

Math 098 Final Exam Review

There are forty problems on the final exam. A TI-30XIIS scientific calculator is allowed on the final exam. No graphing or phone calculators are allowed.

Make sure that you can both set up and solve word problems.

For additional review, attend one of the Fall or Spring review sessions. Questions regarding specific problems, talk to your instructor or visit the Tutoring and Learning Center (TLC - Rm. C2010).

Study well!

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Factor: $7x^2 + 34x - 5$ 1) _____
A) $(7x - 5)(x - 1)$ B) $(7x - 5)(x + 1)$ C) $(7x + 1)(x - 5)$ D) $(7x - 1)(x + 5)$
- 2) List a factor of: $7x^2 + 34x - 5$ 2) _____
A) $(x - 1)$ B) $(7x - 5)$ C) $(7x - 1)$ D) $(x - 5)$
- 3) Factor: $20x^2 + 23x + 6$ 3) _____
A) $(4x - 3)(5x - 2)$ B) $(4x + 3)(5x - 2)$
C) $(4x + 3)(5x + 2)$ D) $(20x - 3)(x - 6)$
- 4) If possible, list a factor of: $20x^2 + 23x + 6$ 4) _____
A) $(20x - 3)$ B) $(5x + 2)$ C) $(4x - 3)$ D) prime
- 5) List a factor of: $6z^2 + 5z - 6$ 5) _____
A) $(6z + 1)$ B) $(3z + 2)$ C) $(z - 2)$ D) $(2z + 3)$
- 6) Factor completely: $4x^2 - 14x - 8$ 6) _____
A) $(4x - 2)(x - 4)$ B) $(4x - 2)(x + 4)$ C) $2(2x + 1)(x - 4)$ D) $2(2x - 1)(x + 4)$
- 7) List a factor of: $4x^2 - 14x - 8$ 7) _____
A) $(x + 4)$ B) $(2x - 1)$ C) $(x - 4)$ D) $(4x - 2)$
- 8) List a factor of: $12a^4b - 75b^3$ 8) _____
A) $(2a - 5b)$ B) $(2a^2 + 5b)$ C) $(4a + 15b)$ D) $(2a + 5b)$
- 9) Factor: $64x^2 - 144xy + 81y^2$ 9) _____
A) $(8x - 9y)(8x + 9y)$ B) $(64x + y)(x + 81y)$
C) $(8x + 9y)^2$ D) $(8x - 9y)^2$
- 10) If possible, factor completely: $x^4 - 81$ 10) _____
A) $(x^2 + 9)(x^2 + 9)$ B) $(x^2 + 9)(x + 3)(x - 3)$
C) $(x^2 - 9)(x^2 - 9)$ D) prime

- 11) If possible, factor: $49x^2 + 25$ 11) _____
 A) $(7x - 5)^2$ B) $(7x + 5)^2$
 C) $(7x + 5)(7x - 5)$ D) prime

- 12) Factor: $512x^3 - 1$ 12) _____
 A) $(512x - 1)(x^2 + 8x + 1)$ B) $(8x + 1)(64x^2 - 8x + 1)$
 C) $(8x - 1)(64x^2 + 8x + 1)$ D) $(8x - 1)(64x^2 + 1)$

- 13) Factor, if possible: $729s^3 + 8$ 13) _____
 A) $(9s + 2)(81s^2 + 4)$ B) $(9s + 2)(81s^2 - 18s + 4)$
 C) $(729s + 8)(s^2 - 9s + 1)$ D) prime

- 14) Find all the solutions for t: $t^2 + 2t - 80 = 0$ 14) _____
 A) $\{-10, 1\}$ B) $\{10, -8\}$ C) $\{10, 8\}$ D) $\{-10, 8\}$

- 15) Find all the solutions for x: $x(3x + 10) = 8$ 15) _____
 A) $\left\{\frac{3}{2}, 4\right\}$ B) $\left\{\frac{2}{3}, -4\right\}$ C) $\left\{0, \frac{10}{3}\right\}$ D) $\left\{0, -\frac{10}{3}\right\}$

- 16) Find all the solutions for x: $81x^2 = 16$ 16) _____
 A) $\left\{\frac{4}{9}\right\}$ B) $\left\{\frac{4}{9}, -\frac{4}{9}, 0\right\}$ C) $\left\{\frac{4}{9}, -\frac{4}{9}\right\}$ D) $\left\{-\frac{4}{9}\right\}$

- 17) Write one equation to solve the following word problem. DO NOT SOLVE. 17) _____

The width of a rectangle is 6 kilometers less than twice its length. If its area is 108 square kilometers, find the dimensions of the rectangle. Let the length = x.

- A) $x(2x-6)=108$ B) $x(6-2x)=108$
 C) $2x + 2(2x-6)=108$ D) $x(6-x)=108$

- 18) The width of a rectangle is 6 kilometers less than twice its length. If its area is 108 square kilometers, find the dimensions of the rectangle. 18) _____
 A) length = 12 km, width = 9 km B) length = 9 km, width = 12 km
 C) length = 6 km, width = 6 km D) length = 3 km, width = 36 km

- 19) The hypotenuse of a right triangle measures 15 inches. The longer leg is 6 inches more than the shorter leg. Find the length of the legs. Round your answers to the nearest hundredth of an inch, if necessary. 19) _____
 A) The shorter leg was 4.17 inches. The longer leg was 16.17 inches.
 B) The shorter leg was 8.02 inches. The longer leg was 14.02 inches.
 C) The shorter leg was 7.17 inches. The longer leg was 13.17 inches.
 D) The shorter leg was 4.01 inches. The longer leg was 7.01 inches.

20) Simplify: $\frac{2x+4}{3x^2+10x+8}$ 20) _____

A) $\frac{2x}{3x+4}$

B) $\frac{2x+3}{3x+10}$

C) $\frac{2}{3x+4}$

D) $\frac{2x+4}{3x^2+10x+8}$

21) Simplify completely: $\frac{7x^2-65x+18}{7x-63}$ 21) _____

A) $\frac{7x^2-65x+18}{7(x-9)}$

B) $\frac{7x-2}{7}$

C) $x-2$

D) $\frac{1}{7(x-9)}$

22) Multiply: $\frac{y^2-6y+8}{3y+12} \cdot \frac{y+4}{4y-8}$ 22) _____

A) $\frac{y-4}{12}$

B) $\frac{(y-4)(y-2)}{12(y+2)}$

C) $\frac{y-2}{12}$

D) $\frac{y+4}{12}$

23) Divide: $\frac{x^2-4}{x^2-2x} \div \frac{x^2+7x+1}{3x+18}$ 23) _____

A) $\frac{(x+2)(x^2+7x+1)}{3x(x+6)}$

B) $\frac{(x-2)(x^2+7x+1)}{3x(x+6)}$

C) $\frac{3(x+2)(x+6)}{x(x^2+7x+1)}$

D) $\frac{3(x-2)(x+6)}{x(x^2+7x+1)}$

24) Add: $\frac{12}{x^2-1} + \frac{6}{x+1}$ 24) _____

A) $\frac{6}{x^2-1}$

B) $\frac{6}{x+1}$

C) $\frac{6(x+3)}{x^2-1}$

D) $\frac{6}{x-1}$

25) Subtract: $\frac{7a}{a^2-2a-8} - \frac{2}{a+2}$ 25) _____

A) $\frac{5a-8}{(a+4)(a+2)}$

B) $\frac{5a-8}{(a-4)(a+2)}$

C) $\frac{5a+8}{(a-4)(a+2)}$

D) $\frac{5a+8}{(a+4)(a+2)}$

26) Find all the solutions for x: $\frac{12}{x^2-16} = \frac{1}{x+4} - \frac{3}{x-4}$ 26) _____

A) $\{-14\}$

B) $\{28\}$

C) $\{14\}$

D) no solution

- 27) Mark can finish a planting job in 2 hours, while it takes Rachel 3 hours to finish the same job. If Mark and Rachel work together on the job, and the cost of labor is \$55 per hour, what should they charge for labor? (Round to the nearest cent, if necessary.) 27) _____
- A) \$45.83 B) \$66.00 C) \$137.50 D) \$132.00

28) Simplify: $\frac{\frac{3}{y} + \frac{2}{y^2}}{\frac{9}{y^2} - \frac{4}{y}}$ 28) _____

- A) $\frac{1}{3-2y}$ B) $\frac{3y+2}{9-4y}$ C) $\frac{1}{3y-2}$ D) $\frac{3y^2+2}{9-4y}$

29) Simplify: $\frac{\frac{7}{x+7} + \frac{21}{x+5}}{\frac{2x+13}{x^2+12x+35}}$ 29) _____

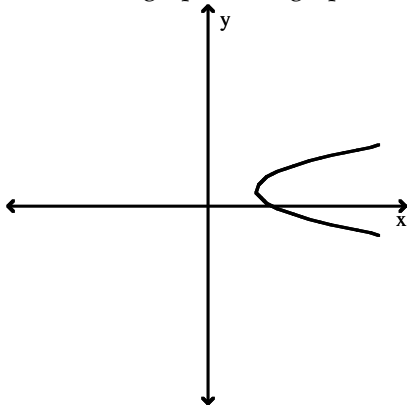
- A) $\frac{1}{14}$ B) 14 C) $2x+13$ D) 28

- 30) When looking at a graph, how do you determine if the graph is a graph of a function? 30) _____
- A) The graph looks like a line.
 B) The graph passes the horizontal line test.
 C) The graph passes the vertical line test.
 D) The graph goes on infinitely in both directions.

- 31) Find the linear function whose graph has a slope of -4 and the graph passes through the point (-3, 3). 31) _____
- A) $f(x) = -4x - 9$ B) $f(x) - 3 = mx + 3$
 C) $f(x) = -4x + 9$ D) $f(x) - 3 = x + 3$

32) Determine whether the graph is the graph of a function.

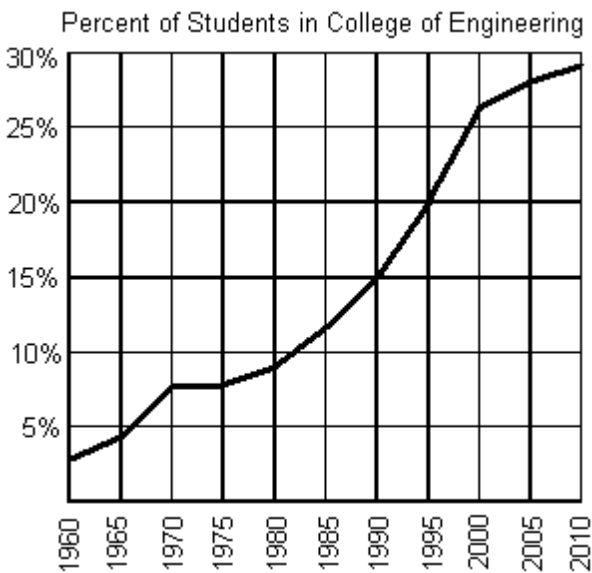
32) _____



A) function

B) not a function

Use the graph to answer questions 33 and 34.



33) Does the graph represent a function?

33) _____

A) Yes

B) No

34) Find $f(1970)$.

34) _____

A) 2.5%

B) 7.5%

C) 4%

D) 9.5%

35) Write an equation to describe the variation. Use k for the constant of proportionality.

35) _____

r varies directly as the square of s and inversely as the cube of t .

A) $r = \frac{kt^3}{s^2}$

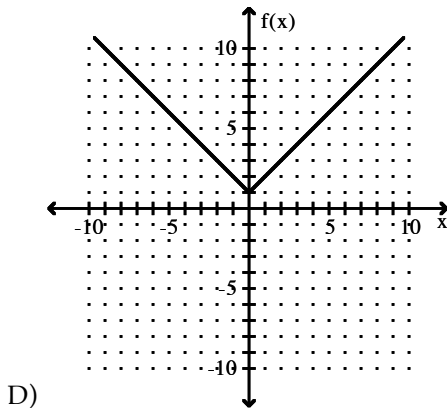
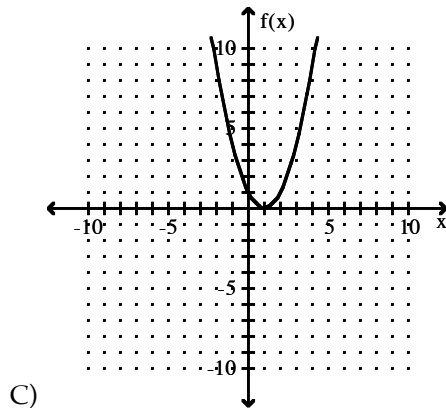
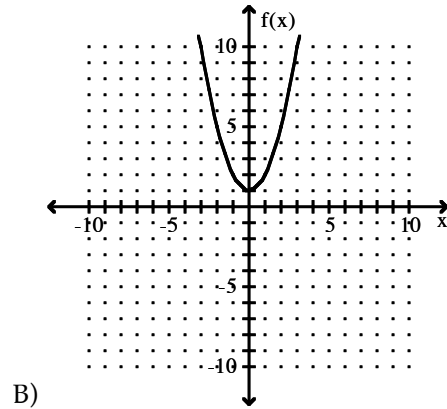
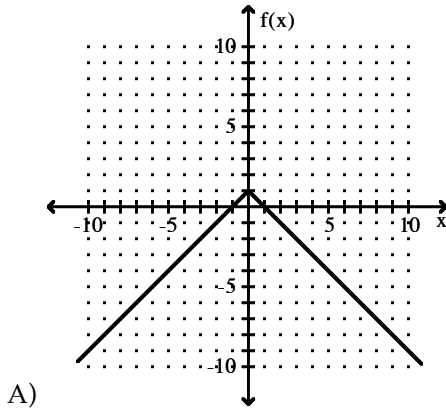
B) $r + s^2 - t^3 = k$

C) $r = \frac{ks^2}{t^3}$

D) $rs^2t^3 = k$

36) Graph: $f(x) = |x| + 1$

36) _____



37) The distance that an object falls when it is dropped varies directly to the square of the amount of time since it was dropped. An object falls 288 feet in 3 seconds. Find the distance the object falls in 5 seconds.

37) _____

- A) 480 feet B) 160 feet C) 15 feet D) 800 feet

38) Find all the solutions for x : $-6x < -24$ and $x + 6 > 7$

38) _____

- A) $(4, \infty)$ B) $(-\infty, 1) \cup (4, \infty)$
 C) $(1, 4)$ D) no solution

39) Find all the solutions for x : $12x - 8 < 4x$ or $-2x \leq -6$

39) _____

- A) $(1, 3]$ B) $[1, 3]$
 C) $(-\infty, 1) \cup [3, \infty)$ D) no solution

40) Find all the solutions for x : $|6x + 2| + 3 = 11$

40) _____

- A) $\{3, -5\}$ B) $\{-1\}$ C) $\left\{1, -\frac{5}{3}\right\}$ D) no solution

41) Find all the solutions for x : $|x + 7| - 1 < 2$

41) _____

- A) $(-10, -4)$ B) $[-10, -4]$ C) $(-10, 2)$ D) no solution

- 42) Find all the solutions for x : $|2x - 4| \geq 5$ 42) _____
- A) $\left(-\frac{1}{2}, \frac{9}{2}\right)$ B) $\left[-\frac{1}{2}, \frac{9}{2}\right]$
 C) $\left[\frac{9}{2}, \infty\right)$ D) $\left(-\infty, -\frac{1}{2}\right] \cup \left[\frac{9}{2}, \infty\right)$
- 43) Simplify: $\sqrt{252}$ 43) _____
 A) $6\sqrt{7}$ B) 15 C) 42 D) $7\sqrt{6}$
- 44) Simplify: $\sqrt{12k^7q^8}$ 44) _____
 A) $2k^3q^4\sqrt{3k}$ B) $2k^3q^4\sqrt{3}$ C) $2q^4\sqrt{3k^7}$ D) $2k^7q^8\sqrt{3k}$
- 45) Simplify: $\sqrt[3]{-27a^9b^3}$ 45) _____
 A) $27a^3b$ B) $3a^3b$ C) $3a^{12}b^6$ D) $-3a^3b$
- 46) Which of the following is equivalent to $6x^3/7$? 46) _____
 A) $\sqrt[7]{6x^3}$ B) $\sqrt[3]{6x^7}$ C) $\sqrt[7]{216x^3}$ D) $6\sqrt[7]{x^3}$
- 47) Multiply: $\sqrt{7}(\sqrt{28} + \sqrt{14})$ 47) _____
 A) $14 + 49\sqrt{2}$ B) $14 + 7\sqrt{2}$ C) 28 D) $196 + 7\sqrt{2}$
- 48) Multiply: $(\sqrt{10} + \sqrt{7})(\sqrt{10} - \sqrt{7})$ 48) _____
 A) $10 - 2\sqrt{10}$ B) 3 C) $10 - 2\sqrt{7}$ D) 17
- 49) Multiply: $(6\sqrt{13} + 8)(2\sqrt{13} + 5)$ 49) _____
 A) $196 + 46\sqrt{13}$ B) $82\sqrt{13}$
 C) $40 + 12\sqrt{13^2} + 30\sqrt{13}$ D) $52\sqrt{13} + 30$
- 50) Add and subtract, as needed: $\sqrt{3a} + 2\sqrt{108a} - 7\sqrt{48a}$ 50) _____
 A) $-5\sqrt{3a}$ B) $-5\sqrt{159a}$ C) $-15\sqrt{159a}$ D) $-15\sqrt{3a}$
- 51) Simplify by rationalizing the denominator: $\frac{\sqrt{x+9}}{\sqrt{x-9}}$ 51) _____
 A) -1 B) $18\sqrt{x}$
 C) $\frac{x+18\sqrt{x}+81}{x-81}$ D) $\frac{x+81}{x-81}$
- 52) Find all the solutions for x : $x = \sqrt{12x - 12} - 2$ 52) _____
 A) $\{6\}$ B) $\{-4\}$ C) $\{-3\}$ D) $\{4\}$

- 53) Simplify completely: $-\sqrt{-270}$ 53) _____
 A) $3\sqrt{30}$ B) $3i\sqrt{30}$ C) $-3i\sqrt{30}$ D) $-3\sqrt{30}$
- 54) If $i=\sqrt{-1}$, simplify: $4i(9-7i)$ 54) _____
 A) $28+36i$ B) $36i-28i^2$ C) $36i+28i^2$ D) $-28+36i$
- 55) If $i=\sqrt{-1}$, simplify: $\frac{2+2i}{4-3i}$ 55) _____
 A) $2-2i$ B) $\frac{2}{7}-2i$ C) $\frac{14}{25}-\frac{2}{25}i$ D) $\frac{2}{25}+\frac{14}{25}i$
- 56) The process of creating a perfect square trinomial is called "completing the square." Determine the value for c so that x^2+8x+c is a perfect square trinomial. 56) _____
 A) $c=4$ B) $c=8$
 $x^2+8x+4=(x+16)^2$ $x^2+8x+8=(x+64)^2$
 C) $c=64$ D) $c=16$
 $x^2+8x+64=(x+8)^2$ $x^2+8x+16=(x+4)^2$
- 57) Find all the solutions for m: $m^2+m+1=0$ 57) _____
 A) $\left\{\frac{1-\sqrt{3}}{2}, \frac{1+\sqrt{3}}{2}\right\}$ B) $\left\{\frac{1-i\sqrt{3}}{2}, \frac{1+i\sqrt{3}}{2}\right\}$
 C) $\left\{\frac{-1-\sqrt{3}}{2}, \frac{-1+\sqrt{3}}{2}\right\}$ D) $\left\{\frac{-1-i\sqrt{3}}{2}, \frac{-1+i\sqrt{3}}{2}\right\}$
- 58) Find all the solutions for x: $5x^2-8x=1$ 58) _____
 A) $\left\{\frac{8\pm 4\sqrt{21}}{5}\right\}$ B) $\left\{\frac{4\pm 2\sqrt{21}}{5}\right\}$ C) $\left\{\frac{4\pm\sqrt{21}}{5}\right\}$ D) $\left\{\frac{8\pm\sqrt{21}}{5}\right\}$
- 59) Find all the solutions for x: $16x^2+1=3x$ 59) _____
 A) $\left\{\frac{3-i\sqrt{55}}{32}, \frac{-3+i\sqrt{55}}{32}\right\}$ B) $\left\{\frac{-3-i\sqrt{55}}{32}, \frac{3+i\sqrt{55}}{32}\right\}$
 C) $\left\{\frac{-3-i\sqrt{55}}{32}, \frac{-3+i\sqrt{55}}{32}\right\}$ D) $\left\{\frac{3-i\sqrt{55}}{32}, \frac{3+i\sqrt{55}}{32}\right\}$
- 60) Find all the solutions for x: $x^2-9x+14 < 0$ 60) _____
 A) $(-\infty, 2)$ B) $(-\infty, 2) \cup (7, \infty)$
 C) $(7, \infty)$ D) $(2, 7)$
- 61) Find all the solutions for x: $x^2-3x \geq -2$ 61) _____
 A) $[1, 2]$ B) $(-\infty, 1]$ C) $[2, \infty)$ D) $(-\infty, 1] \cup [2, \infty)$

62) Find all the solutions for x : $x^4 - 10x^2 + 9 = 0$

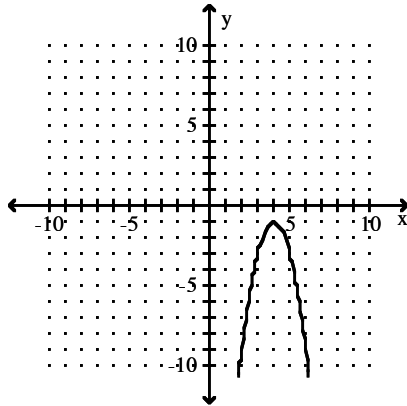
- A) $\{-1, 1, -3, 3\}$
 C) $\{1, 9\}$

- B) $\{-i, i, -3i, 3i\}$
 D) $\{-1, 1, -3i, 3i\}$

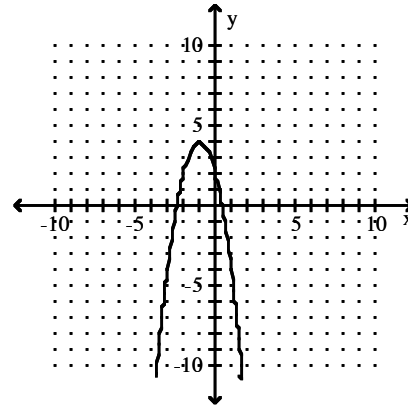
62) _____

63) Graph: $f(x) = -2(x+1)^2 + 4$

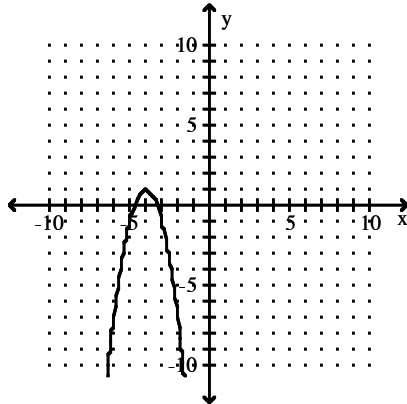
- A) vertex: $(4, -1)$



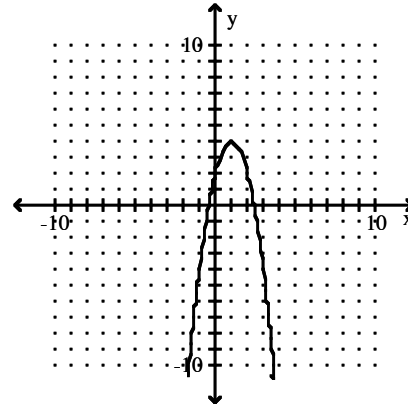
- B) vertex: $(-1, 4)$



- C) vertex: $(-4, 1)$



- D) vertex: $(1, 4)$



63) _____

64) Find the vertex of the graph of: $g(x) = 5x^2 + 100x + 475$

- A) $(100, 475)$

- B) $(-50, -25)$

- C) $(10, -25)$

- D) $(-10, -25)$

64) _____

65) If $f(x) = x^2 + 6x$ and $g(x) = x + 2$, find $(g \circ f)(4)$.

- A) 44

- B) 72

- C) 42

- D) 240

65) _____

66) If $f(x) = 6x + 8$ and $g(x) = 2x + 1$, find $(f \cdot g)(x)$.

- A) $(f \cdot g)(x) = 12x^2 + 22x + 8$

- B) $(f \cdot g)(x) = 12x^2 + 17x + 8$

- C) $(f \cdot g)(x) = 12x^2 + 8$

- D) $(f \cdot g)(x) = 8x^2 + 22x + 9$

66) _____

Answer Key

Testname: MATH 098 FINAL EXAM REVIEW

- | | |
|-------|-------|
| 1) D | 50) D |
| 2) C | 51) C |
| 3) C | 52) D |
| 4) B | 53) C |
| 5) D | 54) A |
| 6) C | 55) D |
| 7) C | 56) D |
| 8) B | 57) D |
| 9) D | 58) C |
| 10) B | 59) D |
| 11) D | 60) D |
| 12) C | 61) D |
| 13) B | 62) A |
| 14) D | 63) B |
| 15) B | 64) D |
| 16) C | 65) C |
| 17) A | 66) A |
| 18) B | |
| 19) C | |
| 20) C | |
| 21) B | |
| 22) A | |
| 23) C | |
| 24) D | |
| 25) C | |
| 26) A | |
| 27) B | |
| 28) B | |
| 29) B | |
| 30) C | |
| 31) A | |
| 32) B | |
| 33) A | |
| 34) B | |
| 35) C | |
| 36) D | |
| 37) D | |
| 38) A | |
| 39) C | |
| 40) C | |
| 41) A | |
| 42) D | |
| 43) A | |
| 44) A | |
| 45) D | |
| 46) D | |
| 47) B | |
| 48) B | |
| 49) A | |