

REG-TTC-2425-ASM-SET 4-MATH

建議題解

多項選擇題

- | | | | | |
|-------|-------|-------|-------|-------|
| 1. C | 2. C | 3. C | 4. D | 5. B |
| 6. A | 7. B | 8. B | 9. B | 10. D |
| 11. C | 12. A | 13. C | 14. B | 15. B |
| 16. C | 17. B | 18. B | 19. C | 20. D |
| 21. D | 22. C | 23. D | 24. D | 25. D |
| 26. A | 27. D | 28. A | 29. A | 30. A |
| 31. D | 32. B | 33. C | 34. B | 35. B |
| 36. D | 37. B | 38. C | 39. C | 40. A |
| 41. B | 42. A | 43. B | 44. C | 45. A |

1. C

$$\frac{\angle BAD}{\angle BDC} = \frac{\widehat{BD}}{\widehat{BC}}$$

$$\frac{\angle BAD}{20^\circ} = \frac{2}{1}$$

$$\angle BAD = 40^\circ$$

$$\angle ADB = 90^\circ$$

$$\angle ABD + \angle ADB + \angle BAD = 180^\circ$$

$$\angle ABD = 50^\circ$$

2. C

$$\angle AOE = 2 \times 25^\circ = 50^\circ。$$

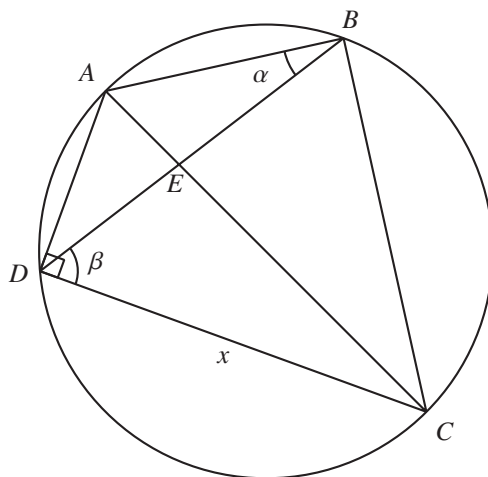
$$\text{由於 } OA = AE, \angle AEO = \angle AOE = 50^\circ。$$

$$\angle ABC = 180^\circ - \angle ADC = 155^\circ。$$

$$\angle ECB = \angle ABC - \angle BEC = 105^\circ。$$

3. C

描繪圓 $ABCD$ 。



留意 AC 為該圓的直徑及 $\angle ABC = 90^\circ$ 。

可得 $\angle ACD = \angle ABD = \alpha$ 及 $\angle BAC = \angle BDC = \beta$ 。

$$BC = AC \sin \beta$$

$$= \left(\frac{x}{\cos \alpha} \right) \sin \beta$$

$$= \frac{x \sin \beta}{\cos \alpha}$$

4. D

$$\begin{aligned} \angle OCA &= 180^\circ - \angle EFC - \angle CEF \\ &= 180^\circ - (180^\circ - \angle BFC) - (180^\circ - \angle CED) \\ &= \angle BFC + \angle CED - 180^\circ \\ &= 30^\circ \end{aligned}$$

故此， $\angle OAC = 30^\circ$ 、 $\angle AOC = 120^\circ$ 及 $\angle COD = 60^\circ$ 。

$$\frac{1+a}{b} = \frac{120^\circ}{60^\circ}$$

$$1+a = 2b$$

$$2b - a = 1$$

5. B

$\angle DAO = \angle ADO = 46^\circ$ 及 $\angle OCA = \angle OAC = 64^\circ - 46^\circ = 18^\circ$ 。

$\angle AOC = 180^\circ - 2 \times 18^\circ = 144^\circ$ 及 反角 $\angle AOC = 360^\circ - 144^\circ = 216^\circ$ 。

$$\angle ABC = \frac{1}{2} \times 216^\circ = 108^\circ。$$

6. A

設 O 為該圓的圓心。

則 $\angle AOC = 2\angle ABC = 56^\circ$ 。

$$\frac{56^\circ}{360^\circ} = \frac{\widehat{AC}}{\text{圓周}}$$

$$\text{圓周} = 45 \text{ cm}$$

7. B

$$\angle ADE = \angle DAC + \angle ACD$$

$$= 36^\circ + 24^\circ$$

$$= 60^\circ$$

$$\angle ABE = \angle ADE$$

$$= 60^\circ$$

$$\angle ABD = \angle ABE + \angle DBE$$

$$90^\circ = 60^\circ + \angle DBE$$

$$\angle DBE = 30^\circ$$

8. B

由於 $\widehat{PS} = \widehat{SR}$ ，可得 $\angle POS = \angle ROS = \frac{136^\circ}{2} = 68^\circ$ 。

由於 $OP = OS$ ，可得 $\angle SPO = \angle PSO = \frac{180^\circ - 68^\circ}{2} = 56^\circ$ 。

9. B

$$\angle ADB = 90^\circ$$

$$(2\angle CBD) + (22^\circ + 90^\circ) = 180^\circ$$

$$\angle CBD = 34^\circ$$

$$\angle BCD = 180^\circ - 22^\circ - 34^\circ$$

$$= 124^\circ$$

10. D

$$\angle P + \angle R = 180^\circ$$

$$\angle P = 180^\circ \times \frac{3}{3+5}$$

$$= 67.5^\circ$$

$$\angle Q = \angle P \times \frac{4}{3}$$

$$= 90^\circ$$

$$\angle S = 180^\circ - 90^\circ = 90^\circ$$

11. C

$$\angle CAD = \angle CBD = 90^\circ$$

$$\angle BDC = \angle BAC = \alpha$$

$$BC = CD \sin \alpha$$

$$AD = CD \cos \beta$$

$$\frac{BC}{AD} = \frac{CD \sin \alpha}{CD \cos \beta} = \frac{\sin \alpha}{\cos \beta}$$

12. A

$$\angle BAD = 180^\circ - \angle DCE = 82^\circ$$

$$\angle ABE = \angle BAD - \angle AEB = 47^\circ$$

13. C

$$\angle ABD = 90^\circ$$

可得 $\angle ABO = 60^\circ$ 、 $\angle OBD = 30^\circ$ 及 $\angle DBE = 15^\circ$ 。

$$\angle DAE = \angle DBE = 15^\circ$$

$$DE = 6 \sin 15^\circ \approx 1.55 \text{ cm}$$

$$\angle CED = \angle BAD = \angle OBA = 60^\circ$$

$$\angle CDE = \angle ABE = 105^\circ$$

$$\angle DCE = 180^\circ - 60^\circ - 105^\circ = 15^\circ = \angle DBE$$

$$CD = BD = 6 \sin 60^\circ = 3\sqrt{3} \text{ cm}$$

$$\triangle CDE \text{ 的面積} = \frac{1}{2}(CD)(DE) \sin 105^\circ \approx 3.90 \text{ cm}^2$$

$$\angle DOE = 2 \times 15^\circ = 30^\circ$$

所求面積

$$= (\triangle CDE \text{ 的面積}) - \left[3^2 \pi \times \frac{30^\circ}{360^\circ} - \frac{1}{2}(3)^2 \sin 30^\circ \right] \approx 3.79 \text{ cm}^2$$

14. B

$$\angle AOC = 2 \times 74^\circ = 148^\circ$$

$$\angle COD = \frac{148^\circ - 52^\circ}{2} = 48^\circ$$

$$\angle ODC = \frac{180^\circ - 96^\circ}{2} = 42^\circ$$

15. B

$$\angle BCD = 90^\circ \text{ 及 } \angle BDC = \angle DBC = \frac{180^\circ - 90^\circ}{2} = 45^\circ$$

$$\angle BAC = \angle BDC = 45^\circ \text{ 及 } \angle ABE = \angle AEB = \frac{180^\circ - 45^\circ}{2} = 67.5^\circ$$

$$\angle BAD = 90^\circ \text{ 及 } \angle BDA = 180^\circ - 90^\circ - 67.5^\circ = 22.5^\circ$$

$$\angle ACB = \angle BDA = 22.5^\circ$$

16. [C]

$$\begin{aligned}\angle CAD &= \angle BAC \times \frac{16}{24} = 42^\circ \\ \angle ACB &= 180^\circ - 90^\circ - 63^\circ = 27^\circ \text{ 及 } \angle ADE = \angle ACB = 27^\circ \\ \angle AED &= 180^\circ - 27^\circ - 42^\circ = 111^\circ\end{aligned}$$

17. [B]

$$\begin{aligned}\angle ABC &= 140^\circ \\ \angle AEC &= \frac{360^\circ - \angle ABC}{2} \\ &= 110^\circ \\ \angle DAE &= \angle ADC - \angle AED \\ &= 140^\circ - 110^\circ \\ &= 30^\circ\end{aligned}$$

18. [B]

$$\begin{aligned}\angle BDC &= \frac{\angle BOC}{2} = 35^\circ \\ \angle ACD &= 90^\circ \\ \angle BEC &= \angle ACD + \angle BDC \\ &= 90^\circ + 35^\circ \\ &= 125^\circ\end{aligned}$$

19. [C]

設 M 、 N 及 T 分別為 AB 、 CD 及 EF 的中點。

$$AB = CD = EF \Rightarrow OT = OM = ON$$

$$\triangle OMQ \cong \triangle ONQ \text{ 及 } \triangle ONR \cong \triangle OTR$$

設 $\angle OQN = a$ 及 $\angle ORN = b$ 。

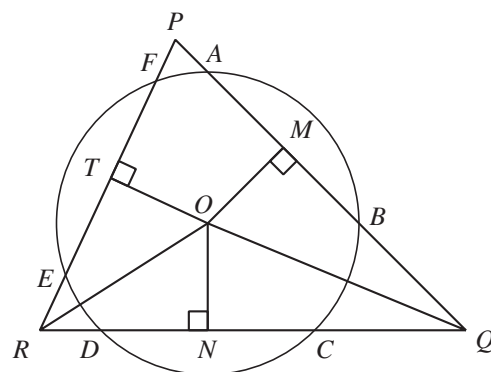
可得 $\angle OQM = a$ 及 $\angle ORT = b$ 。

$$2a + 2b + 42^\circ = 180^\circ$$

$$a + b = 69^\circ$$

$$\angle QOR = 180^\circ - (a + b)$$

$$= 111^\circ$$



20. [D]

留意 $\triangle EBC \sim \triangle EDA$ 。

$$\begin{aligned}\frac{CE}{AE} &= \frac{BE}{DE} \\ \frac{CE}{4+8} &= \frac{8}{10+CE}\end{aligned}$$

$$(CE)^2 + 10(CE) - 96 = 0$$

$$CE = 6 \text{ cm 或 } -16 \text{ cm (捨去)}$$

21. D

$$\text{半徑} = \sqrt{7^2 + \left(\frac{48}{2}\right)^2}$$

$$= 25 \text{ cm}$$

設 θ 為陰影弓形對應的扇形的角度。

$$\cos \frac{\theta}{2} = \frac{7}{25}$$

$$\theta \approx 147^\circ$$

$$\begin{aligned} \text{所求面積} &= 25^2\pi \times \frac{\theta}{360^\circ} - \frac{(48)(7)}{2} \\ &\approx 636 \text{ cm}^2 \end{aligned}$$

22. C

$$\angle OAB + \angle OBA + \angle AOB = 180^\circ$$

$$2(44^\circ) + \angle AOB = 180^\circ$$

$$\angle AOB = 92^\circ$$

$$\angle BOD = 2\angle BCD$$

$$92^\circ + \angle AOD = 2(62^\circ)$$

$$\angle AOD = 32^\circ$$

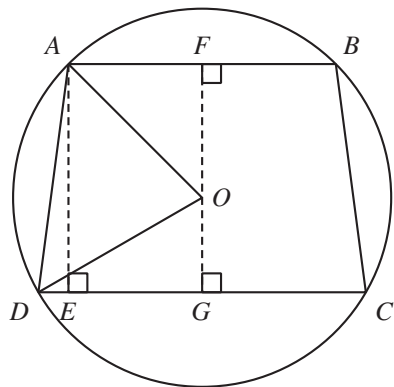
23. D

留意 $\angle ADC = \angle BCD = 80^\circ$ 及 $AB \parallel CD$ 。

設 E 為 CD 上的一點使得 $AE \perp CD$ 。

設 F 及 G 分別為 AB 及 CD 的中點。

將該圓的圓心記為 O 。



考慮 $\triangle ADE$ 。

$$\tan \angle ADE = \frac{AE}{DE}$$

$$\tan 80^\circ = \frac{AE}{\left(\frac{8-6}{2}\right)}$$

$$AE = \tan 80^\circ \text{ cm}$$

設 $OG = x \text{ cm}$ 。考慮 $\triangle ODG$ 及 $\triangle OAF$ 。

$$r^2 = 3^2 + (AE - x)^2 = 4^2 + x^2$$

$$-2(AE)x = 7 - AE^2$$

$$x \approx 2.22$$

所求面積 $= r^2 \pi$

$$= (4^2 + x^2) \pi$$

$$\approx 65.7 \text{ cm}^2$$

24. D

$$\angle CAD = \angle CAB = \frac{50^\circ}{2} = 25^\circ$$

$$\angle ABC = 90^\circ$$

$$\angle ABC + \angle BCA + \angle BAC = 180^\circ$$

$$\angle BCA = 65^\circ$$

$$\angle AEB = \angle BCA = 65^\circ$$

25. D

反角 $\angle AOC = 2x$ 。所以， $y = 360^\circ - 2x$ 。

26. A

較小的圓的圓心在 RT 上，則 $\angle SRT = \angle TRU$ 。

$$\angle RTU = \angle RUQ = 40^\circ \text{ 及 } \angle RTS = 90^\circ$$

$$\angle SRU = 180^\circ - (40^\circ + 90^\circ) = 50^\circ$$

$$\angle TRU = \frac{50^\circ}{2} = 25^\circ \text{ 及 } \angle PUT = \angle TRU = 25^\circ$$

27. D

$$\angle BAC = 180^\circ - 63^\circ - 59^\circ = 58^\circ。$$

$$\angle BOC = 58^\circ \times 2 = 116^\circ \text{ 及 } \angle BCO = \frac{180^\circ - 116^\circ}{2} = 32^\circ。$$

28. A

$$BD \text{ 為直徑 } \Rightarrow \angle DAB = 90^\circ$$

$$\text{設 } \angle CAE = \theta。$$

$$\text{考慮 } \triangle CAE, \angle ACD = \angle CAE + 14^\circ = \theta + 14^\circ。$$

$$\text{由於 } AT \text{ 為切線, } \angle DAT = \angle ACD = \theta + 14^\circ。$$

$$\text{考慮 } \triangle TAE,$$

$$47^\circ + (90^\circ + \theta + 14^\circ) + 14^\circ = 180^\circ$$

$$\theta = 15^\circ$$

29. A

$$BC \text{ 為直徑, } \angle BDC = 90^\circ。$$

$$\text{由於 } \triangle BDC \sim \triangle CDA, \frac{BD}{BC} = \frac{CD}{AC}$$

$$\frac{BD}{CD} = \frac{3}{4}$$

$$\angle BCD = \tan^{-1} \frac{3}{4} \text{ 及 } BD = 9 \sin \angle BCD = 5.4 \text{ cm}。$$

30. A

$$\angle DAC = \angle ABC$$

$$\angle BAC = 90^\circ$$

$$\angle ADE + \angle BAD + \angle ABC + \angle BED = 360^\circ$$

$$54^\circ + 90^\circ + 2\angle ABC + 90^\circ = 360^\circ$$

$$\angle ABC = 63^\circ$$

$$\angle ABC + 90^\circ + \angle BCA = 180^\circ$$

$$\angle BCA = 27^\circ$$

31. D

將 BC 與圓的交點記為 C 及 F 。

$$\angle CAF = \angle ECB = 30^\circ$$

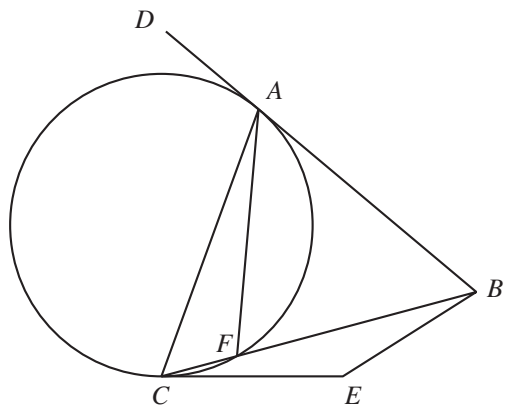
$$\angle BAF = \angle FCA$$

$$\angle FCA + \angle BAF + 30^\circ + 40^\circ = 180^\circ$$

$$2\angle BAF = 110^\circ$$

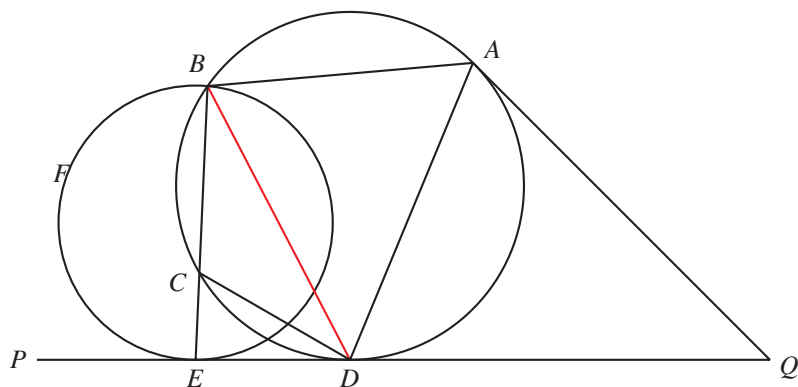
$$\angle BAF = 55^\circ$$

$$\angle CAD = 180^\circ - 30^\circ - 55^\circ = 95^\circ$$



32. **B**

由於 $AQ = DQ$ ，可得 $\angle ADQ = \frac{180^\circ - 50^\circ}{2} = 65^\circ$ 。



$$\angle ABD = \angle ADQ = 65^\circ$$

$$\angle CBD = 100^\circ - 65^\circ = 35^\circ$$

$$\angle CDE = \angle CBD = 35^\circ$$

$$\angle CDB = \angle CBD = 35^\circ$$

$$\angle PEB = \angle EBD + \angle BDE = 35^\circ + (35^\circ + 35^\circ) = 105^\circ$$

33. C

$$\angle AOC + \angle OAC + \angle OCA = 180^\circ$$

$$\angle AOC + 2(27^\circ) = 180^\circ$$

$$\angle AOC = 126^\circ$$

$$\angle BOC = \angle AOC \times \frac{2}{1+2} = 84^\circ$$

$$\angle BAC = \frac{\angle BOC}{2} = 42^\circ$$

$$\angle BCD = \angle \overset{\angle}{B}AC = 42^\circ$$

34. [B]

$$\begin{aligned}\angle DCA &= \angle YAD = 31^\circ \\ AX = AB &\Rightarrow \angle XAB = \frac{180^\circ - 64^\circ}{2} = 58^\circ \\ \angle ACB &= \angle XAB = 58^\circ \\ \angle BCD &= 31^\circ + 58^\circ = 89^\circ\end{aligned}$$

35. [B]

設 $\angle CAP = x$ 。則 $\angle ABC = \angle CAP = x$ 。

$$\begin{aligned}\angle DBA + \angle BAP &= 180^\circ \\ 40^\circ + x + x + 90^\circ &= 180^\circ \\ x &= 25^\circ\end{aligned}$$

36. [D]

$$\begin{aligned}\angle EOD &= 2\angle CBE = 30^\circ \text{ 及 } \angle EDO = \angle EOD = 30^\circ \\ \angle ODC &= \frac{180^\circ - 30^\circ}{2} = 75^\circ \text{ 及 } \angle CDB = 75^\circ - 30^\circ = 45^\circ \\ \angle ABC &= \angle CDB = 45^\circ \text{ 及 } \angle BAC = 180^\circ - 2 \times 45^\circ = 90^\circ\end{aligned}$$

37. [B]

設 O 為半圓 $ABCD$ 的圓心。
 可得 $OC \perp EF$ and $OB \perp BE$ 。
 因此， $\angle BOC = 360^\circ - 90^\circ - 90^\circ - 90^\circ = 90^\circ$ 。
 $\angle AOC = \angle AFE + 90^\circ = 132^\circ$
 $\angle AOB = 132^\circ - 90^\circ = 42^\circ$
 $\angle ACB = \frac{\angle AOB}{2} = 21^\circ$

38. [C]

$$\begin{aligned}\angle ADC &= 180^\circ - 100^\circ = 80^\circ \\ \angle ADB &= 80^\circ \times \frac{2}{2+3} = 32^\circ \\ \angle BCA &= \angle ADB = 32^\circ \\ \angle DAT &= \angle ADC - \angle ATD = 50^\circ \\ \angle ACT &= \angle DAT = 50^\circ \\ \angle BCT &= 32^\circ + 50^\circ = 82^\circ\end{aligned}$$

39. [C]

$$\begin{aligned}\angle OBC + \angle OCB + \angle BOC &= 180^\circ \\ \angle BOC &= 180^\circ - 2 \times 55^\circ \\ &= 70^\circ \\ \angle OCT &= 90^\circ \\ \angle OTC + \angle OCT + \angle COT &= 180^\circ \\ \angle OTC &= 180^\circ - 70^\circ - 90^\circ \\ \angle ATC &= 20^\circ\end{aligned}$$

40. A

$$\begin{aligned}\angle AGE &= 2 \times 66^\circ = 132^\circ \\ \angle CEA &= 132^\circ \times \frac{6}{5+6} = 72^\circ \\ \angle CAT &= \angle CEA = 72^\circ \text{ 及 } \angle ATC = 180^\circ - 2 \times 72^\circ = 36^\circ\end{aligned}$$

41. B

設 O 為圓 ABD 的圓心。

$$\begin{aligned}\angle EAO &= \frac{60^\circ}{2} = 30^\circ \text{ 及 } AO = 9 \tan 30^\circ = 3\sqrt{3} \text{ cm}。 \\ BC &= AC - AB = 9 \tan 60^\circ - 2 \times (3\sqrt{3}) \approx 5.20 \text{ cm}。 \end{aligned}$$

42. A

$$\begin{aligned}\angle AEB &= \angle SAB = 60^\circ \\ \angle BCD &= \angle AEB = 60^\circ \\ \angle BCE : \angle ECD &= 15^\circ : 60^\circ - 15^\circ = 1 : 3\end{aligned}$$

43. B

$$\begin{aligned}EA &= ED \\ \angle EDA &= \frac{180^\circ - 86^\circ}{2} = 47^\circ \\ \angle ACD &= \angle EDA = 47^\circ \\ \angle FGH &= \frac{180^\circ - \angle FEH}{2} = 94^\circ \\ \angle GBC &= \frac{180^\circ - 94^\circ}{2} = 43^\circ \\ \angle BDC &= \angle GBC = 43^\circ \\ \angle AID &= \angle BDC + \angle ACD = 90^\circ\end{aligned}$$

44. C

RT 為 $\angle SRP$ 的角平分線。所以， $\angle SRP = 24^\circ$ 。

$$\angle QPS = \angle QSR。$$

$$\begin{aligned}\angle QPS + (\angle QSR + 70^\circ) + 24^\circ &= 180^\circ \\ \angle QPS &= 43^\circ\end{aligned}$$

45. A

$$\begin{aligned}\angle CBP &= \angle BCP = \angle BAC = 56^\circ \\ \angle BPC &= 180^\circ - 56^\circ - 56^\circ = 68^\circ \\ \angle PBD &= 90^\circ \\ \angle BQP &= 180^\circ - 90^\circ - 68^\circ \\ &= 22^\circ\end{aligned}$$