

REG-ST-2425-ASM-SET 1-MATH

建議題解

多項選擇題

1. C	2. A	3. B	4. B	5. B
6. B	7. A	8. B	9. B	10. B
11. D	12. C	13. A	14. D	15. C
16. C	17. B	18. D	19. A	20. D
21. B	22. C	23. D	24. B	25. C
26. B	27. D	28. A	29. D	30. B

1. C

$$\begin{aligned}
 12\sqrt{3} &= 2 \times \frac{1}{2}(AB)(AD) \sin 120^\circ \\
 &= AB(6) \cdot \frac{\sqrt{3}}{2} \\
 AB &= 4
 \end{aligned}$$

2. A

$$\begin{aligned}
 \frac{1}{2}(10)(8) \sin \theta &= 20 \\
 \sin \theta &= \frac{1}{2} \\
 \theta &= 30^\circ \quad \text{或} \quad 150^\circ \quad (\text{捨去})
 \end{aligned}$$

3. B

$$\begin{aligned}
 \text{所求面積} &= \frac{1}{2}(4)(6) \sin 60^\circ \\
 &= 12 \left(\frac{\sqrt{3}}{2} \right) \\
 &= 6\sqrt{3} \text{ cm}^2
 \end{aligned}$$

4. B

$$\begin{aligned}
 \angle AOB &= \angle BOC = \angle COA = 120^\circ \\
 \text{所求面積} &= 6^2\pi - 3 \times \frac{1}{2}(6)(6) \sin 120^\circ \\
 &\approx 66.3 \text{ cm}^2
 \end{aligned}$$

5. B

$$\begin{aligned}
 \text{設 } OA &= r \text{ cm}。 \\
 r^2\pi \times \frac{60^\circ}{360^\circ} - \frac{1}{2}r^2 \sin 60^\circ &= 10 \\
 r &\approx 10.5
 \end{aligned}$$

6. B

$$\frac{1}{2}(AB)(BC) \sin 80^\circ = 80$$

$$\frac{1}{2}(AB) \left(\frac{3AB}{2} \right) \sin 80^\circ = 80$$

$$AB \approx 10.4 \text{ cm}$$

7. A

留意 $\sin 70^\circ = \sin 110^\circ$ 。

$$\triangle ABD \text{ 的面積} = \frac{1}{2}(EA)(EB) \sin 110^\circ + \frac{1}{2}(EA)(ED) \sin 70^\circ$$

$$= \frac{1}{2}(EA)(EB) \sin 70^\circ + \frac{1}{2}(EA)(ED) \sin 70^\circ$$

$$= \frac{1}{2}(EA)(EB + ED) \sin 70^\circ$$

$$= \frac{1}{2}(EA)(BD) \sin 70^\circ$$

$$\triangle BCD \text{ 的面積} = \frac{1}{2}(EB)(EC) \sin 70^\circ + \frac{1}{2}(EC)(ED) \sin 110^\circ$$

$$= \frac{1}{2}(EC)(EB + ED) \sin 70^\circ$$

$$= \frac{1}{2}(EC)(BD) \sin 70^\circ$$

$$\text{所求面積} = \frac{1}{2}(EA)(BD) \sin 70^\circ + \frac{1}{2}(EC)(BD) \sin 70^\circ$$

$$= \frac{1}{2}(EA + EC)(BD) \sin 70^\circ$$

$$= \frac{1}{2}(AC)(BD) \sin 70^\circ$$

$$\approx 19.7 \text{ cm}^2$$

8. B

留意 $EA = EC = 3 \text{ cm}$ 。

$$\text{所求面積} = \frac{1}{2}(5)(3) \sin 120^\circ$$

$$= \frac{15}{2} \left(\frac{\sqrt{3}}{2} \right)$$

$$= \frac{15\sqrt{3}}{4} \text{ cm}^2$$

9. B

$$\angle BAC = 180^\circ - 90^\circ - 60^\circ = 30^\circ$$

$$AE = 6 \cos 30^\circ = 3\sqrt{3} \text{ cm}$$

$$AD = BC = \frac{6}{\tan 60^\circ} = 2\sqrt{3} \text{ cm}$$

$$\angle DAE = \angle ACB = 60^\circ$$

$$\text{所求面積} = \frac{1}{2}(AD)(AE) \sin 60^\circ$$

$$= \frac{9\sqrt{3}}{2} \text{ cm}^2$$

10. B

$$BC = 36 - 8 - 16$$

$$= 12 \text{ cm}$$

$$\text{設 } s = \frac{8 + 12 + 16}{2} = 18 \text{ cm} \circ$$

$$\begin{aligned} \text{所求面積} &= \sqrt{18(18-8)(18-12)(18-16)} \\ &= 12\sqrt{15} \text{ cm}^2 \end{aligned}$$

11. D

$$\text{設 } s = \frac{5 + 6 + 7}{2} = 9 \text{ cm} \circ$$

$$\begin{aligned} \text{底面積} &= \sqrt{9(9-5)(9-6)(9-7)} \\ &= \sqrt{216} \end{aligned}$$

$$= 6\sqrt{6} \text{ cm}^2$$

$$\begin{aligned} \text{所求面積} &= 2(6\sqrt{6}) + (5)(8) + (6)(8) + (7)(8) \\ &= (144 + 12\sqrt{6}) \text{ cm}^2 \end{aligned}$$

12. C

$$AC = \sqrt{10^2 + 24^2}$$

$$= 26 \text{ cm}$$

$$\text{設 } s = \frac{11 + 25 + 26}{2} = 31 \text{ cm} \circ$$

$$\begin{aligned} \text{所求面積} &= \sqrt{31(31-25)(31-11)(31-26)} \\ &\approx 136.4 \text{ cm}^2 \end{aligned}$$

13. A

$$\text{設 } s = \frac{9 + 9 + 12}{2} = 15 \text{ cm} \circ$$

$$\begin{aligned} \text{所求面積} &= \sqrt{15(15-9)^2(15-12)} \\ &= 18\sqrt{5} \text{ cm}^2 \end{aligned}$$

14. D

$$a = 36 \times \frac{3}{3+4+5} = 9 \text{ cm}$$

$$b = 9 \times \frac{4}{3} = 12 \text{ cm} \text{ 及 } c = 9 \times \frac{5}{3} = 15 \text{ cm}$$

$$\text{設 } s = \frac{a+b+c}{2} = 18 \text{ cm} \circ$$

$$\begin{aligned} \text{面積} &= \sqrt{18(18-9)(18-12)(18-15)} \\ &= 54 \text{ cm}^2 \end{aligned}$$

15. C

$$\frac{\sin \angle BAC}{14} = \frac{\sin 35^\circ}{10}$$

$$\angle BAC \approx 53.4^\circ \text{ 或 } 127^\circ$$

可構成 2 個三角形。

16. C

$$\frac{BP}{\sin x} = \frac{AB}{\sin \angle APB} \quad \text{及} \quad \frac{PC}{\sin y} = \frac{AC}{\sin \angle APC}$$

$$BP = \frac{AB \sin x}{\sin \angle APB} \quad PC = \frac{AC \sin y}{\sin \angle APC}$$

留意 $\sin \angle APB = \sin \angle APC$ 。

$$\begin{aligned} \frac{BP}{PC} &= \frac{AB \sin x}{\sin \angle APB} \div \frac{AC \sin y}{\sin \angle APC} \\ &= \frac{\sin x}{\sin y} \end{aligned}$$

$$BP : PC = \sin x : \sin y$$

17. B

留意 $AD \parallel BC$ 及 $\angle APB = \beta$ 。在 $\triangle ABP$ 中，

$$\frac{AP}{\sin \alpha} = \frac{AB}{\sin \beta}$$

$$\frac{AP}{\sin \alpha} = \frac{2AP}{\sin \beta}$$

$$\frac{\sin \beta}{\sin \alpha} = \frac{2AP}{AP}$$

$$\sin \alpha : \sin \beta = 1 : 2$$

18. D

當 $b = 20$ 、 $c = 14$ 、 $\angle C = 50^\circ$ 時，

$$\frac{\sin B}{20} = \frac{\sin 50^\circ}{14}$$

$$\sin B \approx 1.09 > 1$$

該方程沒有解。

因此，D 描述的三角形不存在。

19. A

$$\angle BAC = 180^\circ - 62^\circ - 74^\circ = 44^\circ$$

$$\frac{BC}{\sin 44^\circ} = \frac{4}{\sin 62^\circ}$$

$$BC = \frac{4 \sin 44^\circ}{\sin 62^\circ}$$

20. D

$$a^2 = b^2 + c^2 - 2bc \cos 120^\circ$$

$$a^2 = b^2 + c^2 - 2bc \left(-\frac{1}{2}\right)$$

$$a^2 = b^2 + c^2 + bc$$

21. B

$$\cos B = \sqrt{\cos^2 B} = \sqrt{1 - \sin^2 B} = \sqrt{1 - \left(\frac{3}{5}\right)^2} = \frac{4}{5}$$

$$AC^2 = 16^2 + 15^2 - 2(16)(15) \cos B$$

$$AC = \sqrt{97} \text{ cm}$$

22. C

設 O 為 BD 的中點。

留意 $\triangle ABO$ 、 $\triangle AEO$ 及 $\triangle DEO$ 均為等邊三角形，可得 $BD = 16 \text{ cm}$ 。

$$16^2 = 10^2 + 10^2 - 2(10)(10) \cos \angle BCD$$

$$\angle BCD \approx 106^\circ$$

23. D

設 $r \text{ cm}$ 為圓的半徑。

$$8^2 = r^2 + r^2 - 2r^2 \cos 120^\circ$$

$$64 = 3r^2$$

$$r \approx 4.62$$

$$\text{所求面積} = r^2 \pi - \frac{1}{2}(8)(8) \sin 60^\circ$$

$$\approx 39.3 \text{ cm}^2$$

24. B

$$10^2 = 11^2 + 3^2 - 2(11)(3) \cos \angle CAB$$

$$\angle CAB \approx 63.0^\circ$$

$$CD = 11 \sin \angle CAB$$

$$\approx 9.80 \text{ cm}$$

25. C

$$10^2 = 9^2 + 12^2 - 2(9)(12) \cos \theta$$

$$\theta \approx 55^\circ$$

26. B

考慮 $\triangle BCD$ 。

$$10^2 = 5^2 + 6^2 - 2(5)(6) \cos \angle BCD$$

$$\angle BCD \approx 131^\circ$$

$$\angle ABC = 180^\circ - \angle BCD \approx 49^\circ$$

27. D

$$3^2 = 5^2 + 7^2 - 2(5)(7) \cos A \quad \text{及} \quad 5^2 = 7^2 + 3^2 - 2(7)(3) \cos B$$

$$\cos A = \frac{13}{14}$$

$$\cos B = \frac{11}{14}$$

$$\cos A : \cos B = \frac{13}{14} : \frac{11}{14} = 13 : 11$$

28. A

$$x^2 = y^2 + z^2 - 2yz \cos 135^\circ$$

$$x^2 = y^2 + z^2 - 2zy \left(-\frac{\sqrt{2}}{2} \right)$$

$$x^2 = y^2 + z^2 + \sqrt{2}yz$$

29. D

$$AC^2 = 3^2 + 4^2 - 2(3)(4) \cos 120^\circ$$

$$AC \approx 6.08$$

30. B

$$4^2 = 6^2 + 4^2 - 2(6)(4) \cos \angle ACB$$

$$\angle ACB \approx 41.4^\circ$$

$$AD^2 = 4^2 + 4^2 - 2(4)(4) \cos \angle ACB$$

$$AD \approx 2.83 \text{ cm}$$