



参考答案

1	2	3	4	5	6	7	8	9	10	11	12
A	C	A	C	B	D	A	B	B	C	B	D

13. 答案: -7 。

14. 答案: 6 。

15. 答案: $2\sqrt{2}$ 。

16. 答案: $\frac{2\sqrt{3}}{3}$ 。

17: (1) $b_1=1, b_2=2, b_3=4$; (2) $\frac{b_{n-1}}{b_n}=2$; (3) $a_n = n \cdot 2^{n-1}$

18: (1) $AB \perp CA, AB \perp DA \Rightarrow AB \perp \text{平面} ACD \Rightarrow \text{平面} ACD \perp \text{平面} ABC$;

(2) ① $BC=3\sqrt{2}$;

② $DC \perp \text{平面} ABC$;

③ 过点 Q 作 $QN \perp AC$ 于点 N, 可得 $QN \perp \text{平面} ABC$

$QN=1$

$S_{\triangle ABP}=3 \Rightarrow V_{Q-ABP}=1$

19: (1) 作图 (2) 0.48; (3) 47.45

20: ① 当 $l \perp x$ 轴, 令 $x=2$, 则 $y=\pm 2$, 则 M (2,2) 或 M (2, -2) $\therefore B(-2,0)$

$\therefore BM$ 方程为 $y = \frac{1}{2}x + 1$ (当 M 为 (2,2) 时), 或 $y = -\frac{1}{2}x - 1$ (当 M 为 (2,-2) 时)

② 令 $M(x_1, y_1), N(x_2, y_2)$ 则 $k_{BM} = \frac{y_1}{x_1 + 2}, k_{BN} = \frac{y_2}{x_2 + 2}$

设过 A 的直线 l 为 $x = ky + 2$, 代入 $y^2 = 2x$ 得

$$y^2 = 2(ky + 2)$$

$$y^2 - 2ky - 4 = 0$$

$$\text{得 } y_1 + y_2 = 2k \quad y_1 \cdot y_2 = -4$$

$$\Delta = 4k^2 + 16 > 0$$

$$k_{BM} + k_{BN} = \frac{y_1}{x_1 + 2} + \frac{y_2}{x_2 + 2} = \frac{y_1}{ky_1 + 2} + \frac{y_2}{ky_2 + 2} = \frac{2ky_1y_2 + 2(y_1 + y_2)}{k^2y_1y_2 + 2k(y_1 + y_2) + 4} = \frac{-8k + 8k}{k^2y_1y_2 + 2k(y_1 + y_2) + 4} = 0$$

$$\therefore k_{BM} = -k_{BN}$$

$$\therefore \angle ABM = \angle ABN$$





$$21: f(x) = ae^x - \ln x - 1$$

$$f'(x) = ae^x - \frac{1}{x}, (x > 0)$$

$$\because f'(2) = ae^2 - \frac{1}{2} = 0$$

$$\therefore a = \frac{1}{2e^2}$$

$$\therefore f(x) = \frac{1}{2}e^{x-2} - \ln x - 1, f'(x) = \frac{1}{2}e^{x-2} - \frac{1}{x}$$

当 $0 < x < 2$ 时, $f'(x) < 0$, 函数单调递减

当 $x > 2$ 时, $f'(x) > 0$, 函数单调递增

(2)

当 $a \geq \frac{1}{e}$ 时, 因为 $e^x > 0$

$$\therefore f(x) = ae^x - \ln x - 1 \geq \frac{1}{e} \cdot e^x - \ln x - 1 = e^{x-1} - \ln x - 1$$

$$\text{令 } g(x) = e^{x-1} - \ln x - 1$$

$$g'(x) = e^{x-1} - \frac{1}{x} \because g'(1) = e^0 - 1 = 0$$

且当 $0 < x < 1$ 时, $e^{x-1} - \frac{1}{x} < 0$

当 $x \geq 1$ 时, $e^{x-1} - \frac{1}{x} \geq 0$

$\therefore x = 1$ 是 $g(x)$ 极小值点

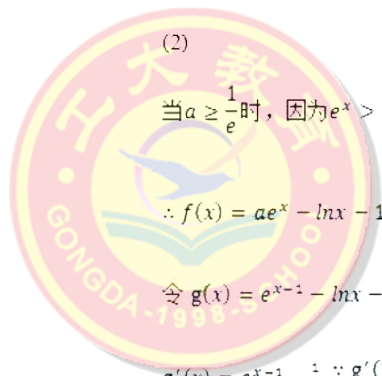
$$\therefore g(x)_{\min} = g(1) = e^{1-1} - \ln 1 - 1 = 0$$

即 $g(x) \geq 0$

$$\therefore f(x) \geq g(x) \geq 0$$

$$22: (1) x^2 + y^2 + 2x - 3 = 0;$$

$$(2) y = -\frac{4}{3}|x| + 2$$



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