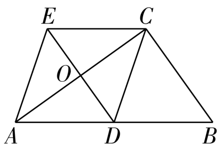
证明如下:令 $ED$ 与 $AC$ 的交点为 $O$,如图(2).



图(2)

$\because CD$ 是 $Rt\triangle ABC$ 斜边 $AB$ 上的中线,$\therefore CD=DA=DB=\dfrac{1}{2}AB.$

$\because AE/\!/DC, CE/\!/AB,$

$\therefore$ 四边形 $ADCE$ 是平行四边形.

$\because DA=DC, \therefore$ 四边形 $ADCE$ 是菱形,$\therefore AC\perp DE.$

命题 3:若连接 $ED$,则 $ED=BC$,是真命题.

证明如下:令 $ED$ 与 $AC$ 的交点为 $O$,如图(2).

$\because CD$ 是 $Rt\triangle ABC$ 斜边 $AB$ 上的中线,

$\therefore CD=DA=DB=\dfrac{1}{2}AB.$

$\because AE/\!/DC, CE/\!/AB, \therefore$ 四边形 $ADCE$ 是平行四边形,$\therefore CE=AD, \therefore CE=DB.$

又$\because CE/\!/AB, \therefore$ 四边形 $BCED$ 是平行四边形,

$\therefore ED=BC.$

**12.**【解】(1)选择①$AB/\!/CD$.

证明:$\because AD/\!/BC, AB/\!/CD, \therefore$ 四边形 $ABCD$ 是平行四边形. $\because \angle ABC=90^\circ, \therefore$ 平行四边形 $ABCD$ 是矩形.

选择②$AD=BC$.

证明:$\because AD/\!/BC, AD=BC, \therefore$ 四边形 $ABCD$ 是平行四边形.

$\because \angle ABC=90^\circ, \therefore$ 平行四边形 $ABCD$ 是矩形.

(任选 1 个作为条件证明即可)

(2)$\because \angle ABC=90^\circ, AB=3, AC=5,$

$\therefore BC=\sqrt{AC^2-AB^2}=\sqrt{5^2-3^2}=4,$

$\therefore S_{矩形ABCD}=AB\cdot BC=3\times4=12.$

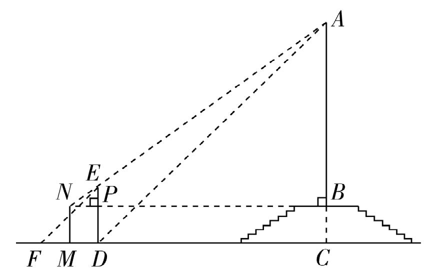
**13.**【解】(1)$\because$ 太阳光线是平行光线,$\therefore \angle EFD=\angle ADC$. 又$\because \angle EDF=\angle ACD=90^\circ, \therefore \triangle EFD\backsim\triangle ADC, \therefore \dfrac{DF}{CD}=\dfrac{DE}{CA}. \because DF=DE, \therefore CD=CA.$

(2)设 $NB$ 与 $DE$ 的交点为 $P$,如图.

由题意得 $PN=DM=1, DP=BC=MN=1.2, BN=CM, \therefore PE=DE-DP=2.1-1.2=0.9.$

设 $AB=x$ m,则 $CD=CA=AB+BC=x+1.2,$

$\therefore BN=CM=CD+DM=x+1.2+1=x+2.2.$




$\because \angle ENP=\angle ANB, \angle EPN=\angle ABN=90^\circ, \therefore \triangle NEP\backsim\triangle NAB, \therefore \dfrac{EP}{AB}=\dfrac{PN}{BN}$,即$\dfrac{0.9}{x}=\dfrac{1}{x+2.2}$,解得 $x=19.8.$

经检验,$x=19.8$ 是原方程的根.

答:纪念碑 $AB$ 的高度为 19.8 m.

(3)小红的结果误差较大,原因可能是平台底部点 $C$ 不可直接到达,间接测量时产生了较大的误差(原因合理即可).

# 期末综合测试

## 刷速度

**1. A** 【解析】$\because \dfrac{3}{a}=\dfrac{5}{b}, \therefore 5a=3b, \therefore a=0.6b,$

$\therefore \dfrac{3a+2b}{a-b}=\dfrac{3\times0.6b+2b}{0.6b-b}=\dfrac{3.8b}{-0.4b}=-\dfrac{19}{2}$. 故选 A.

**2. A** 【解析】$4\sqrt{5}-3\sqrt{5}=\sqrt{5}$,所以 A 选项符合题意;$\sqrt{2^2}=2$,所以 B 选项不符合题意;$\sqrt{(-2)^2}=|-2|=2$,所以 C 选项不符合题意;$\sqrt{(-4)\times(-9)}=\sqrt{4}\times\sqrt{9}$,所以 D 选项不符合题意. 故选 A.

**3. A** 【解析】由题意得 $200(1+x)^2=242$. 故选 A.

**4. D** 【解析】过点 $O$ 作任意不与 $AB$ 重合的直线交木板两边于点 $C,D$,得到平行四边形 $ACBD$,故选项 A 不符合题意;过点 $O$ 作 $AB$ 的垂线 $l$ 交木板两边于点 $C,D$,得到菱形 $ACBD$,故选项 B 不符合题意;在木板两边任意找两点 $C,D$(不与 $A,B$ 重合),使得 $AC=BD$,得到平行四边形或等腰梯形,故选项 C 不符合题意;分别过点 $A,B$ 作木板两边的垂线,交两边于点 $C,D$,得到矩形 $ACBD$,故选项 D 符合题意. 故选 D.

**5. C** 【解析】①$\because a-b+c=0, \therefore b=a+c, \therefore \Delta=b^2-4ac=(a+c)^2-4ac=(a-c)^2\geqslant0, \therefore$ 此方程一定有实数根,故①正确. ②$\because a,c$ 异号,$a\neq0, \therefore ac<0, \therefore -4ac>0, \therefore \Delta=b^2-4ac>0, \therefore$ 此方程一定有实数根,故②正确. 故选 C.

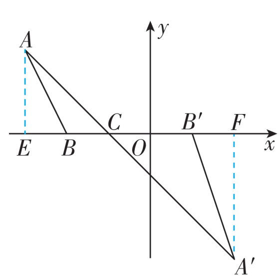
**6. B** 【解析】$\because$ 四边形 $ABCD$ 是菱形,$\therefore AB=BC=CD=AD, AD/\!/BC, AB/\!/CD. \because BE=BC, \therefore BE=BC=AB=CD=AD, \therefore \angle BEA=\angle BAE. \because CH/\!/AE, \therefore \angle DHC=\angle BEA=\angle BAE. \because AB/\!/CD, \therefore \angle ABE=\angle CDH$. 又$\because \angle BEA=\angle DHC, AB=CD, \therefore \triangle ABE\cong\triangle CDH$(AAS),$\therefore \angle DCH=\angle BAE. \because AD/\!/BC, \therefore \angle ADE=\angle EBF$. 又$\because DE=BF, AD=BE, \therefore \triangle ADE\cong\triangle EBF$(SAS),$\therefore \angle AED=\angle EFB, \therefore 180^\circ-\angle AED=180^\circ-\angle EFB$,即$\angle BEA=\angle EFC=\angle BAE$. 综上所述,$\angle BEA, \angle DHC, \angle DCH, \angle EFC$ 与$\angle BAE$ 相等. 故选 B.

**7. C** 【解析】$\because m,n$ 是方程 $x^2-2\,023x+2\,024=0$ 的两个实数根,$\therefore m^2-2\,023m+2\,024=0, n^2-2\,023n+2\,024=0, mn=2\,024, \therefore m^2-2\,022m=m-2\,024, n^2-2\,022n=n-2\,024, \therefore (m^2-2\,022m+2\,024)(n^2-$

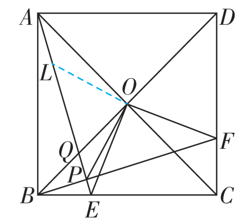
$2\ 022n+2\ 024)=(m-2\ 024+2\ 024)(n-2\ 024+2\ 024)=mn=2\ 024$. 故选 C.

**8. D** 【解析】根据题意得 $\angle ADC=\angle CDB=\angle ACB=\angle AFD=90°$, $\therefore DE/\!/BC$. $\because CE/\!/AB$, $\therefore$ 四边形 $CEDB$ 是平行四边形, $\therefore EC=BD$. $\because CD\perp AB$, $\therefore CD\perp EC$, 即 $\angle ECD=90°$, $\therefore DE^2=EC^2+CD^2=BD^2+CD^2$. $\because \angle ACD+\angle BCD=90°$, $\angle BCD+\angle B=90°$, $\therefore \angle ACD=\angle B$. 又 $\because \angle ADC=\angle CDB=90°$, $\therefore \triangle ADC\backsim\triangle CDB$, $\therefore \dfrac{AD}{CD}=\dfrac{CD}{DB}$, $\therefore CD^2=AD\cdot DB$, $\therefore DE^2=BD^2+AD\cdot BD=BD\cdot(BD+AD)=BD\cdot AB$, 故 A 正确. $\because EC/\!/AD$, $\therefore \angle E=\angle ADF$, $\angle ECF=\angle A$, $\therefore \triangle EFC\backsim\triangle DFA$, $\therefore \dfrac{S_{\triangle CEF}}{S_{\triangle ADF}}=\left(\dfrac{EC}{AD}\right)^2=\left(\dfrac{BD}{AD}\right)^2=\dfrac{BD^2}{AD^2}$, 故 B 正确. $\because \angle ECF=\angle A$, $\angle EFC=\angle CDA=90°$, $\therefore \triangle CEF\backsim\triangle ACD$, $\therefore \dfrac{EC}{AC}=\dfrac{CF}{AD}$. $\because EC=BD$, $\therefore \dfrac{BD}{CA}=\dfrac{CF}{AD}$, 故 C 正确. $\because \angle AFD=\angle ACB=90°$, $\angle A=\angle A$, $\therefore \triangle AFD\backsim\triangle ACB$, $\therefore \dfrac{DF}{BC}=\dfrac{AF}{AC}$, 故 D 错误. 故选 D.

**9. C** 【解析】如图, 过点 $A$ 作 $AE\perp x$ 轴于 $E$, 过点 $A'$ 作 $A'F\perp x$ 轴于 $F$. $\because B(-2,0)$, $C(-1,0)$, $B'(1,0)$, $A'(2,-3)$, $\therefore OB=2$, $OC=OB'=1$, $OF=2$, $A'F=3$, $\therefore BC=1$, $CB'=2$, $CF=3$. 根据题意得 $\triangle ABC\backsim\triangle A'B'C$, $\therefore \dfrac{AE}{A'F}=\dfrac{BC}{B'C}=\dfrac{1}{2}$, $\therefore AE=\dfrac{3}{2}$. $\because \angle ACE=\angle A'CF$, $\angle AEC=\angle A'FC=90°$, $\therefore \triangle AEC\backsim\triangle A'FC$, $\therefore \dfrac{EC}{FC}=\dfrac{AE}{A'F}=\dfrac{1}{2}$, $\therefore EC=\dfrac{3}{2}$, $\therefore OE=EC+OC=\dfrac{5}{2}$, $\therefore A\left(-\dfrac{5}{2},\dfrac{3}{2}\right)$, 故选 C.




**10. B** 【解析】$\because$ 四边形 $ABCD$ 是正方形, 对角线 $AC$, $BD$ 相交于点 $O$, $\therefore DA=AB=BC$, $\angle DAB=\angle ABE=\angle BCF=90°$, $AC\perp BD$, $OC=OA=\dfrac{1}{2}AC$, $OB=OD=\dfrac{1}{2}BD$, 且 $AC=BD$, $\therefore \angle AOB=\angle BOC=\angle COD=90°$, $OA=OB=OC=OD$, $\therefore \angle OAB=\angle OBE=\angle OCB=\angle OCF=45°$. $\because OE\perp OF$, $\therefore \angle EOF=90°$, $\therefore \angle BOE=\angle COF$. 在 $\triangle BOE$ 和 $\triangle COF$ 中, $\begin{cases}\angle BOE=\angle COF,\\ OB=OC,\\ \angle OBE=\angle OCF,\end{cases}$ $\therefore \triangle BOE\cong\triangle COF$ (ASA), $\therefore BE=CF$. 在 $\triangle ABE$ 和 $\triangle BCF$ 中, $\begin{cases}AB=BC,\\ \angle ABE=\angle BCF,\\ BE=CF,\end{cases}$ $\therefore \triangle ABE\cong\triangle BCF$ (SAS), $\therefore \angle BAE=\angle CBF$, $\therefore \angle APF=\angle BAE+\angle ABF=\angle CBF+\angle ABF=\angle ABE=90°$, $\therefore AE\perp BF$, 故①正确. 如图, 作 $OL\perp OP$ 交 $AP$ 于点 $L$, 则 $\angle POL=90°$, $\therefore \angle AOL=\angle BOP$.



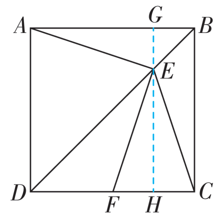

$\because \angle OAL=45°-\angle BAE$, $\angle OBP=45°-\angle CBF$, 且 $\angle BAE=\angle CBF$, $\therefore \angle OAL=\angle OBP$. 在 $\triangle OAL$ 和 $\triangle OBP$ 中, $\begin{cases}\angle OAL=\angle OBP,\\ OA=OB,\\ \angle AOL=\angle BOP,\end{cases}$ $\therefore \triangle OAL\cong\triangle OBP$ (ASA), $\therefore OL=OP$, $AL=BP$, $\therefore AP-BP=AP-AL=PL$. $\because PL=\sqrt{OL^2+OP^2}=\sqrt{2}OP$, $\therefore AP-BP=\sqrt{2}OP$, 故③正确. 易知 $\angle OPL=\angle OLP=45°$, $\therefore \angle APO=\angle ACE=45°$. $\because \angle OAP=\angle EAC$, $\therefore \triangle OAP\backsim\triangle EAC$, 故②正确. $\because BE:CE=2:3$, $\therefore$ 设 $BE=2m$, 则 $CE=3m$, $\therefore DA=AB=BC=2m+3m=5m$, $\therefore BD=\sqrt{AB^2+DA^2}=\sqrt{2}AB=5\sqrt{2}m$, $\therefore OA=OB=OD=\dfrac{1}{2}BD=\dfrac{5\sqrt{2}}{2}m$. $\because BE/\!/DA$, $\therefore$ 易得 $\triangle EBQ\backsim\triangle ADQ$, $\therefore \dfrac{BQ}{DQ}=\dfrac{BE}{DA}=\dfrac{2m}{5m}=\dfrac{2}{5}$, $\therefore BQ=\dfrac{2}{2+5}BD=\dfrac{2}{7}BD=\dfrac{2}{7}\times5\sqrt{2}m=\dfrac{10\sqrt{2}}{7}m$, $\therefore OQ=OB-BQ=\dfrac{5\sqrt{2}}{2}m-\dfrac{10\sqrt{2}}{7}m=\dfrac{15\sqrt{2}}{14}m$, $\therefore \dfrac{OQ}{OA}=\dfrac{\frac{15\sqrt{2}}{14}m}{\frac{5\sqrt{2}}{2}m}=\dfrac{3}{7}$, 故④错误. $\because S_{\triangle BOE}=S_{\triangle COF}$, $\therefore S_{四边形OECF}=S_{\triangle COE}+S_{\triangle COF}=S_{\triangle COE}+S_{\triangle BOE}=S_{\triangle BOC}=\dfrac{1}{4}S_{正方形ABCD}$, 故⑤正确. 故选 B.

**11. $3\sqrt{2}$** 【解析】原式 $=\sqrt{16\times2}-\dfrac{1}{2}\sqrt{4\times2}=4\sqrt{2}-\dfrac{1}{2}\times2\sqrt{2}=4\sqrt{2}-\sqrt{2}=3\sqrt{2}$. 故答案为 $3\sqrt{2}$.

**12. $\dfrac{24}{5}$** 【解析】$\because$ 四边形 $ABCD$ 是菱形, $\therefore AO=\dfrac{1}{2}AC=\dfrac{1}{2}\times6=3$, $OB=\dfrac{1}{2}BD$, $AC\perp BD$. $\because AB=5$, $\therefore BO=\sqrt{AB^2-AO^2}=\sqrt{5^2-3^2}=4$, $\therefore BD=8$. $\because S_{菱形ABCD}=\dfrac{1}{2}AC\cdot BD=CD\cdot AE$, $\therefore \dfrac{1}{2}\times6\times8=5AE$, $\therefore AE=\dfrac{24}{5}$, 故答案为 $\dfrac{24}{5}$.

**13.** $x_1=2,x_2=-1$　【解析】$\because \min\{x,x-1\}=x^2-3$，$\therefore x-1=x^2-3$，整理得 $x^2-x-2=0$，$(x-2)(x+1)=0$，$x-2=0$ 或 $x+1=0$，$\therefore x_1=2,x_2=-1$，故答案为 $x_1=2$，$x_2=-1$.

**14.** 12　【解析】如图，过点 $E$ 作 $GH\perp DC$ 于点 $H$，交 $AB$ 于点 $G$. $\because$ 四边形 $ABCD$ 为正方形，$\therefore$ 易得 $GH\perp AB$，$GH/\!/AD$，$\therefore \angle CBD=\angle ABD=\angle BDC=\angle ADB=\angle GEB=45°$，$\therefore \triangle DEH$，




$\triangle GBE$ 为等腰直角三角形，$\therefore BE=\sqrt{2}BG$，$DE=\sqrt{2}DH$. $\because$ 正方形 $ABCD$ 中，$AB=8$，$\therefore BD=8\sqrt{2}$. $\because DE=3BE$，$\therefore BE=2\sqrt{2}$，$DE=6\sqrt{2}$. $\because DE=\sqrt{2}DH$，$\therefore EH=DH=6$. $\because BE=2\sqrt{2}$，$BE=\sqrt{2}BG$，$\therefore BG=GE=2$，$\therefore AG=AB-BG=6=EH$. $\because EF\perp AE$，$GH\perp AB$，$\therefore \angle GEA+\angle FEH=90°$，$\angle GEA+\angle GAE=90°$，$\therefore \angle FEH=\angle GAE$. 在 $\triangle AEG$ 与 $\triangle EFH$ 中，

$$\begin{cases}\angle GAE=\angle FEH,\\ GA=EH,\\ \angle AGE=\angle EHF=90°,\end{cases}\quad \therefore \triangle AEG\cong\triangle EFH(\mathrm{ASA}),$$

$\therefore AE=EF$，$EG=FH=2$. 在 $\triangle ABE$ 与 $\triangle CBE$ 中，

$$\begin{cases}AB=CB,\\ \angle ABE=\angle CBE,\\ BE=BE,\end{cases}\quad \therefore \triangle ABE\cong\triangle CBE(\mathrm{SAS}),$$

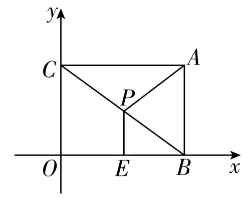
$\therefore AE=EC$. $\because AE=EF$，$\therefore EC=EF$. $\because GH\perp DC$，$FH=2$，$\therefore HC=FH=2$. $\because EH=6$，$\therefore S_{\triangle EFC}=\dfrac{1}{2}\times FC\times EH=\dfrac{1}{2}\times4\times6=12$. 故答案为 12.

**15.** $\left(\dfrac{32}{5},\dfrac{6}{5}\right)$或$(4,3)$　【解析】$\because$ 点 $P$ 在矩形 $ABOC$ 的内部，点 $E$ 在 $BO$ 边上，$\triangle PBE\backsim\triangle CBO$，$\therefore$ 易知点 $P$ 在 $BC$ 上.

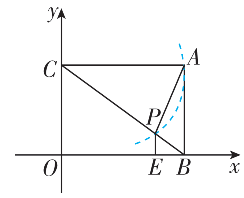
①当 $CP=AP$ 时，如图(1)，此时点 $P$ 在 $AC$ 的垂直平分线上. $\because$ 四边形 $ABOC$ 是矩形，点 $A$ 的坐标为 $(8,6)$，$\therefore$ 点 $P$ 横坐标为 4，$OC=6$，$BO=8$. $\because \triangle PBE\backsim\triangle CBO$，$\therefore \angle PEB=\angle COB=90°$，$\dfrac{PE}{CO}=\dfrac{BE}{BO}$，$\therefore BE=8-4=4$，$\therefore \dfrac{PE}{6}=\dfrac{4}{8}$，$\therefore PE=3$，$\therefore$ 点 $P$ 的坐标为 $(4,3)$.

②当 $AC=PC$ 时，如图(2)，此时点 $P$ 在以点 $C$ 为圆心，$AC$ 为半径的圆弧上. $\because$ 四边形 $ABOC$ 是矩形，点 $A$ 的坐标为 $(8,6)$，$\therefore AC=BO=CP=8$，$AB=OC=6$，$\therefore BC=\sqrt{BO^2+OC^2}=\sqrt{8^2+6^2}=10$，$\therefore BP=2$. $\because \triangle PBE\backsim\triangle CBO$，$\therefore \angle PEB=\angle COB=90°$，$\dfrac{PE}{CO}=\dfrac{BE}{BO}=\dfrac{PB}{CB}$，即 $\dfrac{PE}{6}=\dfrac{BE}{8}=\dfrac{2}{10}$，$\therefore PE=\dfrac{6}{5}$，$BE=\dfrac{8}{5}$，$\therefore OE=8-\dfrac{8}{5}=\dfrac{32}{5}$，$\therefore$ 点 $P$ 的坐标为 $\left(\dfrac{32}{5},\dfrac{6}{5}\right)$.

综上所述，点 $P$ 的坐标为 $\left(\dfrac{32}{5},\dfrac{6}{5}\right)$或$(4,3)$. 故答案为 $\left(\dfrac{32}{5},\dfrac{6}{5}\right)$或$(4,3)$.



图(1)



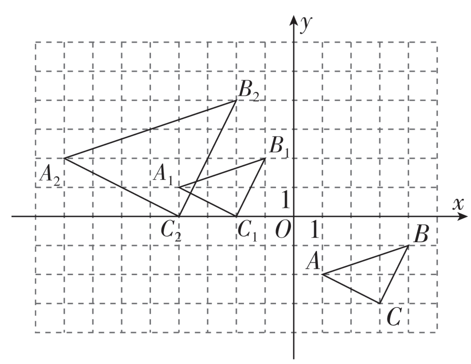
图(2)

**16.**【解】(1) $x^2-4x-3=0$，$x^2-4x=3$，$x^2-4x+4=3+4$，即 $(x-2)^2=7$，$\therefore x-2=\pm\sqrt{7}$，解得 $x_1=2+\sqrt{7}$，$x_2=2-\sqrt{7}$.

(2) $a=1$，$b=-2\sqrt{3}$，$c=-9$，$\therefore \Delta=(-2\sqrt{3})^2-4\times1\times(-9)=48>0$，$\therefore x=\dfrac{2\sqrt{3}\pm\sqrt{48}}{2\times1}=\sqrt{3}\pm2\sqrt{3}$，$\therefore x_1=3\sqrt{3}$，$x_2=-\sqrt{3}$.

(3) $x^2+6x+9=2(x+3)$，$(x+3)^2-2(x+3)=0$，$(x+3)(x+1)=0$，$\therefore x+3=0$ 或 $x+1=0$，$\therefore x_1=-3$，$x_2=-1$.

**17.**【解】(1)如图所示，$\triangle A_1B_1C_1$ 即为所求，$B_1(-1,2)$.




(2)如图所示，$\triangle A_2B_2C_2$ 即为所求，$B_2(-2,4)$.

(3) $P_2(2a-10,2b+6)$.

**18.**【解】(1) $\because a=2\ 023$，$\therefore 1-a<0$，$\therefore \sqrt{1-2a+a^2}=\sqrt{(1-a)^2}=a-1$，$\therefore$ 小明从第二步开始出错. 原式 $=a+a-1=2a-1$，当 $a=2\ 023$ 时，原式 $=2\times2\ 023-1=4\ 045$. 故答案为二，4 045.

(2) $\because b=\sqrt{5}<3$，$\therefore b-3<0$，则原式 $=b+2\sqrt{(b-3)^2}=b+2(3-b)=b+6-2b=6-b$，当 $b=\sqrt{5}$ 时，原式 $=6-\sqrt{5}$.

**19.**【解】(1)设 $AB$ 的长为 $x$ m，则 $x(37+1-2x)=120$，解得 $x_1=4$，$x_2=15$. $\because 0<38-2x\leqslant10$，$\therefore 14\leqslant x<19$，$\therefore x=4$ 时不符合题意，故舍去，$\therefore x=15$.

答：矩形种植园的边 $AB$ 的长为 15 m.

(2)不能. 理由：

设 $AB$ 的长为 $y$ m，则 $y\left(\dfrac{37+10+1-2y}{2}\right)=180$，化简得 $-y^2+24y-180=0$. $\because \Delta=24^2-4\times(-1)\times(-180)=-144<0$，$\therefore$ 他不能围成面积为 180 $\mathrm{m}^2$ 的

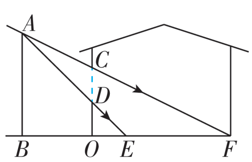
矩形种植园.

**20.**【解】(1)由题知,方程$-12x^2-x+1=0$的倒方程是$x^2-x-12=0$. 故答案为$x^2-x-12=0$.

(2)由题知,方程$x^2-3x+c=0$的倒方程为$cx^2-3x+1=0$,将$x=5$代入此方程,得$25c-15+1=0$,解得$c=\frac{14}{25}$.

(3)由题知,一元二次方程$x^2-5x-1=0$的倒方程是$-x^2-5x+1=0$. 因为$m,n$是此方程的两个不相等的实数根,所以$m+n=-5$,$mn=-1$,$-n^2-5n+1=0$,所以$n^2=-5n+1$,所以$2n^2-mn-10m=2(-5n+1)-mn-10m=-10n+2-mn-10m=-10(m+n)-mn+2=-10\times(-5)-(-1)+2=53$.

**21.**【解】连接$CD$,如图. 由题意得$AB\perp BF$,$DO\perp BF$,$\therefore\angle ABO=\angle DOE=90°$. $\because\angle BEA=\angle OED$,$\therefore\triangle ABE\backsim\triangle DOE$,$\therefore\frac{AB}{OD}=\frac{BE}{OE}$,即$\frac{AB}{1}=\frac{OB+0.8}{0.8}$,$\therefore AB=\frac{5}{4}OB+1$. $\because\angle CFO=\angle AFB$,$\therefore\triangle ABF\backsim\triangle COF$,$\therefore\frac{AB}{CO}=\frac{BF}{OF}$,即$\frac{AB}{1+1.5}=\frac{OB+8}{8}$,$\therefore AB=\frac{5}{16}OB+\frac{5}{2}$,$\therefore\frac{5}{4}OB+1=\frac{5}{16}OB+\frac{5}{2}$,解得$OB=\frac{8}{5}$,$\therefore AB=\frac{5}{4}OB+1=3(\text{m})$,$\therefore$围墙$AB$的高度为3 m.



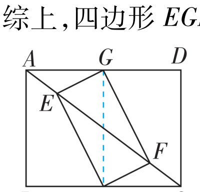
**22.**【解】(1)四边形$EGFH$是平行四边形. 理由如下:由题意得$AE=CF=t$. $\because$四边形$ABCD$是矩形,$\therefore AD/\!/BC$,$AD=BC$,$\therefore\angle GAE=\angle HCF$. $\because G,H$分别是$AD,BC$中点,$\therefore AG=\frac{1}{2}AD$,$CH=\frac{1}{2}BC$,$\therefore AG=CH$,$\therefore\triangle AEG\cong\triangle CFH(\text{SAS})$,$\therefore EG=FH$,$\angle AEG=\angle CFH$,$\therefore\angle FEG=\angle EFH$,$\therefore EG/\!/HF$,$\therefore$四边形$EGFH$是平行四边形.

(2)连接$GH$. 由(1)得$AG=BH=CH$,$AG/\!/BH$,又$\because\angle B=90°$,$\therefore$四边形$ABHG$是矩形,$\therefore GH=AB=6$. 易得$AC=10$.

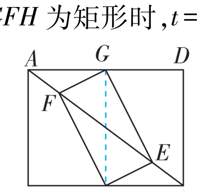
①如图(1),当四边形$EGFH$是矩形时,$EF=GH=6$. $\because AE=CF=t$,$\therefore EF=10-2t=6$,$\therefore t=2$.

②如图(2),当四边形$EGFH$是矩形时,$EF=GH=6$. $\because AE=CF=t$,$\therefore EF=t+t-10=2t-10=6$,$\therefore t=8$.

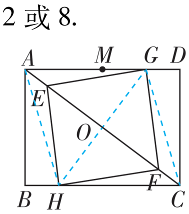
综上,四边形$EGFH$为矩形时,$t=2$或8.



图(1)



图(2)



图(3)

(3)如图(3),取$AD$的中点$M$,连接$AH$,$CG$,$GH$,设$AC$与$GH$交于$O$. $\because$四边形$EGFH$为菱形,$\therefore GH\perp EF$. 易知$OA=OC$,$\therefore AG=CG$. 设$AG=CG=x$,则$DG=8-x$,由勾股定理可得$CD^2+DG^2=CG^2$,即$6^2+(8-x)^2=x^2$,解得$x=\frac{25}{4}$,$\therefore MG=\frac{25}{4}-4=\frac{9}{4}$,即$t=\frac{9}{4}$,$\therefore$当$t=\frac{9}{4}$时,四边形$EGFH$为菱形.

**23.**【证明】(1)连接$FC$,如图(1)所示.

$\because$四边形$ABCD$为正方形,$\therefore AB=CB$,$\angle ABF=\angle CBF=45°$,$\angle ABC=90°$. 在$\triangle ABF$和$\triangle CBF$中,

$$\begin{cases}AB=CB,\\ \angle ABF=\angle CBF,\\ BF=BF,\end{cases}$$

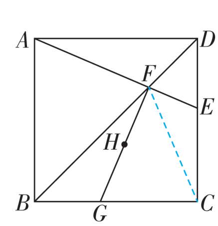
$\therefore\triangle ABF\cong\triangle CBF(\text{SAS})$,

$\therefore AF=CF$,$\angle BAF=\angle BCF$. 在四边形$ABGF$中,$\angle ABC=90°$,$FG\perp AE$,即$\angle AFG=90°$,$\therefore\angle BAF+\angle BGF=180°$. 又$\because\angle FGC+\angle BGF=180°$,$\therefore\angle BAF=\angle FGC$,$\therefore\angle BCF=\angle FGC$,$\therefore FG=CF$,$\therefore AF=FG$.

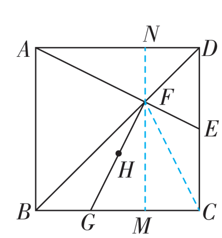
(2)如图(1),$\because$四边形$ABCD$为正方形,$\therefore\angle CDF=45°$,$\angle ADC=90°$.

$\because DE=DF$,$\therefore\angle DEF=\angle DFE=\frac{1}{2}(180°-\angle BDC)=67.5°$,$\therefore\angle DAE=90°-\angle DEF=22.5°$,$\therefore\angle BAF=\angle BCF=90°-22.5°=67.5°$,$\therefore\angle FCE=90°-\angle BCF=22.5°$. $\because\angle DEF=\angle FCE+\angle CFE$,$\therefore\angle CFE=\angle DEF-\angle FCE=67.5°-22.5°=45°$,$\therefore\angle CFE=\angle CDF=45°$. 又$\because\angle FCE=\angle DCF$,$\therefore\triangle FCE\backsim\triangle DCF$,$\therefore CF:CD=CE:CF$,$\therefore CF^2=CE\cdot CD$. $\because FG=CF$,$\therefore FG^2=CE\cdot CD$.

(3)连接$CF$,过点$F$作$FM\perp BC$于$M$,$MF$的延长线交$AD$于$N$,如图(2)所示. $\because$四边形$ABCD$为正方形,$\therefore\angle ADC=\angle DCB=90°$,$AB=CD$,$AD/\!/BC$,$AB/\!/CD$. $\because MN\perp BC$,$\therefore$四边形$CDNM$为矩形,$\therefore DN=CM$. 又$\because FG=CF$,$FM\perp BC$,$\therefore CM=GM=DN$,$\therefore CG=2GM$. $\because DE=CE$,$\therefore DE=\frac{1}{2}CD=\frac{1}{2}AB$,即$DE:AB=1:2$. $\because AB/\!/CD$,$\therefore$易得$\triangle DFE\backsim\triangle BFA$,$\therefore DF:BF=DE:AB=1:2$. $\because AD/\!/BC$,$\therefore$易得$\triangle DNF\backsim\triangle BMF$,$\therefore DN:BM=DF:BF=1:2$,$\therefore BM=2DN$,即$BG+GM=2GM$,$\therefore BG=GM$,$\therefore CG=2GM=2BG$.



图(1)



图(2)