2020-2021

20201030

8 5 40 .

1. e i $\cos\theta$ $\sin\theta$

$e^{i\theta}=\cos\theta+i\sin\theta$ $\left|e^{\frac{\pi}{2}i}+1\right|=$

A 1 B $\sqrt{2}$ C 2 D $\sqrt{5}$

2. — — 120°

A $\sqrt{2}$ B 2 C $\sqrt{3}$ D $\sqrt{5}$

3. $C:\frac{x^2}{a^2}+\frac{y^2}{3}=1$ F O C P $|OF|=|FP|$

C

A $\frac{x^2}{12}+\frac{y^2}{3}=1$ B $\frac{x^2}{8}+\frac{y^2}{3}=1$ C $\frac{x^2}{6}+\frac{y^2}{3}=1$ D $\frac{x^2}{4}+\frac{y^2}{3}=1$

4. xOy $l:kx-y+4k=0$

4 5 20 . .

5 0 3 .

9. $f(x)=\sin(2x-\frac{}{6})$

A. $f(x)$

B. $y=f(x)$ $(\frac{}{6},0)$

C. $f(x)$ $[\frac{}{6},m]$ $\frac{1}{2}$ m $\frac{}{2}$

D. $g(x)=\cos^2 x-\sin^2 x$ $\frac{2}{3}$ $f(x)$

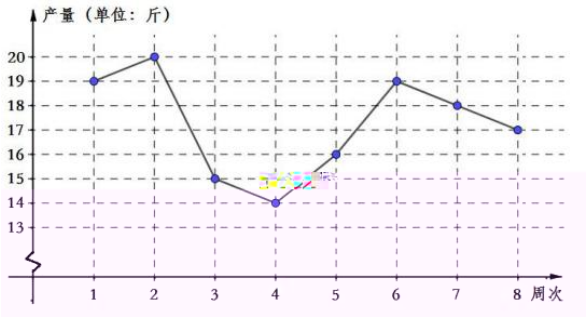
10. . (:), .

A. 19

B. 4

C.

D.



11. C $\frac{x^2}{k-2}+\frac{y^2}{6-k}=1(k\in\mathbf{R})$

A $k=4$ C

B $k=0$ C $y=\pm\sqrt{3}x$

C $k>4$ C x

D k C $\sqrt{2}$

12. 2 $ABCD-A_1B_1C_1D_1$ M B_1C $B_1M=2MC$ A,C_1,M Ω BD Ω N

A. Ω

B. $BD=3BN$

C. $MN\perp$ B_1CD_1

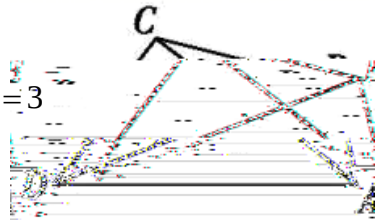
D. $C-MND_1$ $\frac{4}{9}$

4 5 20 2 3 .

13. $A(-2,0)$ $B(2,0)$ C P $P(0,2)$ $P(x,y)$ $l:y=x+3$ C _____.

14. C $y=\pm\frac{\sqrt{3}}{3}x$ $F(0,-8)$ _____ $A(-6,0)$ P C P x P ΔPAF _____.

15. $ABCD$ $AC\perp CD$ $\angle CAB=45°$ $AB=2$ $BC=3$ $\cos\angle ACB=$_____ $DC=2\sqrt{2}$ $BD=$_____.



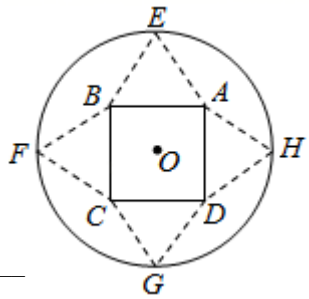
16. O $4cm$ $ABCD$ O,

E,F,G,H O $\Delta ABE,\Delta BCF,\Delta CDG,\Delta ADH$ AB,BC,CD,DA

AB,BC,CD,DA

$\Delta ABE,\Delta BCF,\Delta CDG,\Delta ADH$ E,F,G,H

$AB=2cm$ _____ _____



6 70 17 10

12 .

17. 10 $A(0,-2)$ $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b>0)$ $\frac{\sqrt{2}}{2}$ F E

AF 2 O

E

$P(0\ \sqrt{3})$ k l E M,N $|MN|=\frac{8\sqrt{2}}{7}$ k .

18. 12 ΔABC A,B,C a,b,c $2c\cos C=a\cos B+b\cos A$

C

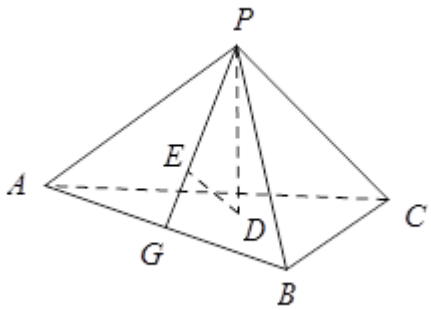
ΔABC $\frac{3\sqrt{3}}{2}$ $a+b=5$ c

19. 12 $P-ABC$ $PA=6$ P ABC

D D PAB E PE AB G.

G AB

E PAC F $PDEF$



20. 12 $\odot M$ $A(\sqrt{3},0)$ $\odot N:(x+\sqrt{3})^2+y^2=16$ $\odot M$ M

C

C

l $B(2,0)$ C PB QB $-\frac{1}{2}$

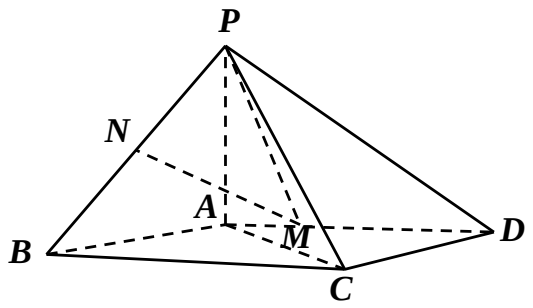
l

21. 12 $P-ABCD$ $PA\perp$ $ABCD$ $AB=AC=AD=3$ $2AM=MD$

N PB $AD//BC$ $MN//$ PCD $PA=2$

BC

$N-PM-D$



22. 12 $O:x^2+y^2=3$ PA O A PB y B

$|PB|=2|PA|$

P E

PA E POA QOA PA

2020-2021

8 5 40 .

1---8 BBDC CAAA

4 5 20 . .

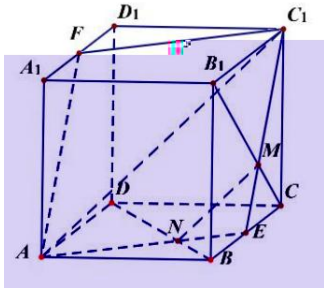
5 0 3 .

9. AC 10. ABD 11. AB 12. BCD

12. A C_1M BC E $\because$ B_1MC_1 CME $\therefore \frac{B_1C_1}{CE}=\frac{B_1M}{MC}=2$

E A_1D_1 F AE AF C_1F

AF C_1E AEC_1F Ω



B AND ENB $\therefore \frac{DN}{NB}=\frac{AD}{BE}=2 \therefore BD=3BN$

C AC_1 $\frac{EM}{MC_1}=\frac{EN}{NA}=\frac{1}{2} \therefore MN//AC_1$

$AC_1 \perp$ B_1CD_1 $\therefore MN \perp$ B_1CD_1

D $\because MN=\frac{1}{3}AC_1=\frac{2\sqrt{3}}{3}$ $S_{B_1CD_1}=\frac{\sqrt{3}}{4}(2\sqrt{2})^2=2\sqrt{3}$ $S_{MCD_1}=\frac{1}{3}S_{B_1CD_1}=\frac{2\sqrt{3}}{3}$

$\therefore V_{C-MND_1}=\frac{1}{3}MN\cdot S_{MCD_1}=\frac{1}{3}\frac{2\sqrt{3}}{3}\frac{2\sqrt{3}}{3}=\frac{4}{9}$ BCD.

4 5 20 2 3 .

13. $\frac{x^2}{8}+\frac{y^2}{4}=1$ $\frac{2\sqrt{26}}{13}$ 14. $\frac{y^2}{16}-\frac{x^2}{48}=1$ 28 15. $\frac{\sqrt{7}}{3}$ 5 16. $16cm^2$ $\frac{25}{2}\pi cm^2$

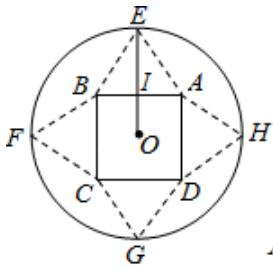
16. OE AB I E,F,G,H P 2 $OI=1$ $IE=3$, $AE=\sqrt{10}$

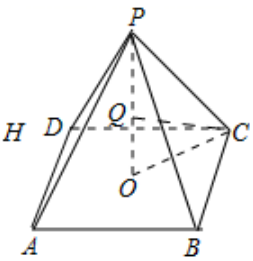
Q R $OC=\sqrt{2}$ $OP=\sqrt{10-2}=2\sqrt{2}$

$R^2=(2\sqrt{2}-R)^2+(\sqrt{2})^2$ $R=\frac{5}{2\sqrt{2}}$

$S=4\pi\times(\frac{5}{2\sqrt{2}})^2=\frac{25}{2}\pi cm^2$

$4\times\frac{1}{2}\times2\times3+2\times2=16cm^2$





6 70 17 10

12

17. $e=\frac{c}{a}=\frac{\sqrt{2}}{2}$ $a=\sqrt{2}c$ AF $k=\frac{0-(-2)}{c-0}=2$ $a=\sqrt{2},c=1,b^2=1$

E $\frac{x^2}{2}+y^2=1$ 4

$l: y=kx+\sqrt{3}$ $M(x_1,y_1)$ $N(x_2,y_2)$ 5

$\begin{cases} y=kx-\sqrt{3} \\ \frac{x^2}{2}+y^2=1 \end{cases}$ $(1+2k^2)x^2+4\sqrt{3}kx+4=0$ 6

$\Delta=(4\sqrt{3}k)^2-16(1+2k^2)>0$ $k^2>1$ $x_1+x_2=-\frac{4\sqrt{3}k}{1+2k^2}$ $x_1x_2=\frac{4}{1+2k^2}$ 8

$$|MN|=\sqrt{1+k^2}\,|x_1-x_2|=\sqrt{1+k^2}\sqrt{(x_1+x_2)^2-4x_1x_2}=\frac{4\sqrt{(1+k^2)(k^2-1)}}{1+2k^2}=\frac{8\sqrt{2}}{7}$$

$17k^4-32k^2-57=0$， $k^2=3$ $-\frac{19}{17}$ $k=\pm\sqrt{3}$ 10

18. $\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$ $2c\cos C=a\cos B+b\cos A$ 2

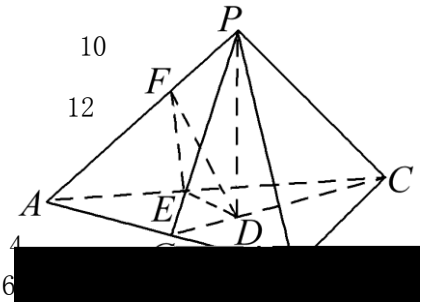
$2\sin C\cos C=\sin A\cos B+\sin B\cos A=\sin(A+B)=\sin C$ $\sin C\neq 0$ $\cos C=\frac{1}{2}$

$C\in(0,\pi)$ $C=\frac{\pi}{3}$ 6

$S_{\triangle ABC}=\frac{1}{2}ab\sin C$ $\frac{3\sqrt{3}}{2}=\frac{1}{2}ab\times\frac{\sqrt{3}}{2}$ $ab=6$ 8

$a+b=5$ $a^2+b^2=(a+b)^2-2ab=5^2-2\times 6=13$ 10

$c^2=a^2+b^2-2ab\cos C=13-2\times 6\times\frac{1}{2}=7$ $c=\sqrt{7}$ 12



19. P ABC D $AB\perp PD$.

D PAB E $AB\perp DE$.

$AB\perp$ PED $AB\perp PG$. 4

$PA=PB$ G AB 6

PAB E PB PA F F E PAC 7

$PB\perp PA$ $PB\perp PC$ $EF//PB$

$EF\perp PA$ $EF\perp PC$ $EF\perp$ PAC F E PAC

CG P ABC D

D ABC G AB D CG $CD=\frac{2}{3}CG$.

$PC\perp$ PAB $DE\perp$ PAB $DE//PC$

$PE=\frac{2}{3}PG$ $DE=\frac{1}{3}PC$.

$PA=6$ $DE=2$ $PE=2\sqrt{2}$. 10

EFP $EF=PF=2$.

$PDEF$ $V=\frac{1}{3}\times\frac{1}{2}\times 2\times 2\times 2=\frac{4}{3}$. 12

20. $\odot M$ R $\odot M$ $A(\sqrt{3},0)$ $\odot N$

$\begin{cases}R=|MA|\\|MN|=4-R\end{cases}$ $|MN|+|MA|=4$ $|NA|<4$ 3

M N A $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b>0)$

$2a=4$ $c=\sqrt{a^2-b^2}=\sqrt{3}$ $a=2$ $b=1$

C $\frac{x^2}{4}+y^2=1$ 5

1 0 BP $k(k\neq 0)$

BP $y=k(x-2)$ 6

$\begin{cases}y=k(x-2)\\\frac{x^2}{4}+y^2=1\end{cases}$ $(1+4k^2)x^2-16k^2x+16k^2-4=0$ 7

$x_1=2$ $x_2=\dfrac{8k^2-2}{1+4k^2}$ P $\left(\dfrac{8k^2-2}{1+4k^2},\dfrac{-4k}{1+4k^2}\right)$ 8

BQ $-\dfrac{1}{2k}$ Q $\left(\dfrac{2-2k^2}{1+k^2},\dfrac{2k}{1+k^2}\right)$ 9

$k\neq\pm\dfrac{\sqrt{2}}{2}$ l $k_{PQ}=\dfrac{3k}{2(1-2k^2)}$

l $y-\dfrac{2k}{1+k^2}=\dfrac{3k}{2(1-2k^2)}\left(x-\dfrac{2-2k^2}{1+k^2}\right)$ 11

$y=\dfrac{3k}{2(1-2k^2)}x-\dfrac{k}{1-2k^2}$ $y=\dfrac{3k}{2(1-2k^2)}\left(x-\dfrac{2}{3}\right)$, l $\left(\dfrac{2}{3},0\right)$

$k=\pm\dfrac{\sqrt{2}}{2}$ l $x=\dfrac{2}{3}$ $\left(\dfrac{2}{3},0\right)$ 12

l $\left(\dfrac{2}{3},0\right)$

2 l l $x=x_1$ $P(x_1,y_1)$ $Q(x_1,-y_1)$

$x_1\neq 2$ $k_{BP}\cdot k_{BQ}=\dfrac{y_1}{x_1-2}\times\dfrac{-y_1}{x_1-2}=-\dfrac{{y_1}^2}{{x_1}^2-4x_1+4}=-\dfrac{1}{2}$

${y_1}^2=\dfrac{{x_1}^2-4x_1+4}{2}$ $\dfrac{{x_1}^2}{4}+{y_1}^2=1$ $x_1\neq 2$ $x_1=\dfrac{2}{3}$ 6

l $x=\dfrac{2}{3}$ l l $y=kx+m$

$\begin{cases} y=kx+m, \\ \dfrac{x^2}{4}+y^2=1 \end{cases}$ $(4k^2+1)x^2+8kmx+4(m^2-1)=0$ 7

$\Delta=(8km)^2-16(4k^2+1)(m^2-1)>0$ $m^2<4k^2+1$

$P(x_1,y_1),Q(x_2,y_2)$ $x_1+x_2=-\dfrac{8km}{4k^2+1}$ $x_1x_2=\dfrac{4(m^2-1)}{4k^2+1}$ 8

$y_1=kx_1+m$ $y_2=kx_2+m$ $y_1y_2=(kx_1+m)(kx_2+m)=\dfrac{m^2-4k^2}{4k^2+1}$

$k_{BP}k_{BQ}=\dfrac{y_1}{x_1-2}\times\dfrac{y_2}{x_2-2}=\dfrac{y_1y_2}{x_1x_2-2(x_1+x_2)+4}=-\dfrac{1}{2}$

$x_1x_2-2\left(x_1+x_2\right)+4=-2y_1y_2$ 10

$\dfrac{4(m^2-1)}{4k^2+1}+\dfrac{16km}{4k^2+1}+4=-\dfrac{2(m^2-4k^2)}{4k^2+1}$ $3m^2+8km+4k^2=0$

$m=-\dfrac{2}{3}k$ $m=-2k$ 11

$m=-\dfrac{2}{3}k$ $m^2<4k^2+1$ l $y=k\left(x-\dfrac{2}{3}\right)$ $\left(\dfrac{2}{3},0\right)$

$m=-2k$ $m^2<4k^2+1$ l $y=k(x-2)$ $(2,0)$

$x=\dfrac{2}{3}$ $\left(\dfrac{2}{3},0\right)$ l $\left(\dfrac{2}{3},0\right)$ 12

21. PC E EN ED NE PBC

$\therefore EN // BC$ M, N, E, D

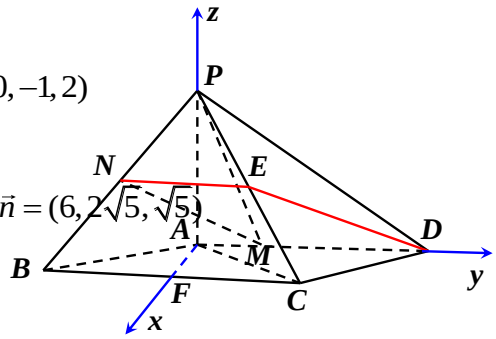
$MN //$ PCD $PCD \cap$ $MNED = ED$ $MN // ED$

$MNED$ $EN = MD = 2$ $BC = 2EN = 4.$ 6

BC F $AB = AC$ $AF \perp BC$ $AF = \sqrt{5}$ $AD // BC$ $\therefore AF \perp AD$

A AF x AD y AP z

PMD $\vec{m} = (1,0,0)$



$B(\sqrt{5},-2,0), M(0,1,0), P(0,0,2), \therefore \overrightarrow{MB} = (\sqrt{5},-3,0), \overrightarrow{MP} = (0,-1,2)$

PBM $\vec{n} = (x, y, z)$

$$\begin{cases} \vec{n} \cdot \overrightarrow{MB} = \sqrt{5}x - 3y = 0 \\ \vec{n} \cdot \overrightarrow{MP} = -y + 2z = 0 \end{cases} \quad y = 2\sqrt{5} \quad \therefore \vec{n} = (6, 2\sqrt{5}, \sqrt{5})$$

$$\therefore \cos\langle \vec{m}, \vec{n} \rangle = \frac{\vec{m} \cdot \vec{n}}{|\vec{m}| \cdot |\vec{n}|} = \frac{6}{1 \times \sqrt{61}} = \frac{6\sqrt{6}}{61}$$

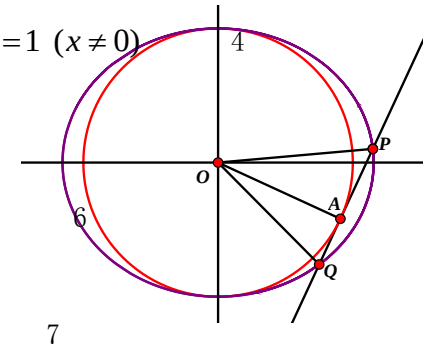
$N - PM - D$ $-\dfrac{6\sqrt{6}}{61}$ 12

22. $P(x, y)$ $|PA|^2 = |PO|^2 - 3 = x^2 + y^2 - 3$ $|PB|^2 = x^2$ 3

$|PB| = 2|PA|$ $|PB|^2 = 4|PA|^2$ $x^2 = 4(x^2 + y^2 - 3)$

$\dfrac{x^2}{4} + \dfrac{y^2}{3} = 1$ P E $\dfrac{x^2}{4} + \dfrac{y^2}{3} = 1 \ (x \neq 0)$ 4

PA 5



$PA: y = kx + m, \ P(x_1, y_1), Q(x_2, y_2)$

PA $\dfrac{|m|}{\sqrt{k^2+1}} = \sqrt{3}, \ m^2 = 3(k^2+1)$ 6

$$\begin{cases} \dfrac{x^2}{4} + \dfrac{y^2}{3} = 1 \\ y = kx + m \end{cases} \quad (3+4k^2)x^2 + 8kmx + (4m^2 - 12) = 0$$ 7

$x_1 + x_2 = \dfrac{-8km}{3+4k^2}, \ x_1 x_2 = \dfrac{4m^2 - 12}{3+4k^2}$ 8

$S_{POA} = 2S_{QOA}$ $\dfrac{1}{2} \times \sqrt{3} \times |PA| = 2\left(\dfrac{1}{2} \times \sqrt{3} \times |QA|\right), |PA| = 2|QA|, |x_1| = 2|x_2|$

$x_1 x_2 = \dfrac{4m^2 - 12}{3+4k^2} = \dfrac{12k^2}{3+4k^2} > 0$ $x_1 = 2x_2$ 10

$$\frac{(x_1+x_2)^2}{x_1 x_2} = \frac{\left(\dfrac{-8km}{3+4k^2}\right)^2}{\dfrac{4m^2-12}{3+4k^2}} = \frac{16k^2m^2}{(3+4k^2)(m^2-3)} = \frac{16(k^2+1)}{3+4k^2} \quad \frac{(x_1+x_2)^2}{x_1 x_2} = \frac{(2x_2+x_2)^2}{2x_2^2} = \frac{9}{2}$$

$\therefore \dfrac{16(k^2+1)}{3+4k^2} = \dfrac{9}{2}$ $k = \pm\dfrac{\sqrt{5}}{2}, m = \pm\dfrac{3\sqrt{3}}{2}$

PA $y = \dfrac{\sqrt{5}}{2}x + \dfrac{3\sqrt{3}}{2}$ $y = \dfrac{\sqrt{5}}{2}x - \dfrac{3\sqrt{3}}{2}$

$y = -\dfrac{\sqrt{5}}{2}x + \dfrac{3\sqrt{3}}{2}$ $y = -\dfrac{\sqrt{5}}{2}x - \dfrac{3\sqrt{3}}{2}$ 12