

Math Challenge II-A: Geometry

Answer Key

Areteem Institute

Chapter 1. Special Angles I

Quick Reponse Questions:

1.11: 5

1.16: A

1.12: 6

1.17: 5

1.13: 1

1.18: 105

1.14: 120

1.19: 75

1.15: B

1.20: 6

Practice Questions:

1.21(a): 75° .

1.26: $\frac{\sqrt{3}+1}{4}$.

1.21(b): 150° .

1.27: $6\sqrt{2}$.

1.22: Omitted

1.28: 10° .

1.23: Yes.

1.29: Omitted

1.24: 150° .

1.30: $\frac{5}{2}(3 + \sqrt{3})$.

1.25: 20.

Chapter 2. Special Angles II

Quick Reponse Questions:

2.11: Yes

2.16: 195

2.12: Yes

2.17: 22

2.13: No

2.18: Yes

2.14: 60

2.19: 50

2.15: C

2.20: 72

Practice Questions:

2.21: $n = 15, 18, \dots$

2.26: 1.

2.22: $\frac{1}{3}$.

2.27: Omitted

2.23: 9.

2.28: $\sqrt{3}/4$.

2.24: $12\sqrt{3}$.

2.29: 45° .

2.25: Omitted

2.30: Omitted

Chapter 3. Analytical Geometry

Quick Reponse Questions:

3.11: A

3.12: C

3.13: C

3.14: 5

3.15: -1

3.16: 1

3.17: 5

3.18: -8

3.19: D

3.20: -8

Practice Questions:

3.21: Omitted

3.22: Omitted

3.23(a): $6\sqrt{2} + \sqrt{117} + 15$.

3.23(b): 45.

3.24: C must either be on the line $y = 2x - 1/2$, on the circle $x^2 + (y - 2)^2 = 5$, or on the circle $(x - 2)^2 + (y - 1)^2 = 5$ but not be points $A(0, 2)$, $B(2, 1)$, $(1, 3/2)$, $(-2, 3)$, or $(0, 4)$.

3.25: $(x - 3)^2 + (y - 3)^2 = 2$.

3.26: Answers may vary.

3.27(a): $(1, 3), (3, 1)$.

3.27(b): Omitted

3.27(c): 2.

3.28: $4py = x^2$.

3.29: $y = x$.

3.30: Focus: $(-1, 2)$, Directrix: $y = 3$.

Chapter 4. Areas I

Quick Reponse Questions:

4.11: Yes

4.16: 36

4.12: 75

4.17: 11.45

4.13: 32

4.18: 8

4.14: 12

4.19: 15

4.15: 7.2

4.20: 46

Practice Questions:

4.21(a): Omitted

4.26: $2 \times 5, 2 \times 6$ or $1 \times 10, 1 \times 12$.

4.21(b): Omitted

4.27: Omitted

4.22: Omitted

4.28: 24.

4.23: Omitted

4.29: Omitted

4.24: $1/2$.

4.30(a): Omitted

4.25: $2\sqrt{s(s-a)(s-b)(s-d)}$.

4.30(b): $1/2$

Chapter 5. Centers of Triangles

Quick Reponse Questions:

5.11: D

5.16: 22

5.12: B

5.17: 25

5.13: A

5.18: 10

5.14: B

5.19: 5

5.15: 36

5.20: 16

Practice Questions:

5.21: Omitted

5.26(a): Omitted

5.22(a): Omitted

5.26(b): Omitted

5.22(b): Omitted

5.27(a): Omitted

5.22(c): Omitted

5.27(b): Omitted

5.23: Omitted

5.28: $AB = 6, AC = 15.$

5.24(a): Incenter and Incircle.

5.29: $(x - 3)^2 + (y - 3)^2 = 12 + 8\sqrt{2}.$

5.24(b): Omitted

5.30(a): Omitted

5.25: 8, 10.

5.30(b): Omitted

Chapter 6. Areas II

Quick Reponse Questions:

6.11: 12

6.16: 61

6.12: 12

6.17: 2

6.13: C

6.18: 455

6.14: 11

6.19: 62

6.15: 3.1

6.20: 40

Practice Questions:

6.21(a): Omitted

6.26: $14\sqrt{5}$.

6.21(b): Omitted

6.27: 3.

6.22: $2/3$.

6.28: $\frac{200}{3}$.

6.23: $48\sqrt{2}$.

6.29: $1 : \sqrt{2} - 1 : \sqrt{3} - \sqrt{2}$.

6.24: 84.

6.30: Omitted

6.25: 2.

Chapter 7. Circles I

Quick Reponse Questions:

7.11: 7

7.16: 40

7.12: 16

7.17: 120

7.13: 12

7.18: 84

7.14: 5

7.19: 32

7.15: 21.5

7.20: 46

Practice Questions:

7.21: Omitted

7.26: Omitted

7.22: Omitted

7.27: Omitted

7.23: $5 + 2\sqrt{3} + 2\sqrt{2}$.

7.28(a): $2/\sqrt{3}$.

7.24(a): 2π .

7.28(b): $\sqrt{28/3}$.

7.24(b): $\pi - \sqrt{3}/2$.

7.29: $3 + 2\sqrt{3}$.

7.25(a): $2\sqrt{3} - 3$.

7.30: 8

7.25(b): $1/2$.

Chapter 8. Circles II

Quick Reponse Questions:

8.11: 80

8.16: 8

8.12: C

8.17: 6.4

8.13: No

8.18: 11

8.14: Yes

8.19: 5

8.15: 4

8.20: 4

Practice Questions:

8.21: Omitted

8.26(b): $\frac{\sqrt{3}}{4\pi} - \frac{1}{3}$

8.22: Omitted

8.27: 968.

8.23: Omitted

8.28: 8

8.24: Omitted

8.29: $\frac{\pi + 6\sqrt{3}}{8}$.

8.25: 3, 12.

8.26(a): Omitted

8.30: $\frac{125\sqrt{3}}{8}$.

Chapter 9. Solid Geometry

Quick Reponse Questions:

9.11: 18

9.16: 48

9.12: 452.2

9.17: 96

9.13: 339.1

9.18: 20

9.14: 512

9.19: 87.5

9.15: 16

9.20: 2.8

Practice Questions:

9.21: $\frac{\sqrt{3}}{9}$.

9.26: $2\sqrt{3}$

9.22(a): 6, 9, 5.

9.27: 1 or $\sqrt{3}/3$.

9.22(b): 7 : 8 for both.

9.28(a): $\frac{1}{6}\pi$.

9.23: $\frac{2\sqrt{11}}{3}$

9.28(b): $\frac{\sqrt{3}}{2}\pi$.

9.24(a): 8.

9.29: 192π

9.24(b): $2 + 6\sqrt{2}$.

9.30: $\frac{8}{3}$

9.25: $1/2$.