2020−2021 0

20200829

12 5 60 1 10 11 12

1. $a\in\mathbf{R}$ $z=\left(a^2-1\right)+\left(a-1\right)\mathrm{i}$ $a=$

A -1 B 0 C 1 D -1 1

2. m, n α, β $m\subset\alpha$ $n\subset\beta$ $m\perp n$ $\alpha\perp\beta$

A

B

C

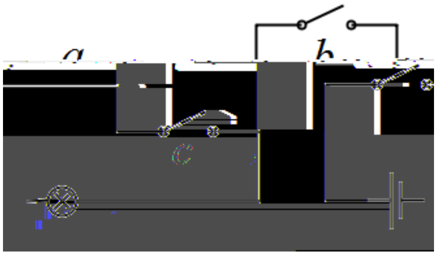
D

3.

15 16.8

A 2,5 B 5,5 C 5,8 D 8,8

4. $\frac{1}{2}$

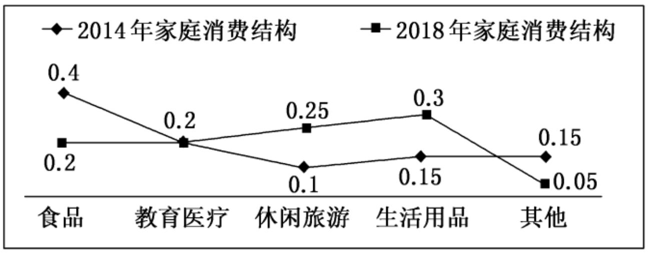


A $\frac{1}{8}$

B $\frac{3}{8}$

C $\frac{1}{4}$

D $\frac{7}{8}$



5.

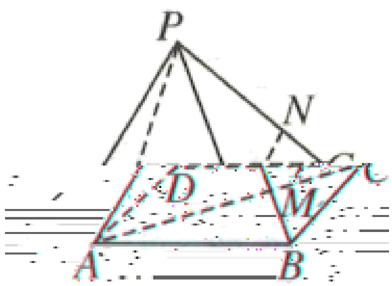
2018 2014

A 2018 2014

B 2018 2014

C 2018 2014

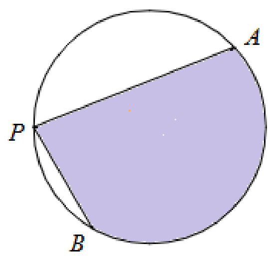
D 2018 2014



6. $P-ABCD$ M, N AC, PC

MN PAD

A $MN\,//\,PD$ B MN PA C $MN\,//\,AD$ D



7. 2 P $\angle APB$

β.

A $4\beta+4\cos\beta$

B $4\beta+4\sin\beta$

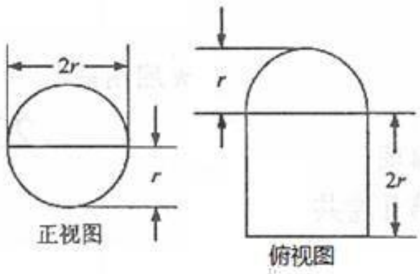
C $2\beta+2\cos\beta$

D $2\beta+2\sin\beta$

8. $\sin 2(\alpha+\gamma)=n\sin 2\beta$ $\frac{\tan(\alpha+\beta+\gamma)}{\tan(\alpha-\beta+\gamma)}=$

A $\frac{n-1}{n+1}$ B $\frac{n}{n+1}$ C $\frac{n}{n-1}$ D $\frac{n+1}{n-1}$

9. r



.

$16+20\pi$ $r=$

A 1 B 2 C 4 D 8

10. $f(x)=\sqrt{2}\sin(\omega x+\varphi)(\omega>0)$ $x=\frac{\pi}{2}$

$f\left(\frac{3\pi}{8}\right)=1$ $f(x)$ $\left[-\frac{3\pi}{8},-\frac{\pi}{4}\right]$ ω

A. 2 B. 4 C. 6 D. 8

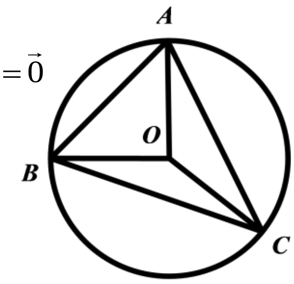
11.

7 5 7

A. $\bar{x}\le 3$ B. $S\le 2$

C. $\bar{x}\le 3$ 2 D. 1 4 .

12. ΔABC O 1 $3\overrightarrow{OA}+4\overrightarrow{OB}+5\overrightarrow{OC}=\vec{0}$



A $\angle BOC=90^\circ$ B $\angle AOB=90^\circ$

C $\overrightarrow{OB}\cdot\overrightarrow{CA}=-\frac{4}{5}$ D $\overrightarrow{OC}\cdot\overrightarrow{AB}=-\frac{1}{5}$

4 5 20 2 3 .

13. x

y

x	9	9.5	10	10.5	11
y	11	10	8	6	5

y x $y=bx+a$ $a=40$

__________ b __________.

14. 1 $\vec{a}=(m,4),\vec{b}=(3,-2)$ $\vec{a}$ $\vec{b}$ $m=$__________.

2 $\vec{a},\vec{b}$ 45° $k\vec{a}$ $\vec{b}$ $\vec{a}$ $k=$__________.

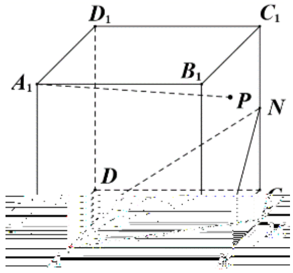
15. $y=x+b$ $x=\sqrt{1-y^2}$ b ______

b ________.

16. $ABCD-A_1B_1C_1D_1$ 2 M,N BC,CC_1

$C-AM-N$ ________ P BCC_1B_1 (

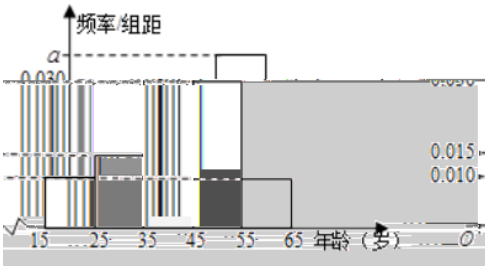
) $PA_1//$ AMN PA_1 ________.



6 70 17 10

12

17. 10



20 20

1 $[15,25)$ 2 $[25,35)$ 3 $[35,45)$ 4 $[45,55)$ 5 $[55,65]$

.

a

$[15,35)$ $[25,35)$

18. 12 ΔABC A,B,C $(2c-a)b=\frac{\sin B}{\sin C}(b^2+c^2-a^2)$

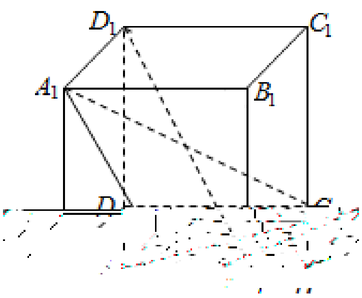
B

$S_{ABC}=6\sqrt{3}$ $3\sin A=2\sin C$ $\overrightarrow{BD}=3\overrightarrow{DC}$ AD

19. 12 1 $ABCD-A_1B_1C_1D_1$ E AB .

BD_1 CE

A A_1EC .

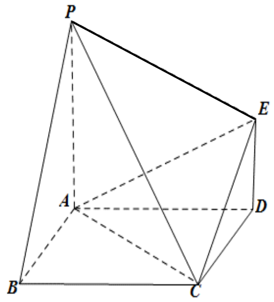


20. 12 $ABCD$

$PA \perp$ $ABCD$ $ED // PA$ $PA = 2ED$.

$CE //$ PAB

$PAC \perp$ PCE.



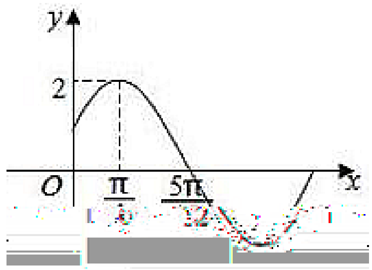
21. 12 $f\left(x\right)=A\sin\left(\omega x+\varphi\right)\left(A>0,\omega>0,\left|\varphi\right|<\dfrac{\pi}{2}\right)$.

$f\left(x\right)$

x $f\left(\dfrac{x}{2}-\dfrac{\pi}{12}\right)+\cos x=m$ $\left[0,2\pi\right]$.

m

$\cos\left(\alpha-\beta\right)=\dfrac{2m^2}{5}-1$.

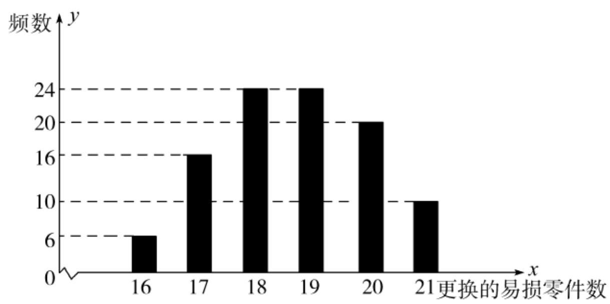


22. 12 1

200

500

100



x 1 y 1 (

) n

$n=19$ y x

n 0.5 n

100 19 20

100 1 19 20

2020-2021 0

12 5 60 1 10 11 12

ADCBC BBDBA CD BD

10. $\frac{\pi}{2}\omega+\varphi=\frac{\pi}{2}+2k\pi$ $\frac{3\pi}{8}\omega+\varphi=\frac{\pi}{4}+2m\pi$ $\frac{\pi}{2}\omega+\varphi=\frac{3\pi}{2}+2k\pi$ $\frac{3\pi}{8}\omega+\varphi=\frac{3\pi}{4}+2m\pi$

$f(x)$ $\left[-\frac{3\pi}{8},-\frac{\pi}{4}\right]$ $-\frac{\pi}{4}-(-\frac{3\pi}{8})=\frac{\pi}{8}\le\frac{T}{2}$ $T\ge\frac{\pi}{4}$ $\omega\le 8$

$\omega=2$ $\omega=6$ $\omega=2$.

12. $\triangle ABC$ O 1 $3\overrightarrow{OA}+4\overrightarrow{OB}+5\overrightarrow{OC}=\vec{0}$

$3\overrightarrow{OA}+4\overrightarrow{OB}=-5\overrightarrow{OC}$ $25+24\overrightarrow{OA}\cdot\overrightarrow{OB}=25\Rightarrow\overrightarrow{OA}\cdot\overrightarrow{OB}=0$

$3\overrightarrow{OA}+5\overrightarrow{OC}=-4\overrightarrow{OB}$ $34+30\overrightarrow{OA}\cdot\overrightarrow{OC}=16\Rightarrow\overrightarrow{OA}\cdot\overrightarrow{OC}=-\frac{3}{5}$

$4\overrightarrow{OB}+5\overrightarrow{OC}=-3\overrightarrow{OA}$ $41+40\overrightarrow{OB}\cdot\overrightarrow{OC}=9\Rightarrow\overrightarrow{OB}\cdot\overrightarrow{OC}=-\frac{4}{5}$.

$\angle BOC\ne 90^\circ$ A $\angle AOB=90^\circ$ B .

$\overrightarrow{OB}\cdot\overrightarrow{CA}=\overrightarrow{OB}\cdot\left(\overrightarrow{OA}-\overrightarrow{OC}\right)=\overrightarrow{OB}\cdot\overrightarrow{OA}-\overrightarrow{OB}\cdot\overrightarrow{OC}=\frac{4}{5}$ C .

$\overrightarrow{OC}\cdot\overrightarrow{AB}=\overrightarrow{OC}\cdot\left(\overrightarrow{OB}-\overrightarrow{OA}\right)=\overrightarrow{OC}\cdot\overrightarrow{OB}-\overrightarrow{OC}\cdot\overrightarrow{OA}=-\frac{4}{5}-\left(-\frac{3}{5}\right)=-\frac{1}{5}$ D .

4 5 20 2 3 .

13. $(10,8)$ -3.2 14. -6 $\frac{\sqrt{2}}{2}$ 15. $[-\sqrt{2},1]$ $(-\sqrt{2},-1]$ 16. $\frac{2}{3}$ $[\frac{3\sqrt{2}}{2},\sqrt{5}]$

6 70 17 10

12

17. $\left(0.01+0.015+a+0.030+0.010\right)\times 10=1$ $a=0.035$ 2

40 3

$\left[15,35\right)$ $\left(0.01+0.015\right)\times 10=0.25$

$\left[35,45\right)$

$35+\frac{0.5-0.25}{0.35}\times 10\approx 42.14$. 5

20 $\left[15,25\right)$ $0.01\times 10\times 20=2$

$\left[25,35\right)$ $0.015\times 10\times 20=3$ 7

$\left[15,35\right)$ 5

$(A,B),(A,a),(A,b),(A,c),(B,a),(B,b),(B,c),(a,b),(a,c),(b,c)$ 10

$\left[25,35\right)$

$(A,a),(A,b),(A,c),(B,a),(B,b),(B,c)$ 6

$\left[25,35\right)$ $p=\frac{m}{n}=\frac{6}{10}=\frac{3}{5}$. 10

18. ΔABC $\left(2c-a\right)b=\dfrac{\sin B}{\sin C}\left(b^2+c^2-a^2\right)$

$(2c-a)b=\dfrac{b}{c}\left(b^2+c^2-a^2\right)$

$2c^2-ac=b^2+c^2-a^2$

$a^2+c^2-b^2=ac$

$\cos B=\dfrac{a^2+c^2-b^2}{2ac}=\dfrac{1}{2}$

$0<B<\pi$ $B=\dfrac{\pi}{3}$

$3\sin A=2\sin C$ $a:c=2:3$

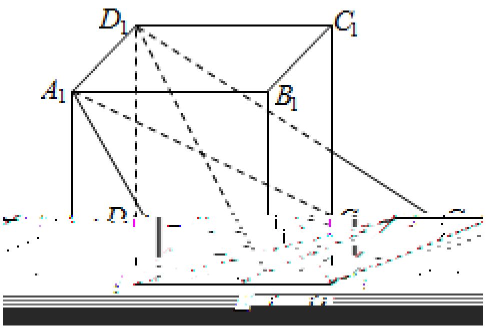
$a=2x$ $c=3x$

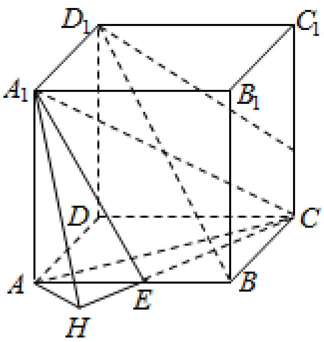
$S_{ABC}=6\sqrt{3}$ $S_{ABC}=\dfrac{1}{2}ac\sin B=\dfrac{1}{2}\cdot 2x\cdot 3x\cdot\dfrac{\sqrt{3}}{2}=6\sqrt{3}$

$x=2$

$a=4,c=6$ $\overrightarrow{BD}=3\overrightarrow{DC}$ $BD=3,\ DC=1$

ADC $AD^2=AB^2+BD^2-2AB\cdot BD\cdot\cos B=27$





3CîÌÛP9íEÜÍ•

$Rt\Delta A_1AH$, $A_1A=1$, $AH=\dfrac{1}{\sqrt{5}}$ $\therefore A_1H=\dfrac{\sqrt{6}}{\sqrt{5}}$.

A A_1EC d $\dfrac{1}{3}AA_1\times S_{\Delta ACE}=\dfrac{1}{3}d\times S_{\Delta A_1CE}$

$\dfrac{1}{3}\times1\times\dfrac{1}{2}\times\dfrac{1}{2}\times1=\dfrac{1}{3}d\times\dfrac{1}{2}\times\sqrt{\dfrac{1}{4}+1}\times\dfrac{\sqrt{6}}{\sqrt{5}}$ $d=\dfrac{\sqrt{6}}{6}$

A A_1EC $\dfrac{\sqrt{6}}{6}$. 2

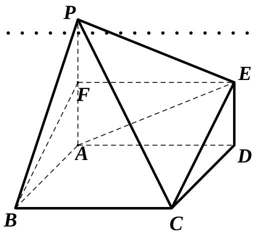
20. 1 $\because$ $ABCD$ $\therefore CD//AB$ 1

$AB\subset$ PAB $CD\not\subset$ PAB, $\therefore CD$ PAB, ... 2

$\because ED//PA$ $PA\subset$ PAB $DE\not\subset$ PAB $\therefore ED$ PAB, ... 3

$ED\cap CD=D$ $\therefore$ $CDE//$ PAB 4

$CE\subset$ CDE, $\therefore CE$ PAB. 5



2 PA F .

$\because ED//PA$ $PA=2ED$

$\therefore ED//AF$ $ED=AF$.

$\therefore$ $ADEF$ 1

$\therefore EF//AD$ $EF=AD$. 2

$\because$ $ABCD$ $\therefore BC//AD$ $BC=AD$. $\therefore BC//EF$ $BC=EF$.

$\therefore$ $BCEF$ 3

$\therefore BF//CE$ 4

$BF\subset$ PAB $CE\not\subset$ PAB, $\therefore CE$ PAB. 5

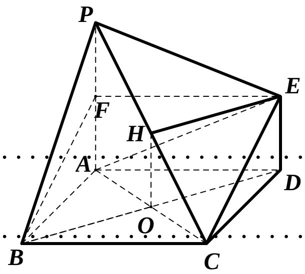
PC H BD $BD\cap AC=O$ OH EH.

$\because$ $ABCD$

$\therefore O$ AC

$\therefore OH=\dfrac{1}{2}PA$ OH PA 6

$\because ED//PA$ $PA=2ED$ $\therefore OH//DE$ $OH=DE$ 7



$\therefore$ $ODEH$ $\therefore OD//EH$. 8

$\because PA\perp$ $ABCD$ $OD\subset$ $ABCD$ $\therefore PA\perp OD$, ... 9

$\because$ $ABCD$ $\therefore AC\perp OD$. $PA\cap AC=A$ $\therefore OD\perp$ PAC. 10

$OD//EH$ $\therefore EH\perp$ PAC. 11

$EH\subset$ PAC $\therefore$ $PAC\perp$ PCE. 12

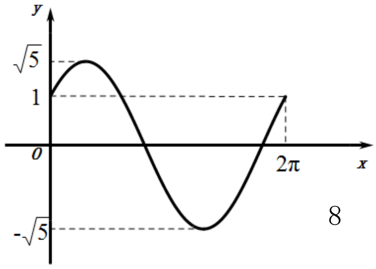
21. $A=2$

T $\dfrac{T}{4}=\dfrac{5\pi}{12}-\dfrac{\pi}{6}=\dfrac{\pi}{4}$ $\therefore T=\pi$ $\therefore \omega=2$ 2

$\because f\left(\frac{\pi}{6}\right)=2\sin\left(\frac{\pi}{3}+\varphi\right)=2$ $\frac{\pi}{3}+\varphi=\frac{\pi}{2}+2k\pi$ $k\in\mathbf{Z}$

$\therefore\varphi=\frac{\pi}{6}+2k$ $\because|\varphi|<\frac{\pi}{2}$ $\therefore\varphi=\frac{\pi}{6}$ $\therefore f(x)=2\sin\left(2x+\frac{\pi}{6}\right).$ 4

$f\left(\frac{x}{2}-\frac{\pi}{12}\right)+\cos x=2\sin\left[2\left(\frac{x}{2}-\frac{\pi}{12}\right)+\frac{\pi}{6}\right]+\cos x=2\sin x+\cos x$



$=\sqrt{5}\sin(x+\theta)$ $\sin\theta=\frac{\sqrt{5}}{5}$ $\cos\theta=\frac{2\sqrt{5}}{5}$

$x=0$ 1 $x\in[0,2\pi]$

$\therefore$ m $(-\sqrt{5},1)\cup(1,\sqrt{5})$. 8

$\because\sin(\alpha+\theta)=\sin(\beta+\theta)=\frac{m}{\sqrt{5}}$ $\therefore\alpha+\theta+\beta+\theta=\pi+2k\pi$ $k\in\mathbf{Z}$

$\therefore\alpha=-\beta-2\theta+\pi+2k\pi$ $k\in\mathbf{Z}$.

$\therefore\cos(\alpha-\beta)=\cos(-2\beta-2\theta+\pi+2k\pi)=\cos[\pi-2(\beta+\theta)]$

$=-\cos2(\beta+\theta)=2\sin^2(\beta+\theta)-1=\frac{2m^2}{5}-1.$ 12

22. $x\le19$ $y=3800$

$x>19$ $y=3800+500(x-19)=500x-5700$

y x $y=\begin{cases}3800 & x\le19\\ 500x-5700 & x>19\end{cases}(x\in\mathbf{N})$ 4

18 0.46 19 0.7

n 19 6

19

100 70 3800 20 4300 10 4800

100

$3800\times0.7+4300\times0.2+4800\times0.1=4000$ 9

20

100 90 4000 10 4500

100 $4000\times0.9+4500\times0.1=4050$

1 19 12