

# ACT Math Review Answers

## Lesson 2. Integers and Basic Arithmetic

### Exercise 1 (Page 10)

1. For example,  $-10, -8, -6, -4, -2$ .
2. For example,  $-2, -1, 0, 1, 2$ .
3.  $2, 3, 5, 7, 11, 13, 17, 19, 23, 29$
4.  $-5$
5.  $-4$
6. For example,  $275$ .
7. (a) Find the greatest multiple of 5 that is still less than 99 and find the difference between that number and 99. That multiple is 95, so the remainder is 4.  
(b) The greatest multiple of 10 that is still less than 12,345,671 is 12,345,670, so the remainder is 1.
8. 21
9. odd
10. (a) yes (b) no (c) no (d) no
11. even
12.  $56 = 2 \cdot 2 \cdot 2 \cdot 7$
13. positive, odd
14. 26
15.  $-4$
16. The distributive law results in  $3x + 6y - 5xy + 20x$ . Although simplifying algebraic expressions has not yet been discussed, this expression can be simplified to  $23x + 6y - 5xy$ .
17.  $2y(2xz - 6x + z)$

### Practice – Order of Operation (Page 11)

- |           |           |           |           |          |
|-----------|-----------|-----------|-----------|----------|
| 1. 24     | 2. $-1$   | 3. 5      | 4. 180    | 5. 4     |
| 6. 8      | 7. 1      | 8. 8      | 9. 6      | 10. $-6$ |
| 11. $-10$ | 12. $-9$  | 13. 20    | 14. $-22$ | 15. 2    |
| 16. 28    | 17. $-40$ | 18. $-15$ | 19. 3     | 20. 0    |
| 21. $-18$ | 22. $-3$  | 23. $-4$  | 24. 3     | 25. 2    |

### Practice Set (Page 12–14)

- |      |      |      |      |      |
|------|------|------|------|------|
| 1. E | 2. A | 3. 1 | 4. 2 | 5. A |
|------|------|------|------|------|

- |       |        |         |         |       |
|-------|--------|---------|---------|-------|
| 6. 18 | 7. E   | 8. E    | 9. E    | 10. B |
| 11. C | 12. 2  | 13. 301 | 14. 121 | 15. D |
| 16. B | 17. E  | 18. D   | 19. A   | 20. 1 |
| 21. 9 | 22. 72 |         |         |       |

Practice: Integers and Basic Arithmetic (Page 15–20)

- |       |       |              |       |       |
|-------|-------|--------------|-------|-------|
| 1. E  | 2. F  | 3. B         | 4. J  | 5. C  |
| 6. K  | 7. C  | 8. G         | 9. D  | 10. K |
| 11. C | 12. K | 13. C        | 14. G | 15. A |
| 16. J | 17. B | 18. All real | 19. A | 20. J |
| 21. C | 22. H | 23. B        | 24. A | 25. K |
| 26. E | 27. D | 28. H        | 29. D | 30. H |
| 31. C | 32. F | 33. B        | 34. A | 35. A |
| 36. K | 37. E | 38. H        | 39. B | 40. A |
| 41. G | 42. B | 43. H        | 44. D | 45. J |
| 46. D | 47. J | 48. D        | 49. K | 50. E |
| 51. B | 52. G | 53. C        | 54. F | 55. B |
| 56. G | 57. E | 58. FJ       | 59. D | 60. G |
| 61. A | 62. H |              |       |       |

**Lesson 3 Fractions**

Exercise 2 (Page 24)

- (a)  $\frac{1}{4}$  (c)  $\frac{17}{13}$  (e)  $\frac{13}{8}$   
(b)  $\frac{3}{4}$  (d)  $\frac{45}{56}$  (f)  $\frac{4}{21}$
- (a)  $\frac{26}{15}$  (c)  $\frac{4}{125}$  (e)  $-\frac{13}{32}$   
(b)  $\frac{1}{9}$  (d)  $\frac{35}{6}$  (f)  $\frac{9}{4}$
- (a)  $\frac{28}{53}$  (b)  $\frac{14}{21}$  (c)  $\frac{7}{5}$
- $\frac{39}{7}$
- $3\frac{4}{7}$
- 12, 18

Practice Set (Page 25–26)

- |        |       |        |                    |       |
|--------|-------|--------|--------------------|-------|
| 1. D   | 2. D  | 3. D   | 4. C               | 5. C  |
| 6. 48  | 7. C  | 8. B   | 9. C               | 10. D |
| 11. 18 | 12. E | 13. 18 | 14. $\frac{5}{36}$ | 15. E |
| 16. E  |       |        |                    |       |

Practice: Fractions (Page 27–29)

- |        |       |       |       |       |
|--------|-------|-------|-------|-------|
| 1. A   | 2. F  | 3. C  | 4. H  | 5. A  |
| 6. F   | 7. D  | 8. J  | 9. B  | 10. F |
| 11. E  | 12. F | 13. D | 14. G | 15. D |
| 16. F  | 17. E | 18. C | 19. H | 20. B |
| 21. G  | 22. D | 23. H | 24. B | 25. H |
| 26. 10 |       |       |       |       |

**Lesson 4 – Decimals**

Exercise 3 (Page 34)

- 106.174
- 115.513
- 11.325
- 45.3
- 19.2
- 0.304
- .002
- 6.5
- $\frac{1}{8}$
- approximately  $\frac{1}{2}$

Practice (Page 35–39)

- |            |             |               |             |         |
|------------|-------------|---------------|-------------|---------|
| 1. B       | 2. A        | 3. C          | 4. B        | 5. C    |
| 6. D       | 7. A        | 8. B          | 9. B        | 10. C   |
| 11. A      | 12. C       | 13. A         | 14. B       | 15. C   |
| 16. B      | 17. D       | 18. C         | 19. D       | 20. D   |
| 21. 4.9    | 22. A) \$51 | B) \$57.63    | 23. A) 20   | B) 0.5  |
| 24. \$49.3 | 25. No      | 26. 7.96      | 27. \$48.03 |         |
| 28. A) 70% | B) 8        | 29. A) \$14.3 | B) 124.3    | 30. Yes |

Practice: Decimals (Page 40–41)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. B  | 2. K  | 3. A  | 4. J  | 5. E  |
| 6. F  | 7. D  | 8. K  | 9. E  | 10. J |
| 11. B | 12. F | 13. A | 14. K | 15. C |
| 16. D | 17. J | 18. B |       |       |

## Lesson 5 – Ratios, Proportions, Variations

### Practice Set (Page 46–50)

- |        |       |            |         |        |
|--------|-------|------------|---------|--------|
| 1. D   | 2. C  | 3. D       | 4. B    | 5. C   |
| 6. D   | 7. B  | 8. E       | 9. 240  | 10. B  |
| 11. C  | 12. B | 13. E      | 14. D   | 15. B  |
| 16. D  | 17. D | 18. A      | 19. 600 | 20. 25 |
| 21. 25 | 22. B | 23. E      | 24. 20  | 25. D  |
| 26. B  | 27. C | 28. $11/3$ | 29. D   | 30. 52 |
| 31. E  | 32. 4 |            |         |        |

### Practice: Ratios (Page 51–54)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. A  | 2. J  | 3. B  | 4. K  | 5. E  |
| 6. F  | 7. B  | 8. J  | 9. B  | 10. J |
| 11. B | 12. B | 13. H | 14. B | 15. J |
| 16. C | 17. K | 18. A | 19. J | 20. E |
| 21. H | 22. D | 23. F | 24. D | 25. G |
| 26. E | 27. K | 28. E | 29. F | 30. C |
| 31. F | 32. D | 33. K | 34. C |       |

## Lesson 6 – Percents

### Practice Set (Page 58–61)

- |         |        |        |       |         |
|---------|--------|--------|-------|---------|
| 1. B    | 2. E   | 3. C   | 4. B  | 5. C    |
| 6. D    | 7. A   | 8. B   | 9. C  | 10. E   |
| 11. 0.6 | 12. E  | 13. C  | 14. B | 15. B   |
| 16. B   | 17. E  | 18. C  | 19. E | 20. 125 |
| 21. C   | 22. C  | 23. B  | 24. A | 25. C   |
| 26. D   | 27. 35 | 28. 45 |       |         |

### Practice: Percents (Page 62–70)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. D  | 2. H  | 3. E  | 4. F  | 5. C  |
| 6. F  | 7. B  | 8. H  | 9. A  | 10. G |
| 11. E | 12. H | 13. D | 14. H | 15. D |
| 16. B | 17. H | 18. D | 19. H | 20. C |
| 21. H | 22. B | 23. G | 24. B | 25. F |
| 26. G | 27. B | 28. G | 29. B | 30. B |
| 31. J | 32. D | 33. H | 34. A | 35. B |
| 36. H | 37. A | 38. G | 39. D | 40. C |
| 41. K | 42. D | 43. K | 44. A | 45. G |

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 46. D | 47. F | 48. A | 49. K | 50. A |
| 51. K | 51. E | 53. H | 54. B | 55. K |
| 56. C | 57. K | 58. A | 59. C | 60. C |
| 61. F | 62. B | 63. K | 64. A | 65. E |
| 66. H | 67. B | 68. A | 69. H | 70. C |

## Lesson 7 – Basic Statistics

### Practice Set (Page 76–78)

- |       |        |          |         |        |
|-------|--------|----------|---------|--------|
| 1. A  | 2. E   | 3. B     | 4. B    | 5. E   |
| 6. C  | 7. E   | 8. 7     | 9. D    | 10. B  |
| 11. C | 12. A  | 13. C    | 14. 3.5 | 15. B  |
| 16. C | 17. 93 | 18. 98   | 19. C   | 20. B  |
| 21. D | 22. C  | 23. 46.7 | 24. 517 | 25. 12 |

### Practice: Statistics (Page 79–82)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. D  | 2. F  | 3. C  | 4. G  | 5. B  |
| 6. H  | 7. A  | 8. J  | 9. E  | 10. G |
| 11. B | 12. H | 13. B | 14. J | 15. C |
| 16. G | 17. B | 18. J | 19. D | 20. E |
| 21. G | 22. A | 23. A | 24. F | 25. D |
| 26. J | 27. D | 28. J | 29. E | 30. E |
| 31. J |       |       |       |       |

## Lesson 8 – Probability

### Practice Problems (Page 91–97)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. E  | 2. A  | 3. C  | 4. D  | 5. E  |
| 6. E  | 7. C  | 8. B  | 9. A  | 10. C |
| 11. A | 12. C | 13. E | 14. C | 15. D |
| 16. C | 17. B | 18. E | 19. A | 20. B |
| 21. B | 22. A | 23. B | 24. E | 25. E |
| 26. D | 27. D | 28. D |       |       |

### Practice – Probability (Page 98–100)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. A  | 2. G  | 3. B  | 4. H  | 5. C  |
| 6. H  | 7. D  | 8. G  | 9. A  | 10. J |
| 11. D | 12. H | 13. C | 14. G | 15. A |
| 16. H | 17. B | 18. K | 19. B | 20. J |
| 21. B | 22. J | 23. C | 24. G | 25. C |

26. G

27. D

## Lesson 9 – Permutations and Combinations

### Practice Problems (Page 106)

- |        |           |        |       |       |
|--------|-----------|--------|-------|-------|
| 1. 240 | 2. a) 150 | b) 265 | c) 36 | d) 65 |
| 3. 8   | 4. 630    |        |       |       |

### Practice Problems (Page 107–111)

- |         |        |       |         |        |
|---------|--------|-------|---------|--------|
| 1. D    | 2. A   | 3. B  | 4. 12   | 5. A   |
| 6. A    | 7. C   | 8. B  | 9. 2592 | 10. B  |
| 11. D   | 12. 30 | 13. C | 14. A   | 15. 16 |
| 16. C   | 17. C  | 18. B | 19. D   | 20. C  |
| 21. 165 |        |       |         |        |

### Practice: Permutations/Combinations (Page 112–114)

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

## Lesson 10 – Sequences

### Exercise 4 (Page 116)

- |                   |                    |        |                    |        |
|-------------------|--------------------|--------|--------------------|--------|
| 1. $-6$           | 2. 20              | 3. 120 | 4. 15              | 5. 594 |
| 6. $\frac{5}{64}$ | 7. $40\frac{1}{3}$ | 8. 24  | 9. $\frac{34}{99}$ |        |

### Practice (Page 117–118)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. c  | 2. d  | 3. e  | 4. c  | 5. e  |
| 6. b  | 7. a  | 8. a  | 9. b  | 10. a |
| 11. b | 12. c | 13. e | 14. b | 15. d |
| 16. d |       |       |       |       |

### Practice: Sequences (Page 119–120)

- |       |       |      |      |       |
|-------|-------|------|------|-------|
| 1. D  | 2. H  | 3. A | 4. F | 5. A  |
| 6. G  | 7. B  | 8. D | 9. J | 10. A |
| 11. J | 12. B |      |      |       |

## Lesson 11 – Set Operations

### Exercises (Page 130–133)

- a) {6}, b) {2, 3, 4, 6, 8, 9, 10}, c) {1, 3, 9}, d) {1, 3, 4, 5, 6, 7, 9}, e) {2, 3, 8, 9, 10}, f) A
- a) T b) F c) T
- a) {1, 3, 4, 5, 7, 9}, b) {1, 5, 9} 4. a) {3, 12}, b) {6}, c) {3, 8, 10}, d) {3, 12}, e) {6}, f) all integers except 6, g) {(3, 6), (3, 8), (3, 10), (6, 6), (6, 8), (6, 10)}
- { $\dots, -4, -3, -2, -1, 0, 1, 2$ }
- 63
- a)  $(A - B) \cup (B - A)$  b)  $(A \cup B)' \cup (A \cap B)$  c)  $B - A$  d)  $A - (A \cap B \cap C)$   
e)  $[(A \cap B) \cup (A \cap C) \cup (B \cap A)] - [A \cap B \cap C]$   
f)  $[(A \cup B) - (A \cap B)] - (B \cap C)$
- b) 19
- b) 19
- $18 + 6 - 4 = 20$
- a)  $\{A♥, K♥\}, \{A♥, K♥, Q♥\}, \{A♥, K♥, J♥\}, \{A♥, K♥, Q♥, J♥\}$ . b) 250.
- a) True, b) False, c) True, d) True, e) False, f) True, g) True, h) False, i) True, j) True, k) False

### Practice: Set Operations (Page 134–136)

- |       |       |  |       |       |
|-------|-------|--|-------|-------|
| 1. C  | 2. E  | 3. D (Typo in question, should be “what is the fifth number) |       |       |
| 6. K  | 7. B  | 8. H   | 9. B  | 10. D |
| 11. B | 12. J | 13. A  | 14. F | 15. A |
| 16. B | 17. E | 18. C  | 19. D |       |

## Lesson 12 – Algebraic Expressions

### Practice (Page 141–143)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. d  | 2. a  | 3. d  | 4. b  | 5. c  |
| 6. b  | 7. e  | 8. e  | 9. c  | 10. a |
| 11. c | 12. c | 13. c | 14. a | 15. d |
| 16. e | 17. d | 18. b | 19. a | 20. b |

### Practice: Algebraic Expressions (Page 144–146)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. C  | 2. F  | 3. D  | 4. H  | 5. A  |
| 6. H  | 7. D  | 8. H  | 9. D  | 10. B |
| 11. G | 12. D | 13. J | 14. E | 15. F |

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 16. E | 17. K | 18. A | 19. J | 20. D |
| 21. H | 22. B | 23. F | 24. A | 25. F |
| 26. A | 27. H | 28. A |       |       |

### Lesson 13 – Exponents

#### Practice (Page 155–157)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. b  | 2. a  | 3. a  | 4. a  | 5. c  |
| 6. b  | 7. d  | 8. c  | 9. e  | 10. b |
| 11. e | 12. d | 13. c | 14. b | 15. c |
| 16. e | 17. d | 18. d | 19. e | 20. d |

#### Exercise 5 (Page 158)

- |                             |                            |                |                        |                   |
|-----------------------------|----------------------------|----------------|------------------------|-------------------|
| 1. $15^4$                   | 2. $a^{16}$                | 3. $6m^6n^7$   | 4. $-\frac{4b^2}{a^5}$ | 5. $x^{50}y^{60}$ |
| 6. $\frac{8b^{11}}{a^{17}}$ | 7. $\frac{x^3z^{20}}{y^3}$ | 8. $-10m^4n^4$ | 9. $\frac{7a^4b}{2}$   | 10. $6x^8y^6$     |

#### Practice: Exponents (Page 159–161)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. C  | 2. H  | 3. B  | 4. F  | 5. D  |
| 6. J  | 7. E  | 8. G  | 9. C  | 10. J |
| 11. C | 12. F | 13. C | 14. H | 15. D |
| 16. J | 17. A | 18. J | 19. B | 20. J |
| 21. D | 22. H | 23. B | 24. H | 25. E |
| 26. F | 27. D | 28. F | 29. D |       |

### Lesson 14 – Basic Polynomials

#### Exercise 6 (Page 167–168)

- degree: 3, LC: 2, LT:  $2x^3$
- degree: 2, LC:  $-1$ , LT:  $-x^2$
- degree: 1, LC: 1, LT:  $x$
- degree: 17, LC: 3, LT:  $23x^{17}$
- degree: 1, LC:  $-4$ , LT:  $-4x$
- $x + 8$
- $-2x + 12$
- $4x^5 + 7x^2 - 2x + 5$
- $-16x - 13$
- $-5x^4 + 2x + 10$
- $3x^3 + 21x^2$
- $-10x^2 + 15x$
- $18x^3 + 6x^2$
- $2x^4 + 8x^2 - 12x$
- $x^3 - 5x^2 + 6x - 30$
- $5x^5 + 10x^4 - 5x^3 + 8x^2 + 16x - 8$
- $x^2$
- $5x^5$
- $84x^9$
- $2x^{21} - 5x^2$
- $8x^4$
- $3x^3$
- $x^8$
- $5x^7$
- $n_1 + n_2 + \dots + n_k$

Practice: Polynomials (Page 169)

- |      |      |      |      |       |
|------|------|------|------|-------|
| 1. D | 2.G  | 3. B | 4. G | 5. C  |
| 6. F | 7. B | 8. F | 9. A | 10. F |

Polynomial Functions (Page 170–180)

- |        |       |       |       |        |
|--------|-------|-------|-------|--------|
| 1. A   | 2. A  | 3. A  | 4. D  | 5. A   |
| 6. D   | 7. A  | 8. A  | 9. A  | 10. B  |
| 11. C  | 12. B | 13. C | 14. A | 15. A  |
| 16. B  | 17. C | 18. A | 19. A | 20. A  |
| 21. B  | 22. A | 23. A | 24. B | 25. A  |
| 26. B  | 27. A | 28. B | 29. C | 30. A  |
| 31. D  | 32. D | 33. B | 34. A | 35. A  |
| 36. D  | 37. A | 38. A | 39. D | 40. B  |
| 41. A  | 42. A | 43. A | 44. A | 45. 16 |
| 46. 45 | 47. 2 |       |       |        |

**Lesson 15 – Linear Equations**

Exercise 7 (Page 194)

- 5 nickels
- 4 h and 10 min, later
- $3\frac{1}{3}$  lb of peanuts and  $6\frac{2}{3}$  lb of raisins
- 30 mg of full strength and 70 mg of 50% solution
- 5:00 p.m.
- 250 pennies
- 481 students
- $1\frac{1}{3}$  oz
- 1:25 p.m.
- 2:30 p.m.

Practice: Linear Equations (Page 195–199)

Solving Linear Equations

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. B  | 2. F  | 3. E  | 4. F  | 5. C  |
| 6. J  | 7. D  | 8. J  | 9. C  | 10. F |
| 11. C | 12. F | 13. D | 14. F | 15. C |
| 16. K | 17. C | 18. K | 19. E | 20. B |
| 21. B | 22. F | 23. D | 24. J | 25. B |
| 26. H | 27. A | 28. K |       |       |

## System of Equations

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. C  | 2. F  | 3. B  | 4. F  | 5. A  |
| 6. F  | 7. A  | 8. J  | 9. A  | 10. F |
| 11. A | 12. K | 13. D | 14. J | 15. B |
| 16. J | 17. A | 18. F | 19. B |       |

## Lesson 16 – Quadratic Equations

### Exercise 8 (Page 205–206)

- |                                       |  |                   |                  |
|---------------------------------------|--|-------------------|------------------|
| 1. $1, x = 2$                         | 2. 0                                     | 3. 0              | 4. $2, x = 0, 4$ |
| 5. 0                                  | 6. $2, x = \frac{5 \pm 2\sqrt{15}}{7}$   | 7. $2, x = \pm 2$ | 8. $1, x = 0.2$  |
| 9. $2, x = \frac{7}{3}, -\frac{3}{2}$ | 10. $2, x = \frac{19 \pm \sqrt{385}}{4}$ |                   |                  |

### Quadratic Equations (Page 207–208)

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

### Practice: Quadratic Equations (Page 109–211)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. B  | 2. G  | 3. B  | 4. K  | 5. D  |
| 6. F  | 7. A  | 8. H  | 9. D  | 10. F |
| 11. E | 12. K | 13. G | 14. H | 15. D |
| 16. J | 17. A | 18. H | 19. C | 20. H |
| 21. B | 22. K | 23. D | 24. K | 25. A |
| 26. G | 27. D | 28. J | 29. B |       |

## Lesson 17 – Linear Inequalities

### Exercise 9 (Page 215)

- |   |                           |                              |                       |
|---|---------------------------|------------------------------|-----------------------|
| 1. $-4 < x \leq 2$                                      | 2. $-3 < x < 0$           | 3. $0 \leq x \leq 2$         | 4. $-4 \leq x \leq 2$ |
| 5. $x < 1$ or $x > 6$                                   | 6. $x < -4$ or $x \geq 2$ | 7. $x \leq -4$ or $x \geq 1$ |                       |
| 8. between 0.5 and 1.5 seconds after being fired upward |                           |                              |                       |

### Practice: Linear Inequalities (Page 216)

- |      |      |      |      |       |
|------|------|------|------|-------|
| 1. D | 2. H | 3. A | 4. G | 5. B  |
| 6. A | 7. D | 8. J | 9. A | 10. K |

### Inequality Word Problems (Page 217–219)

1. d      2. b      3. a      4. a      5. d  
6. a      7. b      8. d      9. a      10. d  
11. a      12. d      13. a      14. d      15.  $10 + 2d \geq 75$ ; min = 33  
16.  $45 - 20 - 15 \geq 0.65x$ ; max = 7

### **Lesson 18 – Matrix**

#### Exercise 10 (Page 226)

1.  $\begin{bmatrix} 6 & 13 \\ 5 & 21 \end{bmatrix}$       2.  $\begin{bmatrix} 3 \\ -9 \\ -2 \end{bmatrix}$       3.  $\begin{bmatrix} -1 & 3 \\ -6 & 2 \end{bmatrix}$       4.  $\begin{bmatrix} -2 & -9 \\ 0 & -3 \end{bmatrix}$       5.  $\begin{bmatrix} 0 & -1 \\ 9 & 16 \end{bmatrix}$   
6.  $[-8]$       7.  $[34 \ 0 \ 44]$       8.  $\begin{bmatrix} 56 & 25 & 83 \\ -34 & -82 & 2 \\ 44 & 106 & 53 \end{bmatrix}$       9. undefined  
10.  $\begin{bmatrix} -1 & -5 & -6 \\ -1 & -2 & -3 \\ 1 & -9 & -2 \end{bmatrix}$       11.  $x = 2$ ;  $y = 7$ ;  $z = 5$       12.  $m = 6$ ;  $n = -2$ ;  $x = 5$

#### Practice: Matrix (Page 227–228)

1. C      2. G      3. A      4. K      5. A  
6. G      7. B      8. J      9. C      10. H  
11. C

### **Lesson 19 – Functions and Graphs**

#### Practice (Page 241–244)

1. c      2. b      3. d      4. e      5. a  
6. d      7. b      8. e      9. c      10. b  
11. c      12. b      13. a      14. e      15. d  
16. b      17. e      18. a      19. c      20. c  
21. a      22. d      23. e      24. b      25. e

#### Practice: Functions and Graphs (Page 245–249)

1. B      2. F      3. C      4. K      5. B  
6. J      7. A      8. G      9. A      6. K  
11. E      12. H      13. A      14. J      15. C  
16. K      17. C      18. G      19. D      20. K  
21. B      22. J      23. D      24. H      25. A  
26. F      27. C      28. H      29. B      30. H

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 31. B | 32. H | 33. E | 34. F | 35. C |
| 36. J | 37. B | 38. J | 39. B | 40. B |
| 41. G | 42. A | 43. H | 44. B | 45. H |

## Lesson 20 – Coordinate Geometry

### Practice (Page 253–256)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. b  | 2. c  | 3. d  | 4. a  | 5. d  |
| 6. b  | 7. c  | 8. a  | 9. d  | 10. a |
| 11. c | 12. e | 13. d | 14. d | 15. d |
| 16. c | 17. a | 18. e | 19. d | 20. b |
| 21. e | 22. c | 23. c | 24. a | 25. d |

### Practice: Coordinate Geometry (Page 260–262)

- |        |       |       |                  |       |
|--------|-------|-------|------------------|-------|
| 1. D   | 2. K  | 3. C  | 4. G             | 5. C  |
| 6. K   | 7. A  | 8. G  | 9. $\frac{1}{3}$ | 10. J |
| 11. A  | 12. G | 13. D | 14. J            | 15. A |
| 16. FH | 17. D | 18. H | 19. D            | 20. J |
| 21. C  | 22. G | 23. E |                  |       |

## Lesson 21 – Logarithms

### Practice Problems (Page 267–268)

- 0.413
- 24.533
- 7.352
- 3
- 0
- 0.973
- $\log_2 16 = 4$
- $\log_{64} 8 = \frac{1}{2}$
- $\ln 54.60 = 4$
- 2
- 4
- 2
- 0.565
- 1
- 1.380
- $1 + \log x$
- $\ln x + \ln y - \ln z$
- $4 \log_b x - 2 \log_b z$
- $1 + 2 \log_4 x$
- $\frac{1}{2} \log_3(x - 2)$
- $(5 \ln x + 2 \ln z) - 3 \ln y$
- $\frac{1}{2}(\ln 3 + \ln x) - \ln 7$
- $\log \frac{7}{x}$
- $\ln \frac{x^3 y^2}{z^4}$
- $\ln x^3$
- $\log_2 \frac{5x}{3}$
- $\log_4 4x^3$
- $\ln 64x^5$
- $\log_5 \frac{\sqrt{7}}{x^2}$
- 1.48
- 0.792
- 1.434
- 2.562
- 0
- $\log_4 64 = 3$
- $\log_{25} 125 = \frac{3}{2}$
- $e^1 = e$
- $3^{-2} = \frac{1}{9}$
- 3
- $\frac{1}{2}$
- 2
- 2
- 7
- 1
- 0
- 3
- a. 0   b. 3   c. -0.631
- a. -2   b. -1   c. 1.477
- a. 1   b. -1.099   c. 2.303
- a. 2   b. 0.223   c. 7.090
- a. -6   b. 0   c. 22.5
- a. 1   b. 3   c. 1.189
- 1.585
- 2.322
- 2.132
- 1.159
- 1.7959
- 0.556645
- 0.43068
- 0.25193
- 1.02931
- 3.11329
- $\log_4 6 + 4 \log_4 x$
- $\log 2 - 3 \log x$
- $\frac{1}{2} \log_5(x + 2)$
- $\frac{1}{3}(\ln x - \ln 5)$
- $\ln(x + 2) - \ln(x - 2)$
- $\ln x + 2 \ln(x - 3)$
- $\frac{1}{2}(\ln 2 + \ln x) + 5 \ln(x + 3)$
- $2 \log_3 a + \frac{1}{2} \log_3 b - \log_3 c - 5 \log_3 d$
- $\ln \left(\frac{1}{3y}\right)^{2/3}$
- $\log_2 y^5$
- $\log_8 32x^3$
- $\log_4 \frac{3x}{5}$
- $\ln \frac{9}{4x^2}$
- $4 + \ln x^8$
- $\log_2 \left(\frac{k}{k-t}\right)^4$
- $\log_8 \sqrt[3]{ab^2}$
- $\ln(x^3 y^4 z)$
- $\ln \frac{x+4}{x^3 y}$
- False.  $\log_2 4x = 2 + \log_2 x$
- False.  $\ln \frac{5x}{10x} = \ln \frac{1}{2}$
- True
- True
- True
- True

Practice: Logarithms (Page 269)

- |       |      |      |      |       |
|-------|------|------|------|-------|
| 1. D  | 2. K | 3. B | 4. J | 5. E  |
| 6. H  | 7. E | 8. F | 9. C | 10. J |
| 11. C |      |      |      |       |

**Lesson 22 – Triangles and Plane Geometry**

Practice: Angles (Page 277–281)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. d  | 2. e  | 3. c  | 4. a  | 5. b  |
| 6. a  | 7. d  | 8. c  | 9. b  | 10. b |
| 11. a | 12. d | 13. b | 14. a | 15. e |
| 16. e | 17. e | 18. a | 19. c | 20. b |
| 21. e | 22. d | 23. c | 24. d | 25. b |

Practice: Triangles (Page 283–286)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. b  | 2. e  | 3. c  | 4. e  | 5. e  |
| 6. a  | 7. d  | 8. c  | 9. a  | 10. d |
| 11. d | 12. b | 13. b | 14. c | 15. a |
| 16. d | 17. b | 18. d | 19. c | 20. a |

Practice: Right Triangles (Page 288–292)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. e  | 2. d  | 3. b  | 4. c  | 5. b  |
| 6. b  | 7. a  | 8. d  | 9. e  | 10. d |
| 11. e | 12. d | 13. c | 14. c | 15. b |
| 16. c | 17. a | 18. a | 19. a | 20. e |
| 21. e | 22. d | 23. a | 24. b | 25. d |

Practice Set (Page 293–299)

- |             |            |        |            |        |
|-------------|------------|--------|------------|--------|
| 1. 130      | 2. C       | 3. A   | 4. B       | 5. C   |
| 6. B        | 7. E       | 8. E   | 9. B       | 10. D  |
| 11. 4, 6, 8 | 12. $25/4$ | 13. D  | 14. E      | 15. 40 |
| 16. B       | 17. 6      | 18. D  | 19. B      | 20. D  |
| 21. E       | 22. E      | 23. 32 | 24. B      | 25. 1  |
| 26. 18      | 27. 2      | 28. C  | 29. B      | 30. A  |
| 31. B       | 32. E      | 33. A  | 34. $14/3$ |        |

Practice: Right Triangles (Page 300–304)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. C  | 2. F  | 3. B  | 4. A  | 5. D  |
| 6. F  | 7. E  | 8. H  | 9. C  | 10. H |
| 11. B | 12. G | 13. B | 14. H | 15. C |

16. F	17. E	18. F	19. E	20. J
21. E	22. K	23. D	24. D	25. J
26. D	27. A	28. D	29. F	30. D
31. G	32. A	33. G	34. C	35. J
36. C	37. F	38. A	39. D	40. C
41. F	42. B	43. J	44. J	45. B
46. K	47. D	48. F		

### Lesson 23 – Circles

#### Practice (Page 308–312)

1. c	2. b	3. a	4. d	5. d
6. a	7. c	8. b	9. c	10. e
11. e	12. b	13. d	14. d	15. d
16. b	17. e	18. e	19. e	20. c
21. d	22. b	23. c	24. c	25. c
26. b	27. d	28. a	29. a	30. b

#### Practice Set (Page 313–315)

1. B	2. E	3. B	4. A	5. 45
6. A	7. C	8. B	9. A	10. A
11. D	12. B	13. D	14. D	15. A

#### Practice: Circles (Page 316–320)

1. C	2. F	3. D	4. B	5. H
6. E	7. G	8. A	9. G	10. A
11. G	12. C	13. H	14. B	15. H
16. B	17. F	18. B	19. H	20. C
21. F	22. B	23. G	24. D	25. F
26. B	27. G	28. A	29. K	30. B
31. F	32. C	33. D	34. H	35. D
36. F	37. A	38. J	39. B	40. K

### Lesson 24 – Quadrilaterals and Polygons

#### Practice: Quadrilaterals (Page 326–328)

1. a	2. c	3. e	4. d	5. b
6. e	7. a	8. a	9. b	10. a
11. d	12. e	13. b	14. d	15. e

Practice: Polygons (Page 330–331)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. b  | 2. b  | 3. a  | 4. c  | 5. b  |
| 6. a  | 7. e  | 8. d  | 9. c  | 10. e |
| 11. d | 12. b | 13. e | 14. c | 15. a |

Practice Set (Page 332–335)

- |       |        |       |          |       |
|-------|--------|-------|----------|-------|
| 1. B  | 2. 192 | 3. D  | 4. C     | 5. C  |
| 6. B  | 7. 30  | 8. B  | 9. $1/4$ | 10. C |
| 11. A | 12. E  | 13. B | 14. 16   | 15. D |
| 16. B | 17. B  | 18. D | 19. E    | 20. D |

**Lesson 25 – Solid Geometry**

Practice Set (Page 339–342)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. b  | 2. b  | 3. b  | 4. a  | 5. e  |
| 6. c  | 7. a  | 8. d  | 9. c  | 10. d |
| 11. a | 12. d | 13. b | 14. d | 15. a |
| 16. e | 17. c | 18. e | 19. d | 20. a |
| 21. e | 22. c | 23. b | 24. e | 25. e |

Practice: Solid Geometry (Page 343–346)

- |       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 1. B  | 2. F  | 3. E  | 4. K  | 5. B  |
| 6. F  | 7. A  | 8. J  | 9. A  | 10. K |
| 11. D | 12. F | 13. B | 14. F | 15. A |
| 16. G | 17. A | 18. G | 19. A | 20. J |
| 21. A | 22. J | 23. A | 24. K | 25. C |
| 26. F | 27. D | 28. G | 29. B | 30. D |
| 31. G | 32. C | 33. H | 34. B | 35. K |
| 36. C | 37. D | 38. K |       |       |

**Lesson 26 – Trigonometry**

Trigonometry Practice Test (Page 366–371)

- |   |  |              |       |       |
|---|--|--------------|-------|-------|
| 1. a  | 2. b                                     | 3. a         | 4. a  | 5. a  |
| 6. a  | 7. b                                     | 8. a         | 9. d  | 10. c |
| 11. e   | 12. a                                    | 13. d        | 14. c | 15. a |
| 16. e   | 17. c                                    | 18. b        | 19. a | 20. d |
| 21. $\angle A = 57.1^\circ$ ; $\angle B = 32.9^\circ$ ; $b = 27.1$ in | 22. $66.9^\circ, 66.9^\circ, 46.3^\circ$ |              |       |       |
| 23. $\angle Q = 19^\circ$ ; $\angle R = 41^\circ$ ; $r = 6$ cm        | 24. $66.5^\circ$                         |              |       |       |
| 25. 318.1 ft; 96.5ft  | 26. 2                                    | 27. 431.1 km |       |       |

Practice: Trigonometry (Page 372–374)

1. B	2. G	3. E	4. H	5. D
6. F	7. C	8. K	9. C	10. F
11. B	12. A	13. D	14. K	15. B
16. B	17. D	18. H	19. D	20. G
21. B	22. D	23. D	24. F	25. F
26. A	27. E			

**Lesson 27 – ACT Math Tactics**

Practice: ACT Math Tactics (Page 383–384)

1. D	2. H	3. D	4. J	5. D
6. J	7. A	8. K	9. C	10. G
11. C	12. G	13. B	14. F	15. E
16. H	17. E			