

REG-EOC-2324-ASM-SET 1-MATH**Suggested solutions****Multiple Choice Questions**

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|-------|-------|-------|-------|-------|
| 1. C | 2. A | 3. B | 4. C | 5. D |
| 6. D | 7. B | 8. C | 9. C | 10. B |
| 11. C | 12. D | 13. D | 14. A | 15. D |
| 16. D | 17. B | 18. C | 19. C | 20. D |
| 21. A | 22. D | 23. D | 24. C | |

1. ☐ CCentre $(-3, -1)$ Radius $= \sqrt{16} = 4$ 2. ☐ ACentre $= \left(\frac{-8}{-2}, \frac{0}{-2} \right) = (4, 0)$ Radius $= \sqrt{4^2 + 0^2 + 8} = \sqrt{24} = 2\sqrt{6}$ 3. ☐ BRadius $= \sqrt{2^2 + 1^2 + 4} = 3$ Required area $= 3^2\pi = 9\pi$ 4. ☐ CThe coordinates of centre are $(2, -2)$.Let the coordinates of B be (a, b) .

$$\begin{aligned} \frac{a+5}{2} &= 2 & \text{and} & & \frac{b-7}{2} &= -2 \\ a &= -1 & & & b &= 3 \end{aligned}$$

The coordinates of B are $(-1, 3)$.5. ☐ DThe coordinates of centre are $(2, -3)$.Radius $= \sqrt{2^2 + 3^2 + 2} = \sqrt{15}$ Area $= (\sqrt{15})^2\pi$ $= 15\pi$

6. D

The coordinates of the centre are (2, 1).

Let the coordinates of Q be (a , b).

$$\begin{aligned}\frac{a-2}{2} &= 2 & \text{and} & & \frac{b+6}{2} &= 1 \\ a &= 6 & & & b &= -4\end{aligned}$$

The coordinates of B are (6, -4).

7. B

The coordinates of centre are (-1, 2).

$$\begin{aligned}\text{Required slope} &= \frac{2-1}{-1-2} \\ &= -\frac{1}{3}\end{aligned}$$

8. C

$$2(x-4)^2 + 2(y+8)^2 = 13$$

$$(x-4)^2 + (y+8)^2 = \frac{13}{2}$$

The coordinates of the centre are (4, -8).

9. C

The coordinates of the centre are (6, 10).

$$\begin{aligned}\frac{h-2}{2} &= 6 & \text{and} & & \frac{k+4}{2} &= 10 \\ h &= 14 & & & k &= 16\end{aligned}$$

10. B

The coordinates of the centre are (6, -4).

$$\text{Radius} = \sqrt{6^2 + 4^2} - 3 = 7$$

11. C

The coordinates of the centre are (4, -2).

$$\text{Radius} = \sqrt{4^2 + 2^2} + 5 = 5$$

$$\begin{aligned}\text{Area} &= 5^2\pi \\ &= 25\pi\end{aligned}$$

12. D

$$\begin{aligned}\frac{h}{-2} &= 2 & \text{and} & & \frac{k}{-2} &= -1 \\ h &= -4 & & & k &= 2\end{aligned}$$

13. D

The coordinates of the centre are $(-3, -5)$.

$$\sqrt{3^2 + 5^2 - f} = 5$$

$$34 - f = 5^2$$

$$f = 9$$

14. A

$$2^2 + (-3)^2 + 4(2) + 6(-3) + k = 0$$

$$k = -3$$

15. D

$$3^2 + 2^2 - 4(3) + 8(-2) + k = 0$$

$$k = 15$$

The coordinates of the centre are $(2, -4)$.

$$\text{Radius} = \sqrt{2^2 + 4^2 - 15} = \sqrt{5}$$

$$\text{Area} = (\sqrt{5})^2 \pi = 5\pi$$

16. D

The coordinates of the centre are $(4, -6)$.

$$\sqrt{4^2 + 6^2 + F} = 8$$

$$52 + F = 8^2$$

$$F = 12$$

17. B

The coordinates of the centre are $\left(4, -\frac{k}{2}\right)$.

$$\frac{\frac{-k}{2} - 2}{4 - 6} = 2$$

$$-\frac{k}{2} - 2 = -4$$

$$k = 4$$

18. C

$$5^2 + (-1)^2 - 6(5) + k(-1) + 2 = 0$$

$$k = -2$$

The coordinates of the centre are $(3, 1)$.

$$\text{Radius} = \sqrt{3^2 + 1^2 - 2} = \sqrt{8}$$

$$\text{Area} = (\sqrt{8})^2 \pi = 8\pi$$

19. C

The coordinates of the centre are $(2, k)$.

$$(2) + (k) - 7 = 0$$

$$k = 5$$

20. D

Coordinates of centre of C are $\left(\frac{5}{2}, -\frac{k}{2}\right)$.

$$2\left(\frac{5}{2}\right) - 3\left(-\frac{k}{2}\right) + 3 = 0$$

$$k = -\frac{16}{3}$$

21. A

The coordinates of the centre are $\left(\frac{k}{2}, -2\right)$.

$$\frac{k}{2} - (-2) + 1 = 0$$

$$k = -6$$

22. D

The coordinates of the centre are $(-5, 3)$.

$$\text{Slope of required chord} = -1 \div \frac{3-4}{-5+7}$$

$$= 2$$

Required equation is

$$y - 4 = 2(x + 7)$$

$$2x - y + 18 = 0$$

23. D

The coordinates of the centre are $\left(-\frac{h}{2}, 1\right)$.

$$-\frac{h}{2} + 2(1) + 1 = 0$$

$$h = 6$$

24. C

I. ✗. The coordinates of the centres are $(3, -4)$ and $(-3, 4)$.

II. ✓. Both radius $= \sqrt{3^2 + 4^2}$

III. ✓. The origin $(0, 0)$ satisfies both equations.

Conventional Questions

25. (a) Substitute $(-2, 9)$ and $(-5, 8)$,

$$\begin{cases} 4 + 81 - 2d + 9e + 24 = 0 \\ 25 + 64 - 5d + 8e + 24 = 0 \end{cases} \quad 1M$$

Solving, we have $d = 5$ and $e = -11$. 1A

- (b) Let C be the centre of circle S and the coordinates of R be (h, k) .

The coordinates of C are $\left(-\frac{5}{2}, \frac{11}{2}\right)$. 1M

$$\frac{-2 + h}{2} = -\frac{5}{2} \quad \text{and} \quad \frac{9 + k}{2} = \frac{11}{2} \quad 1M$$

$$h = -3 \quad k = 2$$

The coordinates of R are $(-3, 2)$. 1A

26. (a) Substitute $(1, 8)$ and $(0, 11)$,

$$\begin{cases} 1 + 64 - 7 + 8e + f = 0 \\ 121 + 11e + f = 0 \end{cases} \quad 1M$$

Solving, we have $e = -21$ and $f = 110$ 1A

$$16 + a^2 - 7(4) - 21(a) + 110 = 0$$

$$a^2 - 21a + 98 = 0$$

$$a = 7 \quad \text{or} \quad 14 \text{ (rejected)} \quad 1A$$

- (b) By (a), $(4, 14)$ lies on circle S . 1M

A, B, C and D are concyclic. 1A