

# **Math Challenge I-C: Algebra**

**Answer Key**

**Areteem Institute**

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## Chapter 1. Solving Equations

### Quick Reponse Questions:

1.11: C

1.16: D

1.12: B

1.17: C

1.13: B

1.18: 5

1.14:  $-4$

1.19: 3.75

1.15: 4

1.20:  $-9$

### Practice Questions:

1.21(a): 23

1.24:  $s = 6$

1.21(b): 2

1.25:  $x = 8$

1.22(a): Yes.

1.26:  $p = 18$

1.22(b): Yes.

1.27:  $w = 4 - t$ .

1.23(a):  $3a + 4b + 9$

1.28: 35

1.23(b):  $\frac{1}{4}s + \frac{1}{4}t - 2$ .

1.29: 8

1.30: \$250

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## Chapter 2. Solving Inequalities

### Quick Reponse Questions:

**2.11:** Yes.

**2.16:** 10

**2.12:** C

**2.17:** -4

**2.13:** A

**2.18:** D

**2.14:** B

**2.19:** B

**2.15:** Yes.

**2.20:** D

### Practice Questions:

**2.21(a):** All real  $x$ :  $(-\infty, \infty)$

**2.25:**  $(0, 40]$

**2.21(b):**  $x < 0$ :  $(-\infty, 0)$

**2.26:** At most 18 feet wide.

**2.22(a):**  $[-3, 6)$

**2.27:** At least 5 hours and 20 minutes.

**2.22(b):**  $(4, \infty)$

**2.28:** At least 166.

**2.23:**  $\left(\frac{37}{34}, \infty\right)$

**2.29:**  $-5 < p < 5$ :  $(-5, 5)$

**2.24:**  $b \geq \frac{20}{3} - \frac{7}{3}a$

**2.30:**  $s < -9$ :  $(-\infty, -9)$

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## Chapter 3. Absolute Values

### Quick Reponse Questions:

**3.11:**  $-1$

**3.16:**  $0$

**3.12:**  $9$

**3.17:**  $0$

**3.13:**  $0$

**3.18:**  $1$

**3.14:**  $C$

**3.19:**  $7$

**3.15:**  $C$

**3.20:**  $6$

### Practice Questions:

**3.21(a):**  $-1$

**3.25(a):** No solution

**3.21(b):**  $1$

**3.25(b):**  $\left(\frac{-55}{4}, \frac{-17}{4}\right)$

**3.22(a):**  $x = 2, 14$

**3.26:**  $x = -3, 3$

**3.22(b):**  $x = -7, -1$

**3.27:**  $x = 0$

**3.23(a):**  $\frac{-13}{7}, \frac{-5}{7}$

**3.28:**  $x = -12, -4, 4$

**3.23(b):** No solution

**3.29:**  $x = 2$

**3.24(a):**  $-4 \leq x \leq 4: [-4, 4]$

**3.30:** All real  $x: (-\infty, \infty)$

**3.24(b):**  $x < 1$  or  $x > 5: (-\infty, 1) \cup (5, \infty)$

## Chapter 4. Linear Functions

### Quick Reponse Questions:

4.11: B

4.16: D

4.12:  $-2$

4.17: B

4.13: 3

4.18: A

4.14: C

4.19: Yes.

4.15:  $-2.5$

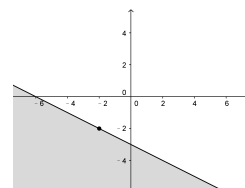
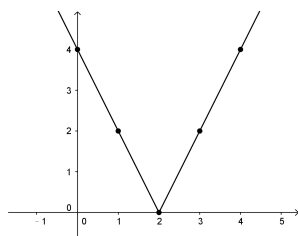
4.20: C

### Practice Questions:

4.21: A: Quadrant I, B:  $x$ -axis, C: Quadrant III, D:  $x$ -axis

4.28:

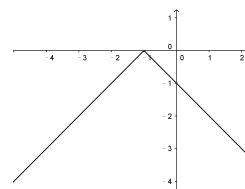
4.22:



4.23(a):  $\frac{4}{11}$

4.29:

4.23(b): Undefined.

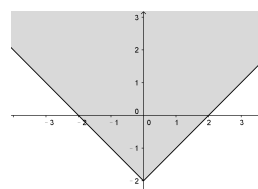


4.24:  $-1$

4.30:

4.25:  $y = 2x + 2$

4.26:  $y - 2 = -(x + 2)$  or  $y + 2 = -(x - 2)$



4.27:  $-3x + y = 3$

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## Chapter 5. Prob. Solving with Linear Functions

### Quick Reponse Questions:

**5.11:** C.

**5.16:** D.

**5.12:** D.

**5.17:** 96

**5.13:** B.

**5.18:** 40

**5.14:** D.

**5.19:** 21

**5.15:** A.

**5.20:** B.

### Practice Questions:

**5.21(a):**  $4x + y = 0$

**5.26:** 89.15

**5.21(b):**  $-4x + 3y = 12$

**5.27:**  $y \geq -\frac{5}{6}x + \frac{200}{3}$

**5.22:**  $y = x - 1$  and  $y = -x + 1$ .

**5.28:**  $y = -\frac{1}{2}x + 5$

**5.23:**  $y = -\frac{1}{3}x + \frac{5}{9}$

**5.29:** 675

**5.24:** Answers may vary.

**5.30:** 70%

**5.25:**  $y = 16$  or  $y = 100$ .

## Chapter 6. Systems of Equations

### Quick Reponse Questions:

**6.11:** No

**6.16:** 7

**6.12:** B

**6.17:** 1

**6.13:** D

**6.18:** 5

**6.14:** C

**6.19:**  $-3$

**6.15:** A

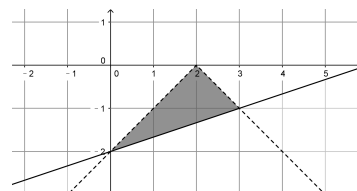
**6.20:** 2

### Practice Questions:

**6.21:**  $(-1, 1)$  and  $(2, 4)$

**6.26:**

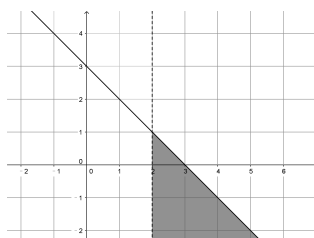
**6.22:**  $(16, 2)$



**6.23:**  $(12, -8)$

**6.24:**  $(600, 500)$

**6.25:**



**6.27:**  $(2, 4, 3)$

**6.28:**  $(2, 5, -3)$

**6.29:** No solutions exist

**6.30:**  $(100, 0.5)$

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## Chapter 7. Prob. Solving with Systems

### Quick Reponse Questions:

**7.11:** 12

**7.16:** C

**7.12:** 2

**7.17:** A

**7.13:** 7

**7.18:** D

**7.14:** 54

**7.19:** 108

**7.15:** 6.5

**7.20:** 40

### Practice Questions:

**7.21:**  $(-1, 1.25, 3)$

**7.26:** Starfish: 20, Beetles: 20, Crabs: 10

**7.22:** 20 red, 30 green, 30 blue

**7.27:** James: 1000, Paul: 500, Wade: 500, Anthony: 0

**7.23:** Ben: 10 days, Jack: 15 days

**7.28:** Rob to Jon is 1 : 2

**7.24:** Stock A: \$150, Stock B: \$800, Stock C: \$50.

**7.29:** No

**7.25:** Chickens: 20, Rabbits: 40

**7.30:** 3 pounds



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## Chapter 8. Exponents and Radicals

### Quick Reponse Questions:

**8.11:** 125

**8.16:** 7

**8.12:** A

**8.17:** 10

**8.13:** 9

**8.18:** 27

**8.14:** D

**8.19:** 1.5

**8.15:** B

**8.20:** C

### Practice Questions:

**8.21(a):**  $9x^6$

**8.27:**  $\frac{36s^4t^4}{r^2}$

**8.21(b):** 25

**8.28:**  $\frac{2\sqrt{2x} - \sqrt{2}}{4}$

**8.22:**  $5\sqrt{10}$

**8.29:**  $\frac{\sqrt[3]{6}}{3}$

**8.23:**  $4y\sqrt{3xy}$

**8.24:**  $2x^2y + 6xy - 2x^2$

**8.30:**  $\frac{\sqrt[3]{xy^2}}{y}$

**8.25:**  $\sqrt{2} + 2\sqrt{6}$

**8.26:**  $x\sqrt{5} + 5\sqrt{x}$

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## Chapter 9. Problem Solving with Exponents

### Quick Reponse Questions:

**9.11:** D

**9.16:** 23

**9.12:** B

**9.17:** 10

**9.13:** 6

**9.18:** C

**9.14:** C

**9.19:** 12

**9.15:** A

**9.20:** B

### Practice Questions:

**9.21(a):**  $11\sqrt{3}$

**9.25:**  $8 + 4\sqrt{3}$

**9.21(b):**  $x^3\sqrt{5} + 5x^2 + 5x^2\sqrt{2}$

**9.26:**  $3\sqrt{2} + \sqrt{6}$

**9.22(a):**  $4x^2 - 5x - 6$

**9.27:**  $\frac{r\sqrt{r} + 2r + \sqrt{r}}{r - 1}$

**9.22(b):**  $2x^2y + y^2 - 6x^2 - 3y$

**9.28:**  $\sqrt{2} + 1$

**9.23:**  $4\sqrt{2} - 2\sqrt{14}$

**9.29:** 2

**9.24:** 7

**9.30:**  $x^2 + +2x + 2x\sqrt{2} + 2\sqrt{2} + 3$