

REG-TTC-2324-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

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

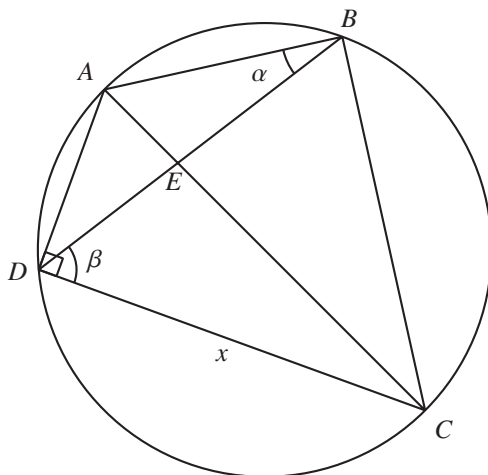
$$\text{由於 } OA = AE \text{，} \angle AEO = \angle AOE = 50^\circ \text{。}$$

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

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

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 $\angle BAC = \angle BDC = \beta$ 。

$$\begin{aligned} BC &= AC \sin \beta \\ &= \left(\frac{x}{\cos \alpha} \right) \sin \beta \\ &= \frac{x \sin \beta}{\cos \alpha} \end{aligned}$$

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

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

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

$$BC = CD \sin \alpha$$

$$AD = CD \cos \beta$$

$$\begin{aligned} \frac{BC}{AD} &= \frac{CD \sin \alpha}{CD \cos \beta} \\ &= \frac{\sin \alpha}{\cos \beta} \end{aligned}$$

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 $\angle DBE = 15^\circ$ 。

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

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

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

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

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

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

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

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

所求面積

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

14. B

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

$$\angle COD = 148^\circ - 52^\circ = 96^\circ$$

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

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

$$\begin{aligned}\angle BDC &= \frac{70^\circ}{2} = 35^\circ \text{ 及 } \angle ACD = 90^\circ \\ \angle BEC &= 90^\circ + 35^\circ = 125^\circ\end{aligned}$$

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 $\angle ORN = b$ 。

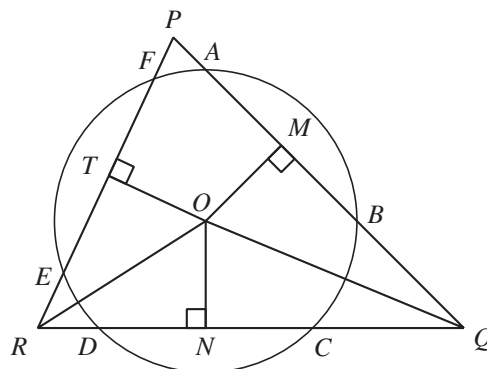
可得 $\angle OQM = a$ 及 $\angle ORT = b$ 。

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

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

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

$$= 111^\circ$$



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

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

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

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

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

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

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

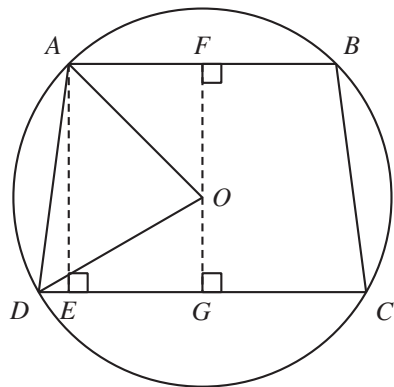
23. D

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 $\triangle OAF$ 。

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

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

$$x \approx 2.22$$

$$\text{所求面積} = r^2 \pi$$

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

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

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 。

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

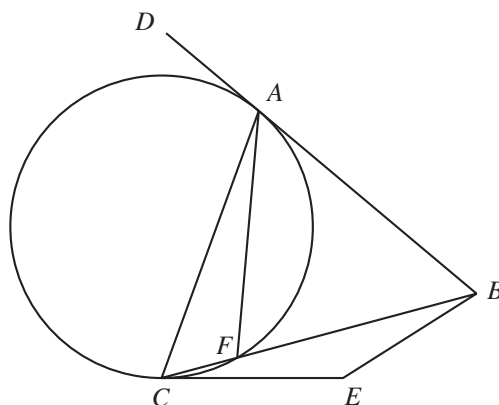
$$\angle BAF = \angle FCA$$

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

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

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

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



32. B

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

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

$$\angle ADC = 180^\circ - 100^\circ = 80^\circ \text{ 及 } \angle CAD = 180^\circ - 65^\circ - 80^\circ = 35^\circ$$

$$\text{由於 } BC = CD, \angle BAC = \angle CAD = 35^\circ。$$

$$\angle DCE = \angle BAD = 35^\circ + 35^\circ = 70^\circ$$

$$\angle CED = \angle CDQ - \angle DCE = 80^\circ + 65^\circ - 70^\circ = 75^\circ$$

$$\angle PEB = 180^\circ - 75^\circ = 105^\circ$$

33. C

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

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

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

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

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

$$\angle BCD = \angle BAC = 42^\circ$$

34. B

$$\angle DCA = \angle YAD = 31^\circ$$

$$AX = AB \Rightarrow \angle XAB = \frac{180^\circ - 64^\circ}{2} = 58^\circ$$

$$\angle ACB = \angle XAB = 58^\circ$$

$$\angle BCD = 31^\circ + 58^\circ = 89^\circ$$

35. B

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

$$\angle DBA + \angle BAP = 180^\circ$$

$$40^\circ + x + x + 90^\circ = 180^\circ$$

$$x = 25^\circ$$

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

$$\angle ADC = 180^\circ - 100^\circ = 80^\circ$$

$$\angle ADB = 80^\circ \times \frac{2}{2+3} = 32^\circ$$

$$\angle BCA = \angle ADB = 32^\circ$$

$$\angle DAT = \angle ADC - \angle ATD = 50^\circ$$

$$\angle ACT = \angle DAT = 50^\circ$$

$$\angle BCT = 32^\circ + 50^\circ = 82^\circ$$

39. C

$$\angle OBC + \angle OCB + \angle BOC = 180^\circ$$

$$\angle BOC = 180^\circ - 2 \times 55^\circ$$

$$= 70^\circ$$

$$\angle OCT = 90^\circ$$

$$\angle OTC + \angle OCT + \angle COT = 180^\circ$$

$$\angle OTC = 180^\circ - 70^\circ - 90^\circ$$

$$\angle ATC = 20^\circ$$

40. A

$$\angle AGE = 2 \times 66^\circ = 132^\circ$$

$$\angle CEA = 132^\circ \times \frac{6}{5+6} = 72^\circ$$

$$\angle CAT = \angle CEA = 72^\circ \text{ 及 } \angle ATC = 180^\circ - 2 \times 72^\circ = 36^\circ$$

41. B

設 O 為圓 ABD 的圓心。

$$\angle EAO = \frac{60^\circ}{2} = 30^\circ \text{ 及 } AO = 9 \tan 30^\circ = 3\sqrt{3} \text{ cm}。$$

$$BC = AC - AB = 9 \tan 60^\circ - 2 \times (3\sqrt{3}) \approx 5.20 \text{ cm}。$$

42. A

$$\angle AEB = \angle SAB = 60^\circ$$

$$\angle BCD = \angle AEB = 60^\circ$$

$$\angle BCE : \angle ECD = 15^\circ : 60^\circ - 15^\circ = 1 : 3$$

43. B

$$EA = ED$$

$$\angle EDA = \frac{180^\circ - 86^\circ}{2} = 47^\circ$$

$$\angle ACD = \angle EDA = 47^\circ$$

$$\angle FGH = 180^\circ - \angle FEH = 94^\circ$$

$$\angle GBC = \frac{180^\circ - 94^\circ}{2} = 43^\circ$$

$$\angle BDC = \angle GBC = 43^\circ$$

$$\angle AID = \angle BDC + \angle ACD = 90^\circ$$

44. C

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

$$\angle QPS = \angle QSR。$$

$$\angle QPS + (\angle QSR + 70^\circ) + 24^\circ = 180^\circ$$

$$\angle QPS = 43^\circ$$

45. A

$$\angle CBP = \angle BCP = \angle BAC = 56^\circ$$

$$\angle BPC = 180^\circ - 56^\circ - 56^\circ = 68^\circ$$

$$\angle PBD = 90^\circ$$

$$\angle BQP = 180^\circ - 90^\circ - 68^\circ$$

$$= 22^\circ$$