

暑假班高二数学[参考答案]

第1讲：初中平面向量衔接

1. C; 2. D; 3. A; 4. B; 5. B; 6. A; 7. $\frac{3}{2}$; 8. $2\vec{a}-\vec{b}$; 9. ± 1 ; 10. 1:2; 11. 3; 12. $\frac{4}{3}$;
13. $\vec{AF} = \frac{2}{3}\vec{a} + \frac{1}{3}\vec{b}$; 14. $|\vec{BC}|_{\max} = \sqrt{41}, |\vec{BC}|_{\min} = \sqrt{5}$; 15. $k = \pm 2$;

第2讲：向量的坐标及其表示

1. A; 2. D; 3. C; 4. C; 5. C; 6. C; 7. $\lambda_1\lambda_2 = 1$; 8. $\frac{\pi}{4}$; 9. (2,5); 10. (-1,2); 11. $\frac{1}{3}$; 12. $-\frac{21}{2}\vec{a}-15\vec{b}$.
13. $y = 2, \vec{PQ} = (-1,1)$; 14. 略; 15. $\vec{a} = (\sqrt{2}, \sqrt{2}), \vec{b} = (-\frac{3}{2}, \frac{3}{2}\sqrt{3}), \vec{c} = (2\sqrt{3}, -2)$.

第3讲：向量的数量积

1. C; 2. D; 3. D; 4. A; 5. A; 6. A; 7. $\frac{\pi}{3}$; 8. $\frac{7}{12}$; 9. 18; 10. -3; 11. 18 或 $\frac{9}{2}$; 12. $\frac{5}{2}$.
13. $\theta = \frac{2\pi}{3}, |\vec{a}+\vec{b}| = \sqrt{13}, |\vec{a}-\vec{b}| = \sqrt{37}$; 14. $|\vec{a}+\vec{b}| = \frac{3}{2}, A = [-\frac{\sqrt{2}}{2}-2, \frac{\sqrt{2}}{2}-2]$.
15. $T = \pi$, 减区间 $[k\pi - \frac{\pi}{6}, k\pi + \frac{\pi}{3}], k \in Z, b = 3, c = 2$.

第4讲：平面向量基本分解定理

1. D; 2. B; 3. A; 4. B; 5. A; 6. A; 7. 不共线, 不共线; 8. $-\frac{4}{5}\vec{a}-\frac{3}{10}\vec{b}$; 9. 0; 10. $\frac{2\pi}{3}$; 11. -1;
12. $\frac{2}{3}\vec{a} + \frac{1}{3}\vec{b}$; 13. $x = \frac{1}{3}, y = \frac{1}{3}$; 14. $\vec{GK} = -\frac{1}{4}\vec{b}, \vec{AH} = \frac{2}{5}\vec{a} + \frac{4}{5}\vec{b}$; 15. $\frac{1}{7}\vec{a} + \frac{3}{7}\vec{b}$.

第5讲：向量的应用

1. B; 2. C; 3. D; 4. -16; 5. $3\sqrt{2}$; 6. 4; 7. $\frac{5}{4}$; 8. -6; 9. $-\frac{4}{9}$; 10. $2\sqrt{2}$; 11. $[\frac{\pi}{6}, \frac{5\pi}{6}]$; 12. $\sqrt{13}$;
13. $\frac{\pi}{6}$; 14. $\frac{\pi}{2}$; 15. $k = f(t) = \frac{1}{4}(t^3 - 3t), t \neq 0$.

第6讲：平面向量的综合提升与复习

1. $\frac{\pi}{4}$; 2. 钝角; 3. $\sqrt{3}$; 4. 10; 5. $\sqrt{2}$; 6. $\frac{\sqrt{3}}{3}$; 7. $|\vec{BC}| = 4\sqrt{2}, |\vec{AD}| = 2\sqrt{10}, t = -\frac{11}{5}$;

8. $k = f(t) = \frac{t^2 - t - 5}{t + 2}, t \neq -2, k_{\min} = -3$; 9. -2; 10. $\sqrt{29}$; 11. C.

第7讲：阶段测试(平面向量)

1. $(\frac{\sqrt{5}}{5}, \frac{2\sqrt{5}}{5}), (-\frac{\sqrt{5}}{5}, -\frac{2\sqrt{5}}{5})$; 2. -1; 3. $\frac{\sqrt{2}}{2}$; 4. $\frac{1}{2}$; 5. 7; 6. $\sqrt{21}$; 7. $\frac{\pi}{3}$; 8. $\frac{\pi}{3}$; 9. 1; 10. -3;
 11. $\frac{5}{2}$; 12. 1; 13. $\frac{1}{5}\vec{m} + \frac{2}{5}\vec{n}$; 14. $-\frac{1}{2}$; 15. -5; 16. 2; 17. $\frac{1}{3}$ 或 $\frac{3}{5}$; 18. $\frac{7}{3}$; 19. 4:3; 20. $-\frac{4}{3}$;
 21. 4; 22. $\frac{\sqrt{3}}{4}$; 23. 1; 24. $-\frac{4}{7}$; 25. 2.

第8讲：矩阵的概念及矩阵的运算

1. $\begin{pmatrix} -1 & 0 \\ -2 & -1 \end{pmatrix}$; 2. $\begin{pmatrix} 10 & 4 \\ 24 & 10 \end{pmatrix}$; 3. $\begin{cases} x=1, \\ y=1 \end{cases}$.

第9讲：二阶行列式与三阶行列式

1. (1)无解; (2)唯一解; (3)唯一解;

2. 当 $m \neq \pm 2$ 时, 原方程组有唯一解 $\begin{cases} x = \frac{m}{m+2} \\ y = \frac{m+1}{m+2} \end{cases}$; 当 $m = -2$ 时, 原方程组无解; 当 $m = 2$ 时, 原方

程组有无穷多解, 此时原方程组的解可表示为 $\begin{cases} x = t \\ y = \frac{2-t}{2} \end{cases} (t \in R)$.

3. $x = 2$; 4. -1; 5. 2

第10讲：数学归纳法及其应用

1. 证明: (i) 当 $n=1$ 时, 左边 $= 1^2 = 1$, 右边 $= \frac{1 \cdot (1+1) \cdot (2 \cdot 1 + 1)}{6}$, 等式成立;

(ii) 假设当 $n=k$ 时, 等式成立, 即 $1^2 + 2^2 + 3^2 + \dots + k^2 = \frac{k(k+1)(2k+1)}{6}$

则当 $n=k+1$ 时, 左边 $= 1^2 + 2^2 + 3^2 + \dots + k^2 + (k+1)^2$

$$\begin{aligned}
&= \frac{k(k+1)(2k+1)}{6} + (k+1)^2 = \frac{1}{6}(k+1)[k(2k+1) + 6(k+1)] \\
&= \frac{1}{6}(k+1)(2k^2 + 7k + 6) = \frac{1}{6}(k+1)[(k+1) + 1][2(k+1) + 1]
\end{aligned}$$

=右边, 即当 $n=k+1$ 时等式也成立.

.由(i),(ii)可知, $n \in N^*$ 时, 等式成立.

2. 略; 3. C; 4. C; 5. $1+2+3+\cdots+k+1$; 6. $a_1=3, a_2=5, a_3=7, a_n=2n+1$.

第 11 讲: 数列的极限

1. (1) 0; (2) 3; (3) $\frac{2}{3}$; (4) 0; 2. (1) 2; (2) $\frac{7}{5}$; 3. (1) 5; (2) $-\frac{2}{3}$; 4. 1; 5. 3; 6. $\frac{1}{2}$; 7. $\frac{3\pi l^2}{32}$;
8. $(\frac{4}{5}, \frac{2}{5})$; 9. $A = \arctan \frac{1}{2}, BC = \frac{1}{2}a$.

第 12 讲: 无穷等比数列各项和

1. $\frac{4}{3}$; 2. 2; 3. $(\frac{4}{5}, \frac{2}{5})$.

第 13 讲: 阶段测试(数列的综合)

1. D; 2. C; 3. B; 4. D; 5. B; 6. A; 7. 2000; 8. 10; 9. 25; 10. $\frac{67}{66}$; 11. (1) $a_n = \frac{1}{3^n}$; (2) $\frac{-2n}{n+1}$;
12. (1) $a_n = n+2$; (2) $\frac{\tan(n+3) - \tan 3}{\tan 1} - n$.

第 14 讲: 数列的递推

1. $a_n = \frac{3n-2}{2n}$; 2. $a_n = 2^n - 1$; 3. $a_n = \frac{3}{2^n} - \frac{2}{3^n}$; 4. $a_n = 2 \times 3^n - n - 1$; 5. $a_n = \frac{(-5)^n - 4}{(-5)^n + 2}$;
6. $a_n = \frac{1}{3}(4^n - 1)$; 7. (1) $b_n - b_{n-1} = 2n - 8, b_n = n^2 - 7n - 8$; (2) $n = 8$ 或 9 ;
8. (1) $a_n = \frac{1}{2n+1}$; (2) $T_n = \begin{cases} -n^2 + 18n, & 1 \leq n \leq 8, \\ n^2 - 18n + 162, & n \geq 9 \end{cases}$.

第 15 讲：数列的求和

1. $a_n = 2n - 1$; 2. $S_n = \frac{1}{d} \cdot \left(\frac{1}{a_1} - \frac{1}{a_{n+1}} \right)$; 3. $S_n = 2 - \frac{n+2}{2^n}$;

4.(1) $a_n = 3n + 2$; (2) $S_n = 6 \times 2^n + 2n - 6$; 5.(1) $a_n = \frac{1}{3^n}$; (2) $T_n = \frac{-2n}{n+1}$;

6.(1) $a_n = 3^{\frac{1}{2}n(n-1)}$; (2) $T_n = \begin{cases} 2, n=1, \\ 3, n=2, \\ \frac{1}{2}n^2 - \frac{5}{2}n + 6, n \geq 3 \end{cases}$;

7.(1) $b_n = \frac{1}{4^n}$; (2) $S_n = \frac{2}{3} - \frac{3n+2}{3 \cdot 4^n}$; (3) $m \leq -5$ 或 $m \geq 1$; 8. 存在 $b_n = 3n + 1$.

第 16 讲：数列综合复习

1. $\frac{1}{3}(4^n - 1)$; 2.(1) $a_n = 2^n$; (2) $S_n = n^2 + n$; 3.(1) $a_n = \frac{1}{2^{n-1}}$; (2) $T_n = 8 - \frac{3n+4}{2^{n-1}}$;

4.(1) $\left\{ \frac{a_n}{n} \right\}$ 是以 $\frac{1}{3}$ 为公比的等比数列; (2) $(a_n)_{\max} = a_1 = 1$, 没有最小项;

5.(1) $\{a_n - 1\}$ 是以 2 为公比的等比数列; (2) $T_n = \frac{n}{n+1}$;

6.(1) $\{a_{n+1} - a_n\}$ 是以 2 为公比的等比数列; (2) $S_n = 2^{n+1} - n - 2$; 7. B.