$,即$\frac{0.4}{8}=\frac{0.2}{BC}$.

解得$BC=4$.

$\because AC=1.5$,

$\therefore AB=AC+BC=1.5+4=5.5$(m).

答:树高AB为5.5 m.

五、

19.**解**:(1)$\because$在Rt$\triangle ABC$中,$\angle ACB=90^\circ$,$AB=\sqrt{6}$,$AC=2$,

$\therefore BC=\sqrt{AB^2-AC^2}=\sqrt{(\sqrt{6})^2-2^2}=\sqrt{2}$.

当$\triangle ABD\backsim\triangle ACB$时,

$\frac{AB}{AC}=\frac{AD}{AB}$,即$\frac{\sqrt{6}}{2}=\frac{AD}{\sqrt{6}}$.

解得$AD=3$.

当$\triangle ABD\backsim\triangle BCA$时,

$\frac{AB}{BC}=\frac{AD}{AB}$,即$\frac{\sqrt{6}}{\sqrt{2}}=\frac{AD}{\sqrt{6}}$.

解得$AD=3\sqrt{2}$.

综上,AD的长为3或$3\sqrt{2}$.

(2)当$\triangle ABD\backsim\triangle ACB$时,

$\frac{S_{\triangle ABD}}{S_{\triangle ABC}}=\left(\frac{AD}{AB}\right)^2=\left(\frac{3}{\sqrt{6}}\right)^2=\frac{3}{2}$;

当$\triangle ABD\backsim\triangle BCA$时,

$\frac{S_{\triangle ABD}}{S_{\triangle ABC}}=\left(\frac{AD}{AB}\right)^2=\left(\frac{3\sqrt{2}}{\sqrt{6}}\right)^2=3$.

综上,$\triangle ABD$与$\triangle ABC$的面积比为$\frac{3}{2}$或3.

20.**解**:(1)$\because$等边$\triangle A_1B_1C_1$的边长为1,点O是B_1C_1的中点,点A_2是OA_1的中点,

$\therefore$等边$\triangle A_2B_2C_2$的边长为$\frac{1}{2}$.

由此类推,等边$\triangle A_{10}B_{10}C_{10}$的边长为$\left(\frac{1}{2}\right)^9$,等边$\triangle A_7B_7C_7$的边长为$\left(\frac{1}{2}\right)^6$.

$\therefore$等边$\triangle A_{10}B_{10}C_{10}$和等边$\triangle A_7B_7C_7$的相似比为$\frac{\left(\frac{1}{2}\right)^9}{\left(\frac{1}{2}\right)^6}=\frac{1}{8}$,它们的位似中心为点$O$.

(2)$\because$第n个等边$\triangle A_nB_nC_n(n\geqslant2)$的边长为$\left(\frac{1}{2}\right)^{n-1}$,

$\therefore$第n个等边$\triangle A_nB_nC_n(n\geqslant2)$的周长为$\frac{3}{2^{n-1}}$.

六、

21.(1)**证明**:$\because AB=AD$,

$\therefore \angle ABD=\angle ADB$.

$\because AD\parallel BC$,

$\therefore \angle ADB=\angle DBC$.

$\therefore \angle DBC=\angle ABD=\frac{1}{2}\angle ABC=35^\circ$.

$\because \angle ADC+\angle C=180^\circ,\angle ADC=145^\circ$,

$\therefore \angle C=35^\circ$.

$\therefore \angle ADB=\angle ABD=\angle DBC=\angle C$.

$\therefore \triangle ABD\backsim\triangle DBC$.

$\therefore$对角线BD是四边形$ABCD$的“理想对角线”.

(2)**解**:$\because$对角线AC是四边形$ABCD$的“理想对角线”,CA平分$\angle BCD$,

$\therefore \triangle ACB\backsim\triangle DCA$.

$\therefore \frac{DC}{AC}=\frac{AC}{BC}$.

$\therefore AC^2=DC\cdot BC=3\times2=6$.

解得$AC=\sqrt{6}$(负值舍去).

$\therefore AC$的长为$\sqrt{6}$.

七、

22.(1)**证明**:$\because$立杆AB,CD相交于点O,

$\therefore \angle AOC=\angle EOF$.

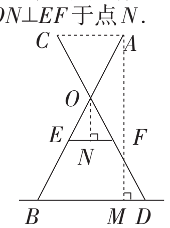
又$\because \frac{OA}{OE}=\frac{OC}{OF}=\frac{51}{34}=\frac{3}{2}$,

$\therefore \triangle AOC\backsim\triangle EOF$.

$\therefore \angle A=\angle OEF$.

$\therefore AC\parallel EF$.

(2)**解**:如图,过点A作$AM\perp BD$于点M,过点O作$ON\perp EF$于点N.



(第22题图)

$\because OE=OF=34$,

$\therefore \triangle OEF$是等腰三角形.

$\therefore \angle OEF=\frac{1}{2}(180^\circ-\angle EOF)$.

$\because ON\perp EF,EF=32$,

$\therefore ON$是边EF上的中线.

$\therefore EN=16$.

在Rt$\triangle OEN$中,根据勾股定理,得$ON=\sqrt{OE^2-EN^2}=\sqrt{34^2-16^2}=30$.

$\because ON\perp EF,AM\perp BD$,

$\therefore \angle ONE=\angle AMB=90^\circ$.

$\because OA=OC,AB=CD$,

$\therefore OB=OD$.

$\therefore \angle OBD=\frac{1}{2}(180^\circ-\angle BOD)$.

$\therefore \angle OBD=\angle OEF$.

$\therefore \triangle EON\backsim\triangle BAM$.

$\therefore \frac{OE}{AB}=\frac{ON}{AM}$,即$\frac{34}{136}=\frac{30}{AM}$.

解得$AM=120$(cm).

答:利用夹子垂挂在晾衣架上的连衣裙总长度小于120 cm时,连衣裙才不会拖在地面上.

八、

23.**解**:(1)$AD\perp BE$(或垂直).

(2)(1)中的结论成立.

证明:延长BE交AD于点N.

$\because \angle ACB=\angle DCE=90^\circ$,

$\therefore \angle ACD=\angle BCE$.

又$\because \frac{DC}{CE}=\frac{AC}{BC}=\frac{1}{m}$,

$\therefore \triangle DCA\backsim\triangle ECB$.

$\therefore \angle DAC=\angle CBE$.

$\because \angle CAB+\angle ABE+\angle CBE=90^\circ$,

$\therefore \angle CAB+\angle ABE+\angle DAC=90^\circ$.

$\therefore \angle ANB=90^\circ$.

$\therefore AD\perp BE$.

(3)如图①,当点E在线段AD上时,连接BE.

$\because \triangle DCA\backsim\triangle ECB$,

$\therefore \frac{BE}{AD}=\frac{BC}{AC}=m=\sqrt{3}$.

$\therefore BE=\sqrt{3}AD=\sqrt{3}(4+AE)$.

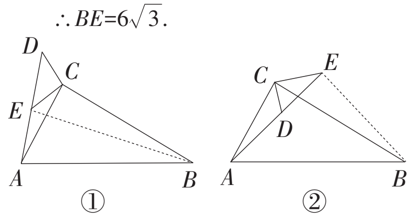
$\because AD\perp BE$,

$\therefore AB^2=AE^2+BE^2$,

即$(4\sqrt{7})^2=AE^2+3(4+AE)^2$.

解得$AE=2$(负值舍去).

$\therefore BE=6\sqrt{3}$.



(第23题图)

如图②,当点D在线段AE上时,连接BE.

$\because \triangle DCA\backsim\triangle ECB$,

$\therefore \frac{BE}{AD}=\frac{BC}{AC}=m=\sqrt{3}$.

$\therefore BE=\sqrt{3}AD=\sqrt{3}(AE-4)$.

$\because AD\perp BE$,

$\therefore AB^2=AE^2+BE^2$,

即$(4\sqrt{7})^2=AE^2+3(AE-4)^2$.

解得$AE=8$(负值舍去).

$\therefore BE=4\sqrt{3}$.

综上,BE的长为$6\sqrt{3}$或$4\sqrt{3}$.

第5期

2版

22.1 比例线段

第1课时

1.D

2.(1)×;(2)×;(3)√;(4)√;(5)√;(6)×

3.**解**:(1)$\because$四边形$ABCD$与四边形$EFGH$是相似图形,且点A与点E,点B与点F,点C与点G,点D与点N分别是对应顶点,

$\therefore$四边形$ABCD$与四边形$EFGH$的相似比为$\frac{AD}{EH}=\frac{1.8}{1.2}=\frac{3}{2}$.

(2)$\because$四边形$ABCD$与四边形$EFGH$是相似图形,

$\therefore BC:FG=AB:EF=AD:EH=3:2$.

$\because FG=2.8,AB=3.6$,

$\therefore BC=4.2,EF=2.4$.

第2课时

1.A

2.6

3.**解**:(1)$\because AB=8$ cm,$BC=12$ cm,$A'B'=4$ cm,$B'C'=6$ cm,

$\therefore \frac{A'B'}{AB}=\frac{4}{8}=\frac{1}{2},\frac{B'C'}{BC}=\frac{6}{12}=\frac{1}{2}$.

(2)由(1)知,$\frac{A'B'}{AB}=\frac{1}{2},\frac{B'C'}{BC}=\frac{1}{2}$,

$\therefore \frac{A'B'}{AB}=\frac{B'C'}{BC}$.

$\therefore$线段$A'B',AB,B'C',BC$是成比例线段.

第3课时

1.B

2.A

3. $\frac{5}{2}$

4.170

5. $5\sqrt{5}-5$

6.**解**:$\triangle ABC$是等边三角形.

理由:$\because a,b,c$是$\triangle ABC$三边的长,

$\therefore a+b+c\neq0$.

$\because \frac{a-b}{b}=\frac{b-c}{c}=\frac{c-a}{a}$,

$\therefore \frac{a-b}{b}=\frac{b-c}{c}=\frac{c-a}{a}=\frac{a-b+b-c+c-a}{b+c+a}=0$.

$\therefore a-b=0,b-c=0,c-a=0$.

$\therefore a=b=c$.

$\therefore \triangle ABC$是等边三角形.

第4课时

1.C　2.C

3.**解**:$\because DE\parallel BC,\frac{AD}{DB}=\frac{2}{3}$,

$\therefore \frac{AE}{EC}=\frac{AD}{DB}=\frac{2}{3}$.

$\because EF\parallel AB$,

$\therefore \frac{BF}{CF}=\frac{AE}{EC}=\frac{2}{3}$,

即$\frac{BF}{BC-BF}=\frac{2}{3}$.

$\because BC=20$,

$\therefore BF=8$.

3版

一、选择题

1~5.CADDA

6~10.CCCBC

二、填空题

11.2:3

12.16

13. $\frac{3}{7}$

14. $\frac{5-2\sqrt{5}}{2}$

三、解答题

15.**解**:$\because CD\perp BC,\therefore \angle C=90^\circ$.

$\because$四边形$A'B'C'D'$与四边形$ABCD$相似,

$\therefore \angle B'=\angle B=65^\circ,\angle C'=\angle C=90^\circ$,$\frac{A'B'}{AB}=\frac{B'C'}{BC}=\frac{A'D'}{AD}$.

$\therefore \frac{x}{21}=\frac{12}{y}=\frac{10}{15}$.

$\therefore x=14,y=18$.

$\therefore \alpha=\angle D'=360^\circ-\angle A'-\angle B'-\angle C'=360^\circ-135^\circ-65^\circ-90^\circ=70^\circ$.

16.**解**:$\because \frac{2a}{b+c+d}=\frac{2b}{a+c+d}=\frac{2c}{a+b+d}=\frac{2d}{a+b+c}=k$,

$\therefore \frac{2(a+b+c+d)}{3(a+b+c+d)}=k$.

当$a+b+c+d\neq0$时,可得$k=\frac{2}{3}$.

当$a+b+c+d=0$时,$b+c+d=-a$,

$\therefore k=\frac{2a}{b+c+d}=\frac{2a}{-a}=-2$.

当$k=\frac{2}{3}$时,

$k^2-3k-4=\left(\frac{2}{3}\right)^2-3\times\frac{2}{3}-4=-\frac{50}{9}$;

当$k=-2$时,

$k^2-3k-4=(-2)^2-3\times(-2)-4=6$.

综上,k^2-3k-4的值为$-\frac{50}{9}$或6.

17.**解**:(1)不相似.

理由:$\because AB=20$ m,$AD=30$ m,小路的宽度为2 m,

$\therefore EF=AB+2\times2=24$(m),$EH=AD+2\times2=34$(m).

$\because \frac{AB}{EF}=\frac{20}{24}=\frac{5}{6},\frac{AD}{EH}=\frac{30}{34}=\frac{15}{17}$,

$\therefore \frac{AB}{EF}\neq\frac{AD}{EH}$.

$\therefore$矩形$ABCD$与矩形$EFGH$不相似.

(2)$\because$相对两条小路的宽度相等,

$\therefore EF=AB+2y=(20+2y)$m,$EH=AD+2x=(30+2x)$m.

$\because$矩形$EFGH$与矩形$ABCD$相似,

$\therefore \frac{EF}{AB}=\frac{EH}{AD}$,即$\frac{20+2y}{20}=\frac{30+2x}{30}$.

$\therefore \frac{x}{y}=\frac{3}{2}$.

$\therefore$小路的宽度x与y的比值为$\frac{3}{2}$.

18.**解**:(1)证明:如图②,过点C作$CE\parallel DA$,交BA的延长线于点E.

$\therefore \frac{AB}{AE}=\frac{BD}{CD},\angle CAD=\angle ACE,\angle BAD=\angle E$.

$\because AD$平分$\angle BAC$,

$\therefore \angle BAD=\angle CAD$.

$\therefore \angle ACE=\angle E$.

$\therefore AE=AC$.

$\therefore \frac{AB}{AC}=\frac{BD}{CD}$.

(2)$\because AD$是角平分线,

$\therefore \frac{AB}{AC}=\frac{BD}{CD}$.

$\because AB=5$ cm,$AC=4$ cm,$BC=7$ cm,

$\therefore \frac{5}{4}=\frac{BD}{7-BD}$.

解得$BD=\frac{35}{9}$.

$\therefore BD$的长为$\frac{35}{9}$ cm.

(3)10.

第6期

2版

22.2相似三角形的判定

第1课时

1.A　　2.D

3.解：$\because \frac{AE}{AB}=\frac{2}{3},\therefore \frac{AE}{BE}=\frac{2}{5}.$

$\because AG/\!/BC$，

$\therefore \triangle EAG\backsim\triangle EBD.$

$\therefore \frac{AG}{BD}=\frac{AE}{BE}=\frac{2}{5}.$

∵点D是边BC的中点，$\therefore DC=BD.$

$\therefore \frac{AG}{DC}=\frac{2}{5}.$

$\because AG/\!/BC,\therefore \triangle AGF\backsim\triangle CDF.$

$\therefore \frac{AF}{FC}=\frac{AG}{DC}=\frac{2}{5}.$

第2课时

1.D　　2.B

3.证明：∵四边形$ABCD$为矩形，

$\therefore \angle BAD=\angle D=90°.$

$\therefore \angle DAE+\angle BAE=90°.$

$\because BF\perp AE$于点F，$\therefore \angle BFA=90°.$

$\therefore \angle ABF+\angle BAE=90°.$

$\therefore \angle ABF=\angle DAE.$

又$\because \angle BFA=\angle D=90°$，

$\therefore \triangle ABF\backsim\triangle EAD.$

第3课时

1.B

2. 54或$\frac{75}{2}$

3.解：(1)答案不唯一，如添加的条件是$\angle ADC=\angle ABC$.

证明：$\because \angle BAD=\angle CAE$，

$\therefore \angle BAD+\angle BAE=\angle BAE+\angle CAE$，即$\angle DAE=\angle BAC$.

又$\because \angle ADC=\angle ABC$，

$\therefore \triangle ADE\backsim\triangle ABC.$

(2)$\triangle ABD\backsim\triangle ACE$.

理由：$\because \triangle ADE\backsim\triangle ABC$，

$\therefore \frac{AB}{AD}=\frac{AC}{AE}.$

$\therefore \frac{AB}{AC}=\frac{AD}{AE}.$

又$\because \angle BAD=\angle CAE$，

$\therefore \triangle ABD\backsim\triangle ACE.$

第4课时

1.相似

2.解：$\triangle ABC$与$\triangle DEF$相似.

理由：根据题意，得$AB=2,DE=1$.

由勾股定理，可得$AC=2\sqrt{5}$，$BC=4\sqrt{2}$，$DF=\sqrt{5}$，$EF=2\sqrt{2}$.

$\therefore \frac{AB}{DE}=2,\frac{AC}{DF}=\frac{2\sqrt{5}}{\sqrt{5}}=2,\frac{BC}{EF}=\frac{4\sqrt{2}}{2\sqrt{2}}=2$，

$\therefore \frac{AB}{DE}=\frac{AC}{DF}=\frac{BC}{EF}.$

$\therefore \triangle ABC\backsim\triangle DEF.$

第5课时

1.D

2.证明：$\because BF=3,CF=5$，

$\therefore BC=BF+CF=8.$

$\because \angle B=90°,AB=6$，

由勾股定理，可得$AC=10$.

$\because \frac{AB}{DE}=\frac{6}{15}=\frac{2}{5},\frac{AC}{DF}=\frac{10}{25}=\frac{2}{5}$，

$\therefore \frac{AB}{DE}=\frac{AC}{DF}.$

又$\because \angle B=\angle E=90°$，

$\therefore \triangle ABC\backsim\triangle DEF.$

3版

一、选择题

1~5.DAABD　6~10.ACCBA

二、填空题

11.答案不唯一，如$\angle ADE=\angle B$

12.$\triangle ADC$和$\triangle ACB$

13.5

14.$\frac{25}{8}$或$\frac{20}{7}$

三、解答题

15.证明：$\because AD=1,AB=3,AC=\sqrt{3}$，

$\therefore \frac{AC}{AB}=\frac{\sqrt{3}}{3},\frac{AD}{AC}=\frac{1}{\sqrt{3}}=\frac{\sqrt{3}}{3}.$

$\therefore \frac{AD}{AC}=\frac{AC}{AB}.$

又$\because \angle A=\angle A$，

$\therefore \triangle ACD\backsim\triangle ABC.$

16.(1)证明：$\because CA\perp AD,CB\perp BE,ED\perp AD$，

$\therefore \angle A=\angle CBE=\angle D=90°.$

$\therefore \angle C+\angle CBA=90°,\angle CBA+\angle DBE=90°.$

$\therefore \angle C=\angle DBE.$

$\therefore \triangle ABC\backsim\triangle DEB.$

(2)解：$\because \triangle ABC\backsim\triangle DEB$，

$\therefore \frac{AC}{BD}=\frac{AB}{DE}$，即$\frac{6}{BD}=\frac{8}{4}$.

解得$BD=3$.

∴线段BD的长为3.

17.(1)证明：∵四边形$ABCD$为正方形，

$\therefore AD=AB=DC=BC,\angle A=\angle D=90°.$

$\because AE=ED,\therefore \frac{AE}{AB}=\frac{1}{2}.$

$\because DF=\frac{1}{4}DC,\therefore \frac{DF}{ED}=\frac{1}{2}.$

$\therefore \frac{AE}{AB}=\frac{DF}{ED}$，即$\frac{AE}{DF}=\frac{AB}{ED}$.

$\therefore \triangle ABE\backsim\triangle DEF.$

(2)解：∵四边形$ABCD$为正方形，

$\therefore ED/\!/BG.$

$\therefore \triangle EDF\backsim\triangle GCF.$

$\therefore \frac{ED}{CG}=\frac{DF}{CF}.$

$\because DF=\frac{1}{4}DC,AE=ED$，正方形$ABCD$的边长为4，

$\therefore DF=1,CF=3,ED=2.$

$\therefore CG=6.$

$\therefore BG=BC+CG=4+6=10.$

18.解：(1)当$PQ/\!/BC$时，$AP:AB=AQ:AC$.

$\because AP=4x,AQ=30-3x$，

$\therefore \frac{4x}{20}=\frac{30-3x}{30}.$

解得$x=\frac{10}{3}$.

$\therefore$当$x=\frac{10}{3}$时，$PQ/\!/BC$.

(2)$\triangle APQ$与$\triangle CQB$能相似.

$\because BA=BC,\therefore \angle A=\angle C.$

①当$\frac{AP}{CQ}=\frac{AQ}{BC}$时，$\triangle APQ\backsim\triangle CQB$.

$\therefore \frac{4x}{3x}=\frac{30-3x}{20}.$

解得$x=\frac{10}{9}$.

$\therefore AP=4x=\frac{40}{9}$(cm).

②当$\frac{AP}{BC}=\frac{AQ}{CQ}$时，$\triangle APQ\backsim\triangle CBQ$.

$\therefore \frac{4x}{20}=\frac{30-3x}{3x}.$

解得$x_1=5,x_2=-10$(舍去).

$\therefore AP=4x=20$(cm).

综上，当AP的长为$\frac{40}{9}$ cm或20 cm时，$\triangle APQ$与$\triangle CQB$相似.

第7期

2版

22.3相似三角形的性质

1.D　2.C　3.k

4.证明：$\because \frac{AB}{A_1B_1}=\frac{AD}{A_1D_1}=\frac{BD}{B_1D_1}$，

$\therefore Rt\triangle ABD\backsim Rt\triangle A_1B_1D_1.$

$\therefore \angle ABC=\angle A_1B_1C_1.$

又$\because \angle C=\angle C_1$，

$\therefore \triangle ABC\backsim\triangle A_1B_1C_1.$

$\therefore \frac{BE}{B_1E_1}=\frac{AB}{A_1B_1}$，

又$\because \frac{AD}{A_1D_1}=\frac{AB}{A_1B_1}$，

$\therefore \frac{AD}{A_1D_1}=\frac{BE}{B_1E_1}.$

5.C　6.4.2

7.(1)证明：$\because AB=27,AC=18,CD=12$，

$\therefore \frac{AB}{AC}=\frac{27}{18}=\frac{3}{2},\frac{AC}{CD}=\frac{18}{12}=\frac{3}{2}.$

$\therefore \frac{AB}{AC}=\frac{AC}{CD}.$

$\because AB/\!/CD$，

$\therefore \angle BAC=\angle ACD.$

$\therefore \triangle ABC\backsim\triangle CAD.$

(2)解：由(1)可知，$\triangle ABC\backsim\triangle CAD$.

$\therefore \frac{S_{\triangle ABC}}{S_{\triangle CAD}}=\left(\frac{AB}{AC}\right)^2=\left(\frac{3}{2}\right)^2=\frac{9}{4}.$

$\because \triangle ACD$的面积为80 m²，

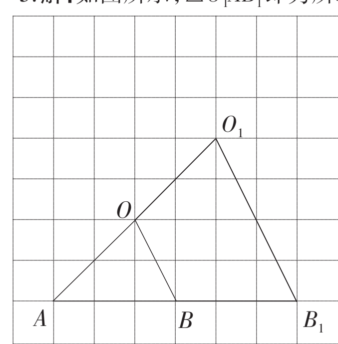
$\therefore \triangle ABC$的面积为$80\times\frac{9}{4}=180$(m²).

答：水果园$\triangle ABC$的面积为180 m².

22.4图形的位似变换

1.B　2.D　3.A　4.50

5.解：如图所示，$\triangle O_1AB_1$即为所求.



（第5题图）

22.5综合与实践　测量与误差

解：$\because AD/\!/EG$，

$\therefore \angle ADO=\angle EGF.$

又$\because \angle AOD=\angle EFG=90°$，

$\therefore \triangle AOD\backsim\triangle EFG.$

$\therefore \frac{AO}{EF}=\frac{OD}{FG}$，即$\frac{AO}{1.8}=\frac{20}{2.4}$.

解得$AO=15$.

同理，得$\triangle BOC\backsim\triangle AOD$.

$\therefore \frac{BO}{AO}=\frac{OC}{OD}$，即$\frac{BO}{15}=\frac{16}{20}$.

解得$BO=12$.

$\therefore AB=AO-BO=15-12=3$(m).

答：旗杆AB的高是3 m.

3版

一、选择题

1~5.DADCD　　6~10.DDCBC

二、填空题

11.4.5　　12.(2，1)

13.48　　14.21.2

三、解答题

15.解：(1)$\because \triangle ABC\backsim\triangle A'B'C'$，$\frac{AB}{A'B'}=\frac{1}{2}$，

$\therefore \frac{CD}{C'D'}=\frac{1}{2}.$

$\because CD=4$ cm，

$\therefore C'D'=4\times2=8$(cm).

$\therefore A'B'$边上的中线$C'D'$的长为8 cm.

(2)$\because \triangle ABC\backsim\triangle A'B'C'$，$\frac{AB}{A'B'}=\frac{1}{2}$，

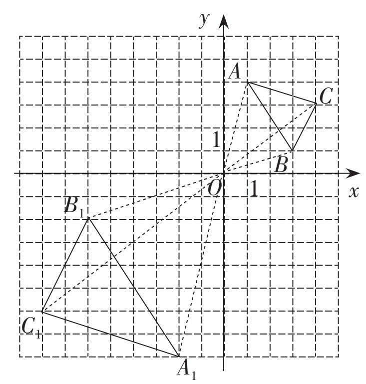
$\therefore \frac{C_{\triangle ABC}}{C_{\triangle A'B'C'}}=\frac{1}{2}.$

$\because \triangle ABC$的周长为20 cm，

$\therefore C_{\triangle A'B'C'}=20\times2=40$(cm).

$\therefore \triangle A'B'C'$的周长为40 cm.

16.解：(1)如图，$\triangle A_1B_1C_1$即为所求.



（第16题图）

(2)14.

17.解：由题意可知，$AB\perp FN,MN\perp FN,CD\perp FN$.

$\therefore \angle N=\angle BAE=\angle DCF=90°.$

$\because \angle BEA=\angle MEN$，

$\therefore \triangle BEA\backsim\triangle MEN.$

$\therefore \frac{AB}{MN}=\frac{EA}{EN}$，即$\frac{1.5}{MN}=\frac{2}{2+AN}$.①

同理可证，$\triangle FDC\backsim\triangle FMN$，

$\therefore \frac{DC}{MN}=\frac{FC}{FN}$，即$\frac{1.5}{MN}=\frac{4}{4+50+AN}$.②

联立①②，解得$AN=50,MN=39$.

答：古塔的高度为39 m.

18.解：(1)∵四边形$EGHF$为正方形，

$\therefore EF/\!/GH,EF=EG,\angle FEG=\angle EGH=90°.$

$\therefore \triangle AEF\backsim\triangle ABC.$

$\therefore \frac{EF}{BC}=\frac{AK}{AD}.$

$\because AD\perp BC$，

$\therefore \angle FEG=\angle EGD=\angle GDK=90°.$

∴四边形$EGDK$为矩形.

$\therefore KD=EG=EF.$

$\therefore \frac{EF}{120}=\frac{80-EF}{80}.$

解得$EF=48$.

答：这个正方形零件的边长为48 mm.

(2)∵四边形$EGHF$为矩形，

$\therefore EF/\!/GH$，即$EF/\!/BC$.

$\therefore \triangle AEF\backsim\triangle ABC.$

$\therefore \frac{EF}{BC}=\frac{AK}{AD}=\frac{AD-KD}{AD}.$

易证四边形$EGDK$为矩形，

$\therefore KD=EG.$

设$EG=x,EF=y$，

$\therefore \frac{y}{120}=\frac{80-x}{80}.$

$\therefore y=-\frac{3}{2}x+120.$

$\therefore S=xy=x\left(-\frac{3}{2}x+120\right)=-\frac{3}{2}x^2+120x=-\frac{3}{2}(x-40)^2+2\,400.$

$\because -\frac{3}{2}<0$，

∴当$x=40$ mm时，S最大，最大值为2 400 mm².

答：矩形$EGHF$的面积S的最大值是2 400 mm².