

Math Challenge II-B: 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. Trigonometry I

Quick Reponse Questions:

3.11: 112.5

3.16: D

3.12: C

3.17: A

3.13: 0.5

3.18: 8

3.14: 2.4

3.19: 12

3.15: 7.1

3.20: B

Practice Questions:

3.21:

1. $\frac{24}{25}$
2. $\frac{24}{7}$
3. $\frac{25}{7}$
4. $\frac{25}{24}$
5. $\frac{24}{7}$

6. $\cos(\theta)$

7. $-\tan(\theta)$

3.23: Omitted

3.24: $\frac{29}{2}$.

3.25: $\frac{\sqrt{3}}{2}$.

3.26: 4,4.

3.22: Using the unit circle definitions:

1. $\cot(\theta)$
2. $\tan(\theta)$
3. $-\tan(\theta)$
4. $-\tan(\theta)$
5. $-\sin(\theta)$

3.27: 7.

3.28: $-\frac{\pi}{3} + \frac{k\pi}{2}$ for integers k .

3.29: $2\sec^2(\theta)(1 - \tan(\theta))$.

3.30: Omitted

Chapter 4. Trigonometry II

Quick Reponse Questions:

4.11: B

4.16: A

4.12: D

4.17: B

4.13: C

4.18: 90

4.14: A

4.19: 289

4.15: B

4.20: -1

Practice Questions:

4.21: Omitted

4.25: $\frac{1}{4} \sin(4x)$

4.22(a): Omitted

4.26: $\frac{204}{325}$.

4.22(b): Omitted

4.27: Omitted

4.22(c): Omitted

4.23: Omitted

4.28(a): $0, \pi/6, \pi, 11\pi/6$.

4.24(a): $\frac{-1}{2}$.

4.28(b): $x = \pi/6, 5\pi/6, 3\pi/2$.

4.24(b): 1

4.29: 3.

4.24(c): $2 + \sqrt{3}$.

4.30: $\angle B = 105^\circ, \angle C = 15^\circ$.

Chapter 5. Areas I

Quick Reponse Questions:

5.11: Yes

5.16: 36

5.12: 75

5.17: 11.45

5.13: 32

5.18: 8

5.14: 12

5.19: 15

5.15: 7.2

5.20: 46

Practice Questions:

5.21(a): Omitted

5.26: $2 \times 5, 2 \times 6$ or $1 \times 10, 1 \times 12$.

5.21(b): Omitted

5.27: Omitted

5.22: Omitted

5.28: 24.

5.23: Omitted

5.29: Omitted

5.24: $1/2$.

5.30(a): Omitted

5.25: $2\sqrt{s(s-a)(s-b)(s-d)}$.

5.30(b): $1/2$

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: Omitted

6.26: $14\sqrt{5}$.

6.22(a): Omitted

6.27: 3.

6.22(b): Omitted

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

6.23: $\frac{2}{3}$.

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

6.24: $48\sqrt{2}$.

6.30: Omitted

6.25: 84.

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(a): Omitted

8.28: 8

8.23(b): Omitted

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

8.24: Omitted

8.25: 3, 12.

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

8.26(a): Omitted

Chapter 9. Solid Geometry

Quick Reponse Questions:

9.11: 18

9.16: 20

9.12: 452.2

9.17: 2.8

9.13: 339.1

9.18: 96

9.14: 512

9.19: 87.5

9.15: 16

9.20: 678.2

Practice Questions:

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

9.25: $\frac{2\sqrt{6}}{3}$

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

9.26: $\frac{1}{2}$

9.22: 1/2.

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

9.23(a): 6, 9, 5.

9.28: 1 : 3 : 3 : 5.

9.23(b): 7 : 8 for both.

9.29: 5, 5.

9.24(a): 8.

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

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