

AMC 10/12 Review Answers

Discrete Math

Lesson 1. (Page 45-75)

Intermediate Worksheet

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|--------------|-------------|------------|----------|--------|
| 1. 604800 | 2. 60/7 | 3. 790272 | 4. 210 | 5. 120 |
| 6. 5040 | 7. 1260 | 8. 1000 | 9. 42 | 10. 20 |
| 11. 27600 | 12. 8000000 | 13. 483840 | 14. 1440 | |
| 15. 29937600 | 16. 56 | 17. 4320 | 18. 120 | |
| 19. 12 | 20. 210 | 21. 715 | 22. 56 | 23. 15 |
| 24. 6160 | 25. 15504 | 26. 16 | 27. 8 | 28. 72 |
| 29. 12 | 30. 11440 | 31. 420 | 32. 24 | 33. 24 |
| 34. 4200 | 35. 720 | | | |

Combinatorics Practice Questions

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|-------------|------------|---------|-----------------------|------------|-------|
| 1. A | 2. D | 3. C | 4. A | 5. B | |
| 6. C | 7. B | 8. D | 9. $-\frac{20x}{y^9}$ | 10. 127 | |
| 11. 69 | 12. C | 13. B | 14. C | 15. 16 | |
| 16. A | 17. C | 18. A | 19. B | 20. C | |
| 21. A | 22. 7 | 23. C | 24. C | | |
| 25. a) 4060 | b) 24360 | c) 1900 | | | |
| 26. C | 27. C | 28. B | 29. B | 30. D | |
| 31. B | 32. C | 33. D | 34. C | 35. a) 120 | b) 66 |
| 36. C | 37. C | 38. B | 39. a) 70 | b) 1575 | 40. D |
| 41. B | 42. a) 280 | b) 148 | 43. D | 44. C | 45. C |
| 46. D | 47. C | 48. D | 49. C | 50. B | |
| 51. B | 52. A | 53. D | 54. A | 55. C | |
| 56. A | 57. D | 58. D | 59. B | 60. C | |
| 61. C | 62. C | 63. A | 64. B | 65. D | |
| 66. C | 67. D | 68. C | 69. C | 70. B | |

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|-------------|-----------|-------|----------|------------|--------|
| 71. C | 72. B | 73. D | 74. B | 75. 6 | |
| 76. a) 1260 | b) 362880 | | c) 30240 | d) 1728 | |
| 77. a) 3360 | b) 840 | | c) 120 | d) 1260 | |
| 78. A | 79. C | 80. D | 81. B | 82. a) 150 | b) 325 |
| 83. C | 84. B | 85. B | 86. A | | |

Advanced Practice Questions

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

Free-Response

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|--------|----------------|---------------------|-----------|----------|
| 1. 300 | 2. 5 | 3. 10^{th} | 4. 1 | 5. 22308 |
| 6. 2 | 7. $-30618x^3$ | 8. 240 | 9. 282240 | 10. 72 |
| 11. 21 | 12. 25401600 | | | |

Selected Past AMC Questions

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

Lesson 2. (Page 108-133)

Simple Worksheet

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

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|-------|-------|-------|-------|-------|
| 31. C | 32. D | 33. A | 34. B | 35. A |
| 36. D | 37. B | 38. A | 39. D | 40. C |
| 41. B | 42. B | 43. B | 44. D | 45. D |
| 46. C | 47. C | 48. A | 49. B | 50. B |
| 51. C | 52. A | 53. C | 54. A | 55. A |
| 56. B | 57. B | 58. D | | |

Intermediate Worksheet

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|----------------------|----------------------|----------------------|---------------------|---------------------|
| 1. $\frac{1}{19}$ | 2. $\frac{11}{30}$ | 3. $\frac{1}{8}$ | 4. $\frac{1}{256}$ | 5. $\frac{7}{50}$ |
| 6. $\frac{33}{62}$ | 7. $\frac{2}{5}$ | 8. $\frac{1}{4}$ | 9. $\frac{1}{35}$ | 10. $\frac{7}{40}$ |
| 11. $\frac{15}{196}$ | 12. $\frac{1}{12}$ | 13. $\frac{1}{100}$ | 14. $\frac{16}{49}$ | 15. $\frac{4}{7}$ |
| 16. $\frac{15}{34}$ | 17. $\frac{7}{22}$ | 18. $\frac{36}{65}$ | 19. $\frac{9}{20}$ | 20. $\frac{7}{432}$ |
| 21. $\frac{2}{27}$ | 22. $\frac{55}{221}$ | 23. $\frac{47}{442}$ | | |

Advanced Practice Questions

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|-------|-------|-------|-------|-------|
| 1. B | 2. A | 3. C | 4. D | 5. D |
| 6. A | 7. D | 8. D | 9. E | 10. D |
| 11. D | 12. D | 13. B | 14. E | 15. D |
| 16. A | 17. E | 18. E | 19. C | 20. B |
| 21. D | 22. C | 23. E | 24. B | 25. E |
| 26. A | 27. A | 28. C | 29. B | 30. D |
| 31. A | 32. B | 33. B | 34. E | 35. B |
| 36. E | 37. C | 38. C | 39. B | 40. C |
| 41. C | 42. C | 43. D | 44. C | 45. E |
| 46. E | 47. C | 48. B | 49. D | 50. C |
| 51. E | 52. D | 53. D | 54. C | |

Free-Response

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|-------------------------------|--|---------------------|--------------------|-------------------|
| 1. 60 | 2. $\frac{3}{5}$ | 3. $\frac{31}{35}$ | 4. 17:3 | 5. $\frac{3}{16}$ |
| 6. 337 | 7. $\frac{1}{2}(1 + \frac{1}{3^{50}})$ | 8. a) $\frac{1}{4}$ | b) $\frac{33}{80}$ | c) $\frac{7}{73}$ |
| 9. $\frac{1}{2}, \frac{1}{2}$ | | | | |

Selected Past AMC Questions

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|-------|-------|-------|------|-------|
| 1. E | 2. D | 3. A | 4. C | 5. C |
| 6. C | 7. D | 8. C | 9. A | 10. C |
| 11. A | 12. C | 13. C | | |

AMC/AIME Intersession Contest

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|---------|---------|--------|---------|---------|
| 1. C | 2. D | 3. E | 4. D | 5. B |
| 6. B | 7. B | 8. B | 9. C | 10. C |
| 11. 728 | 12. 59 | 13. 67 | 14. 11 | 15. 49 |
| 16. 26 | 17. 376 | 18. 79 | 19. 560 | 20. 197 |

Lesson 3. (Page 187-253)

Congruence of Integers

Testing Questions (A) (Page 191)

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|---------|-----------------------|------|------|--------|
| 1. 16 | 2. 1 | 4. 9 | 5. 1 | 6. 875 |
| 7. 1731 | 8. All multiples of 3 | | 9. E | 10. 88 |

Testing Questions (B) (Page 192)

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|--|-------|--------|------|
| 1. 36 | 2. 29 | 3. 101 | 4. 9 |
| 5. $6k + 1$ or $6k + 2$, $k = 0, 1, 2, \dots$ | | | |

Decimal Representation of Integers

Testing Questions (A)

- | | | | |
|-------------------------|---------|-----------|---------|
| 2. $25 \times 10^{n-2}$ | 3. 489 | 5. 142587 | 6. 1977 |
| 7. 17901 | 8. 1979 | 9. 29995 | 10. 100 |

Testing Questions (B)

- | | | | |
|---------|----------------------------------|-------|---------|
| 1. 512 | 2. (3, 2, 1) (6, 8, 4) (8, 3, 7) | 3. 52 | 4. 7744 |
| 5. 1681 | | | |

Perfect Square Numbers

Testing Questions (A) (Page 203)

1. does not exist 2. D 3. 421 4. 1045
5. 1972

Testing Questions (B) (Page 204)

1. 98 2. 3

Pigeonhole Principle

Testing Questions (A)

9. 7051th term

$\lfloor x \rfloor$ and $\{x\}$

Testing Questions (A) (Page 217)

2. -1 3. $0, \frac{1+\sqrt{5}}{2}$ 4. $1, \sqrt{33}, \sqrt{33}, 7$ 5. $n^2 - n + 1$
6. -2 7. 7 8. 600 9. 1486 10. 298

Testing Questions (B) (Page 218)

1. Yes 3. $10, 7\frac{1}{2}, 9\frac{1}{8}, 8\frac{2}{7}, 6\frac{4}{5}$
4. 08 5. -9.2 or any non-zero integer

Diophantine Equations

Testing Questions (A) (Page 225)

1. D 2. C 3. 5 4. 1997
5. 5 dragonflies 2 spiders; or 1 dragonfly 5 spiders
6. There are 541 ways to get the 10 dollars.
7. 1984 8. 84
9. (0; 25; 75); (4; 18; 78); (8; 11; 81); (12; 4; 84)
10. $x = 667; y = 666; z = 665$.

Testing Questions (B) (Page 226)

1. There are 60 of 1 g, 39 of 2 g, and 1 of 50 g, respectively.
5. (i) No (ii) Yes

Advanced Practice Questions – Divisibility (Page 227-233)

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

Advanced Practice Questions – Remainders

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

Advanced Practice Questions – Number Properties

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

Selected Past AMC Questions

Prime Decomposition

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

Number Theory

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

More Number Theory Practice Questions

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

AMC/AIME Intersession

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|---------|---------|---------|---------|---------|
| 1. B | 2. E | 3. D | 4. D | 5. C |
| 6. B | 7. E | 8. D | 9. E | 10. E |
| 11. 592 | 12. 432 | 13. 61 | 14. 750 | 15. 890 |
| 16. 8 | 17. 248 | 18. 589 | 19. 358 | 20. 38 |

Mock Tests. (Page 255-268)

Mock AMC 10 2010

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|---|-------|-------|-------|---|
| 1. E | 2. D | 3. E | 4. D | 5. C |
| 6. D | 7. A | 8. D | 9. C | 10. B |
| 11. E | 12. B | 13. C | 14. D | 15. B |
| 16. C (Typo: in the question, should be $AD = 5$, not $CD = 5$) | | | | |
| 17. C | 18. C | 19. A | 20. B | |
| 21. C | 22. B | 23. A | 24. C | 25. C (Typo, choice C should be 69, not 79) |

Mock AMC 12 Intermediate (Page 259-263)

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

Mock AMC 12 Hard (Page 264-268)

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