

# 2019-2020

20200718

1.  $z = \frac{1}{2} + i$ ,  $|z| =$  ?

- A  $\sqrt{5}$       B  $\frac{\sqrt{10}}{2}$       C  $\frac{5}{2}$       D  $\frac{5\sqrt{2}}{4}$

2.  $\vec{AB} = (1, 2)$ ,  $\vec{AC} = (4, 2)$ ,  $|\vec{BC}| =$  ?

- A 5      B 10      C 25      D 50

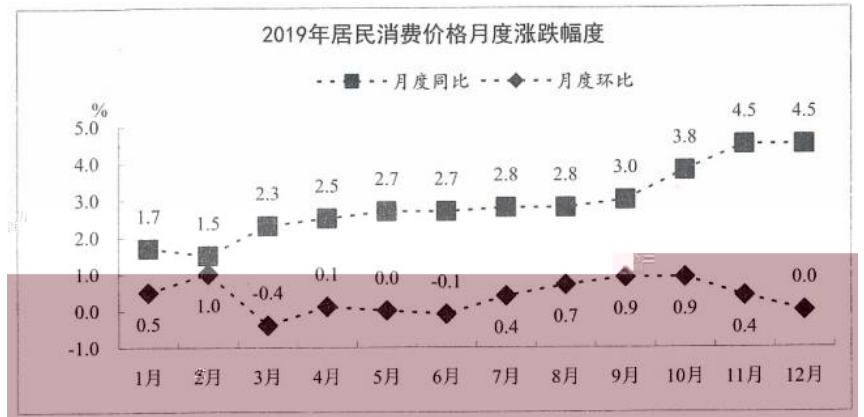
3.  $\frac{2}{3} + \frac{3}{4} =$  ?

- A  $\frac{3}{4}$       B  $\frac{2}{3}$       C  $\frac{5}{7}$       D  $\frac{5}{12}$

4.  $f(x) = (\sin x + \cos x)^2 - \cos 2x$

- A  $f(x) = \cos 2x$       B  $y = f(x)$  的周期为  $\frac{\pi}{8}$   
 C  $f(x) = \cos x$       D  $f(x) = \sqrt{2} \cos x$

5. 2019



- A 2019      B 2018 7      C 2019      D 2019 3

6.

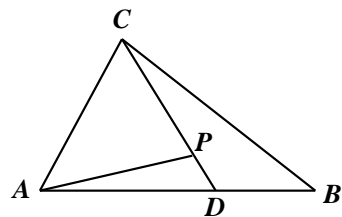
- 8      5      1
- A 14      B 22      C 36      D 66



7.  $\cos \frac{3}{5} \quad \tan \frac{4}{2}$   
 A  $\frac{1}{3}$       B  $\frac{1}{2}$       C 2      D 3

8.  $\frac{50}{80} \quad \frac{70}{60} \quad \frac{75}{70} \quad \frac{75}{90}$        $\bar{x}$   
 $s^2$   
 A  $\bar{x} \quad 70, s^2 \quad 75$       B  $\bar{x} \quad 70, s^2 \quad 75$   
 C  $\bar{x} \quad 70, s^2 \quad 75$       D  $\bar{x} \quad 70, s^2 \quad 75$

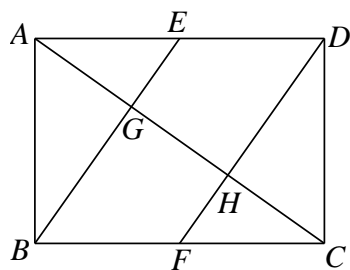
9.  $\frac{ABC}{BAC} = \frac{3}{\overline{AD} \quad 2\overline{DB}} \quad P \quad CD$   
 $\overline{AP} = m\overline{AC} = \frac{1}{2}\overline{AB} \quad (m \quad \mathbf{R}) \quad AC = 3, AB = 4 \quad \overline{AP} \quad \overline{CD}$   
 A 3      B  $\frac{13}{12}$       C  $\frac{13}{12}$       D  $\frac{1}{12}$



10.  $ABCD \quad GD \quad ABCD \quad DGEA \quad DGFC$   
 $EF, FB, BE \quad H \quad BF \quad DE \quad BF \quad EF \quad CH \quad 60^\circ$   
 $EC \quad DBF \quad BF \quad ACFE \quad 45^\circ$   
 A      B      C      D

11.  $ABC, A \quad B \quad C \quad a \quad b \quad c.$   
 A  $\frac{\sin A}{a} = \frac{\cos B}{b}, B = \frac{3}{4}$   
 B  $B = \frac{3}{4}, b = 2, a = \sqrt{3},$   
 C  $b^2 = ac, 2\sin B = \sin A = \sin C \quad ABC$   
 D  $a = 5, c = 2, S_{\triangle ABC} = 4, \cos B = \frac{3}{5}$

12.  $A4 \quad \sqrt{2} \quad AD, BC \quad ABE, CDF$   
 $BE, DF \quad A, C \quad BFDE$   
 A. A, G, H, C  
 B.  $ABE \parallel CDF \quad AC \parallel BFDE$   
 C. A, C      P      PDE      PBF  
 D. A, C      P       $PBE \cap PDF = l \quad l \parallel BFDE$



13.  $\frac{4}{100} \quad \frac{5}{86} \quad \frac{20}{x} \quad \frac{2}{y} \quad \frac{3}{7}$   
 $83$

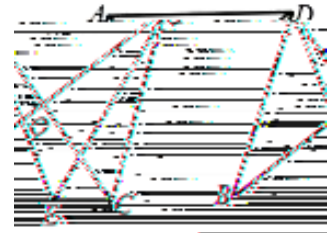
甲	乙
8 9	7 6
5 x 3	8 1 2 y
6 2	9 1 1 6

14.  $P \ ABC \quad AP \ AB \ AC \ \sqrt{2}$

$AD \ DE \ EA \quad \underline{\hspace{2cm}}$ .

15.  $3 \ 3 \ 2 \quad \underline{\hspace{2cm}}$

16.  $ABCD \quad 3 \quad AC \ BD \ O$   
 $|\vec{AC}| \ 2\sqrt{3} \ E \ BC \ (\quad)$   
 $|\vec{EA}| \quad \underline{\hspace{2cm}} \quad \vec{EA} \ \vec{ED} \quad \underline{\hspace{2cm}}$ .



6      70

17      10

17.  $12$

10

2020

500

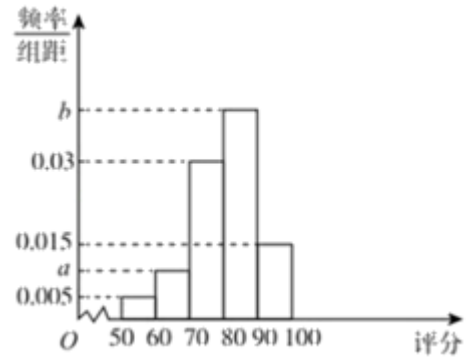
80

0.45

$[60,70) \ [90,100]$

2

2



5

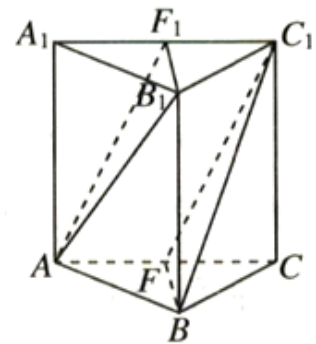
$[60,70)$

18.  $12 \quad ABC \ A_1B_1C_1 \quad ABC \ A_1B_1C_1$

$AA_1 \quad ABC \ F \ F_1 \quad AC \ A_1C_1 \quad \cdot$

$AB_1F_1 \quad C_1BF$

$AB_1F_1 \quad ACC_1A_1$ .



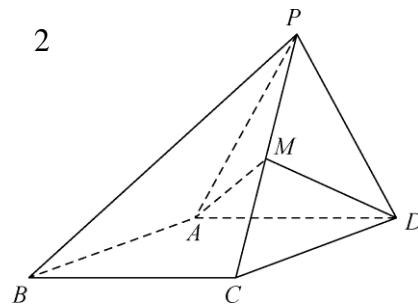
19.  $12 \quad ABC \quad A, B, C$

$a \sin B \ b \sin A \ \frac{1}{3}$

A

$D \ BC \quad AD \ BD \ 2 \ CD \ 3 \quad ADC$

20. 12  $P \ ABCD \ PAD \ 2$   
 $ABCD \ ABC \ 60^\circ \ M \ PC$   
 $PC \ AD$   
 $PB \ Q \ A, Q, M, D$   
 $Q$   
 $D \ PAM$

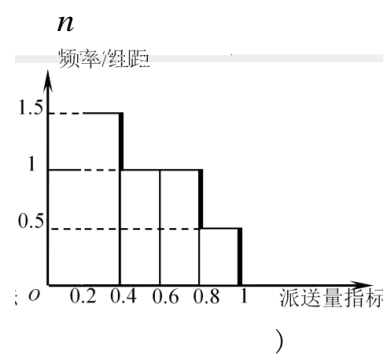


21. 12  $f(x) = 2\cos^2 x - 2\sqrt{3}\sin x \cos x, x \in \mathbf{R}$ .  
 $f(x)$

$x_1, x_2 \in \max\{x_1, x_2\} \quad \begin{matrix} x_1 & x_1 & x_2 \\ x_2 & x_1 & x_2 \end{matrix} \quad g(x) = \max\{\sqrt{3}a \sin x, a \cos x\}, x \in \mathbf{R}$   
 $a > 0 \quad x_1 \in \mathbf{R} \quad x_2 \in \mathbf{R} \quad g(x_1) < f(x_2) \quad a$

22. 12  
 100 1 140 54 54  
 20 .

$y$   
 100  
 100  
 $(\frac{n-1}{5}, \frac{n}{5}] (n = 1, 2, 3, 4, 5)$   
 $50 \leq 2n$   
 100 ( )



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12

5

60

1

10

11 12

BADCD BDACB AC BCD

9.  $\therefore \overline{AD} = 2\overline{DB}, \overline{AB} = \frac{3}{2}\overline{AD}$   $\overline{AP} = m\overline{AC} = \frac{1}{2}\overline{AB} = m\overline{AC} = \frac{3}{4}\overline{AD}$

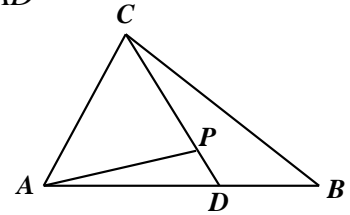
$P, C, D$   $m = \frac{3}{4}$   $1, m = \frac{1}{4}$

$\overline{AP} = \frac{1}{4}\overline{AC} = \frac{3}{4}\overline{AD}$   $\overline{CD} = \overline{AD} - \overline{AC} = \overline{AD}^2 - 9\overline{AD}^2 = \frac{64}{9}$

$\overline{AC} \cdot \overline{AD} = |\overline{AC}| \cdot |\overline{AD}| \cos 60^\circ = 3 \cdot \frac{8}{3} \cdot \frac{1}{2} = 4$

$\overline{AP} \cdot \overline{CD} = \frac{1}{4}\overline{AC} \cdot \frac{3}{4}\overline{AD} = \overline{AD} \cdot \overline{AC} = \frac{3}{4}\overline{AD}^2 = \frac{1}{4}\overline{AC}^2 = \frac{1}{2}\overline{AC} \cdot \overline{AD}$

$\frac{3}{4} \cdot \frac{64}{9} = \frac{1}{4} \cdot 9 = \frac{1}{2} \cdot 4 = \frac{13}{12}$



10.

$\therefore \angle DEF = \angle DEF = 60^\circ$

$DE \parallel CH$   $\angle EF = \angle CH = 60^\circ$

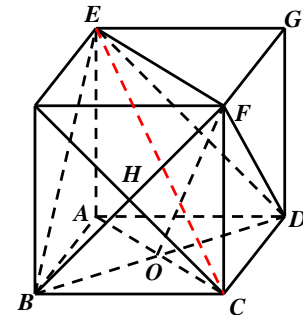
$BD \perp AC, BD \perp AE, AC \cap AE = A$   $BD \perp$   $ACFE$

$BD \perp EC$   $BF \perp EC$   $BD \cap BF = B$

$EC \perp$   $DBF$

$AC \cap BD = O$   $BO \perp$   $ACFE$   $BFO \perp$   $BF \perp$   $ACFE$

$2 \cdot BO = \sqrt{2}, OF = \sqrt{6}, \tan \angle BFO = \frac{BO}{OF} = \frac{\sqrt{3}}{3}$



12.

$\angle ABE = \tan \angle ABE = \frac{\sqrt{2}}{2}$   $\angle ACD = \tan \angle CAD = \frac{\sqrt{2}}{2}$   $\angle ABE = \angle DAC$

$AC \perp BE$   $AC \perp DF$   $BE \perp$   $AGH$   $DF \perp$   $CHG$

$DF \perp BE$   $AGH \perp$   $CHG$

$AGH \perp$   $CHG$   $ACGH \perp$   $A$

$ABE \cap AGHC = AG$   $CDF \cap AGHC = CH$

$ABE \parallel CDF$   $AG \parallel CH$   $AG = CH$

$AGHC \perp$   $AC \perp$   $GH \perp$   $AC \parallel$   $BFDE$   $B$

$PE \perp DE = 1$   $PD = \sqrt{2}$   $PE \perp DE$   $PE \perp BF$   $PE \perp PB$   $BF \cap PB = B$

$PE \perp$   $PBF$   $PDE \perp$   $PBF$   $C$

$BE \perp DF$   $BE \perp$   $PBE \perp$   $DF \perp$   $PBE \perp$   $DF \perp$   $PBE$

$PDF \cap PBE = l$   $l \perp$   $DF \perp$   $l \perp$   $BEDF \perp$   $l \perp$   $BEDF \perp$   $D$

$4$   $5$   $20$   $2$   $3$

13. 8

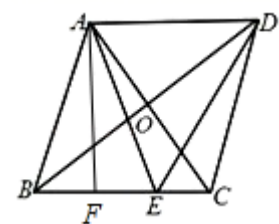
14.  $\sqrt{3} = 1$  15. 11  $\frac{11\sqrt{11}}{6}$  16.  $2\sqrt{2}, 2\sqrt{3}$   $\frac{23}{4}$

16.

$OC = \sqrt{3}$   $BO = \sqrt{6}$

(1)  $AF \perp BC$   $AF = \frac{2\sqrt{3}}{3}$   $\sqrt{6} = 2\sqrt{2}$   $AE$

$E \perp C$   $AE$   $2\sqrt{2} = AE = 2\sqrt{3}$





$$B = 0, \frac{2}{3} \quad \angle BAD = \angle ADC = 2, \quad \angle DAC = \frac{2}{3}, \quad \angle ACD = \frac{2}{3} \quad 6$$

$$\frac{AD}{\sin \frac{2}{3}} = \frac{CD}{\sin \frac{2}{3}} = \frac{AD}{\sin \frac{2}{3}} = \frac{3}{\sin \frac{2}{3}} = \frac{2}{\sin \frac{2}{3}} \quad 7$$

$$\frac{\frac{3}{2} \cos \frac{1}{2} \sin \frac{\sqrt{3}}{2}}{\frac{1}{2} \sin \frac{\sqrt{3}}{2} \cos \frac{1}{2}} = \sin \frac{\sqrt{3}}{5} \cos \frac{1}{2} \quad 8$$

$$\sin^2 \frac{1}{2} \cos^2 \frac{1}{2} = 1 \quad \sin \frac{\sqrt{21}}{14}, \cos \frac{5\sqrt{7}}{14} \quad 9$$

$$\sin 2 \frac{1}{2} = 2 \sin \frac{1}{2} \cos \frac{1}{2} = \frac{5\sqrt{3}}{14} \quad 10$$

$$S_{ADC} = \frac{1}{2} AD \cdot CD \cdot \sin \angle ADC = \frac{1}{2} \cdot 2 \cdot 3 \cdot \frac{5\sqrt{3}}{14} = \frac{15\sqrt{3}}{14} \quad 12$$

$$\cos \angle ADB = \cos \angle ADC = 0 \quad \frac{4}{2} \frac{4}{2} \frac{c^2}{2} = \frac{4}{2} \frac{9}{2} \frac{b^2}{3}$$

$$2b^2 - 3c^2 = 50 \quad 8$$

$$a^2 = b^2 + c^2 - 2bc \cos A \quad b^2 = c^2 + bc - 25 \quad 9$$

$$2c^2 - 2bc = 0 \quad c = 2b \quad b^2 = \frac{25}{7} \quad 11$$

$$S_{ADC} = \frac{3}{5} S_{ABC} = \frac{3}{5} \cdot \frac{1}{2} bc \sin A = \frac{3}{5} b^2 \sin A = \frac{3}{5} \cdot \frac{25}{7} \cdot \frac{\sqrt{3}}{2} = \frac{15\sqrt{3}}{14}$$

20.

$$AD \perp OC \quad \angle ABCD = \angle ABC = 60^\circ$$

$$\begin{aligned} & \angle ACD = \angle OC = \angle AD \\ & \angle PAD = \angle OP = \angle AD. \quad 2 \\ & OC \cap OP = O \quad \angle POC \end{aligned}$$

$$\begin{aligned} & AD \perp POC \quad PC \perp POC \quad PC \perp AD. \quad B \\ & \quad Q \perp PB \quad A, Q, M, D \end{aligned}$$

$$\begin{aligned} & PB \perp Q \\ & M \perp PC \quad QM \parallel BC \quad 6 \end{aligned}$$

$$AD \parallel BC \quad QM \parallel AD \quad A, Q, M, D \quad 8$$

$$D \perp PAM \quad D \perp PAC \quad d \perp PO \perp AD$$

$$PAD \perp ABCD \quad AD \perp PO \perp PAD$$

$$PO \perp ABCD \quad PO \perp P \perp ACD \quad 9$$

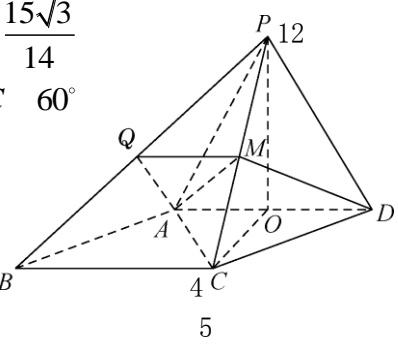
$$V_{P-ACD} = V_{D-PAC} = PO \cdot S_{ACD} = d \cdot S_{PAC} \quad 10$$

$$\text{Rt } \triangle POC \quad PO = OC = \sqrt{3} \quad PC = \sqrt{6} \quad PAC \quad PA = AC = 2, PC = \sqrt{6}$$

$$S_{PAC} = \frac{1}{2} PC \cdot AM = \frac{\sqrt{15}}{2}, \quad \sqrt{\quad} \quad \angle$$

$$\sqrt{3} \cdot \sqrt{3} = d \cdot \frac{\sqrt{15}}{2} = d \cdot \frac{2\sqrt{15}}{5} \quad 12$$

$$D \perp PAM \quad \frac{2\sqrt{15}}{5}$$



21.  $f(x) = \cos 2x - 2\sqrt{3} \sin x \cos x + 1 = \cos 2x - \sqrt{3} \sin 2x + 1 = 2 \sin 2x - \frac{1}{6} + 1 = 2$

$T = \frac{2}{2} = \frac{2}{2}$  3

$2x = \frac{2}{6} = \frac{2}{2} = 2k, \frac{2}{2} = 2k \quad k \in \mathbf{Z} \quad x = \frac{1}{3}k, \frac{1}{6}k \quad k \in \mathbf{Z}$

$f(x) = 2 \sin 2x - \frac{1}{6} + 1 = 2 \sin 2x + \frac{5}{6}$  5

$x_1 \in \mathbf{R} \quad x_2 \in \mathbf{R} \quad g(x_1) = f(x_2)$

$y|y = g(x) \quad y|y = f(x)$  6

$f(x) = 2 \sin 2x + \frac{5}{6}$  7

$g(x) = \max \sqrt{3}a \sin x, a \cos x$

$\sqrt{3}a \sin x = a \cos x \quad 2k, \frac{7}{6} = 2k \quad g(x) = \sqrt{3}a \sin x = \frac{\sqrt{3}}{2}a, \sqrt{3}a$

$a \cos x = \sqrt{3}a \sin x \quad 2k, \frac{1}{6} = 2k \quad g(x) = a \cos x = \frac{\sqrt{3}}{2}a, a$

$g(x) = \frac{\sqrt{3}a}{2}, a$  10

$a = 0$

$\frac{\sqrt{3}}{2}a = 0, \frac{2\sqrt{3}}{3}$

$\sqrt{3}a = 3$

$a = 0, \frac{2\sqrt{3}}{3}$  12

22.  $y = n - 100$  2

$140,0 = n - 54$

$y = 20n - 940, n = 54$  4

$\bar{x} = 0.1 \quad 0.2 \quad 0.3 \quad 0.3 \quad 0.5 \quad 0.2 \quad 0.7 \quad 0.2 \quad 0.9 \quad 0.1 \quad 0.44$  6

$P(X)$	0.2	0.3	0.2	0.2	0.1
$X$	152	154	156	158	160