Math Challenge I-C: Geometry

Answer Key

Areteem Institute

Chapter 1. Plane Geometry and Parallel Lines

Quick Reponse Questions:

1.11: B

1.12: 42

1.13: 48

1.14: 115

1.15: 0.25

1.16: 7

1.17: -2

1.18: B

1.19: C

1.20: C

Practice Questions:

1.21: $y = \frac{-1}{2}x + \frac{9}{2}$

1.22: $(-6, 1)$

1.23: $k = -1$ or $k = 5$

1.24: $x_C = 1$ or $x_C = 3$

1.25: 75°

1.26: $\angle 2 = 70^\circ$, $\angle 3 = 50^\circ$, $\angle 4 = 60^\circ$, $\angle 7 = 75^\circ$.

1.27: Omitted

1.28: 60°

1.29: 25

1.30: 11 : 7

Chapter 2. Geometric Measurements

Quick Reponse Questions:

2.11: 7

2.12: 13

2.13: C

2.14: 20

2.15: 1

2.16: 3

2.17: 13

2.18: 17

2.19: Yes

2.20: 117

Practice Questions:

2.21: 20

2.22: $6\sqrt{5}, 5\sqrt{5}$

2.23: 17

2.24: Omitted

2.25: 10

2.26(a): Omitted

2.26(b): Omitted

2.27: 121

2.28: $4\sqrt{2}$

2.29: 572

2.30: 6

Chapter 3. Congruent and Similar Triangles

Quick Reponse Questions:

3.11: Yes

3.12: No

3.13: 5

3.14: No

3.15: 8

3.16: 6

3.17: C

3.18: Yes

3.19: B

3.20: 45

Practice Questions:

3.21: Omitted

3.22: 20

3.23: Omitted

3.24: 25

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

3.26: $1:1:\sqrt{2}$

3.27: 105

3.28: $y=3x-5$

3.29: $\left(\frac{7}{2},\frac{11}{2}\right),\left(\frac{3}{2},-\frac{1}{2}\right)$

3.30: $12\sqrt{3}-18$

Chapter 4. Right Triangles and Trigonometry

Quick Reponse Questions:

4.11: 18

4.12: 4

4.13: C

4.14: 29.9

4.15: Yes

4.16: No

4.17: 184

4.18: B

4.19: 9.8

4.20: 45

Practice Questions:

4.21(a): $\frac{1}{2}$

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

4.21(c): $\frac{\sqrt{3}}{3}$

4.22(a): $\sin(\theta) = \frac{3\sqrt{10}}{10}$, $\cos(\theta) = \frac{\sqrt{10}}{5}$, $\tan(\theta) = \frac{3}{2}$

4.22(b): $\sin(\theta) = \frac{\sqrt{55}}{8}$, $\cos(\theta) = \frac{3}{8}$, $\tan(\theta) = \frac{\sqrt{55}}{3}$

4.23(a): $\frac{2\sqrt{13}}{13}$

4.23(b): $\frac{3\sqrt{13}}{13}$

4.24(a): $a = 10, b = 24, c = 26$

4.24(b): $a = 4\sqrt{2}, b = 2, c = 6$

4.25: Omitted

4.26: Omitted

4.27: $\frac{240}{17}$

4.28: 58

4.29: 14.9 ft

4.30: 4.86 feet

Chapter 5. Polygons

Quick Reponse Questions:

5.11: Yes

5.12: No

5.13: 130

5.14: 360

5.15: C

5.16: 48

5.17: C.

5.18: 18

5.19: 72

5.20: 50

Practice Questions:

5.21: 2: Triangles and Hexagons

5.22: 22

5.23: $82.5°, 37.5°$

5.24: 14

5.25: $2\sqrt{3}+4$

5.26: $10\sqrt{3}+10$

5.27: 12

5.28: 3

5.29: Omitted

5.30(a): $\frac{3\sqrt{3}}{2}$

5.30(b): 3

Chapter 6. Circles

Quick Reponse Questions:

6.11: 12

6.12: 25.1

6.13: 201

6.14: 72

6.15: 8

6.16: C

6.17: 17

6.18: 40

6.19: 84

6.20: 5

Practice Questions:

6.21: $x^2+y^2=6x+8y+15$

6.22: 2

6.23: Omitted

6.24: Omitted

6.25: 46

6.26: 4

6.27: They are the same.

6.28: 25

6.29: $y=x$.

6.30: 20

Chapter 7. Geometry in Three Dimensions

Quick Reponse Questions:

7.11: 5

7.12: B

7.13: A

7.14: B

7.15: 268

7.16: 201

7.17: B

7.18: 214

7.19: 4

7.20: 8

Practice Questions:

7.21(a): Yes

7.21(b): No

7.21(c): Yes

7.22: $x = -y + 2 = -z + 1$

7.23: 12

7.24: 18

7.25: 4 vertices, 6 edges, 4 faces

7.26: Omitted

7.27: 6000

7.28: 512

7.29: The one ball of radius 4 has more volume

7.30: The two balls of radius 3 have more combined surface area

Chapter 8. Solids

Quick Reponse Questions:

8.11: 780

8.12: 640

8.13: 10

8.14: 12

8.15: 48

8.16: 96

8.17: 9

8.18: 16

8.19: 9

8.20: 75

Practice Questions:

8.21: Volume: $\frac{\sqrt{3}}{4}$, Surface Area: $\frac{\sqrt{3}}{2}+3$

8.22: $\frac{3}{4}$ inches

8.23: $\frac{2\sqrt{2}}{3}$

8.24: $a^2\sqrt{3}$

8.25: 36π

8.26: $\frac{4}{\sqrt[3]{2}} = 2\sqrt[3]{4}$

8.27: $\sqrt{3}:1$

8.28: $\sqrt{2}$

8.29: $\frac{1}{3}$

8.30: 216π

Chapter 9. Conic Sections and 3-D Graphing

Quick Reponse Questions:

9.11: C

9.12: A

9.13: D

9.14: B

9.15: 8

9.16: 2.7

9.17: D

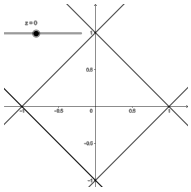
9.18: A

9.19: C

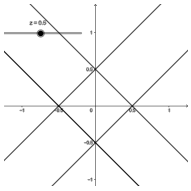
9.20: Yes

Practice Questions:

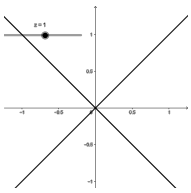
9.21(a):



9.21(b):



9.21(c):



9.22: $\frac{2}{3}$

9.23: 8π

9.24: $\left(-\frac{3}{2},-\frac{3}{2},0\right)$

9.25: Answers may vary. Easy points are $(\pm 3,0,0)$, $(0,1,4)$, $\left(0,-\frac{3}{5},-\frac{12}{5}\right)$

9.26: Ellipse

9.27: Hyperbola opening up/down

9.28: $(\pm 3,\pm\sqrt{3}$ (four total intersection points)

9.29: Omitted

9.30: Omitted