

> Answer key

1. (b) 2. (a) 3. (a) 4. (e) 5. (c) 6. (d) 7. (c) 8. (a) 9. (d) 10. (c)
 11. (c) 12. (b) 13. (c) 14. (b) 15. (d) 16. (d) 17. (e) 18. (a) 19. (c) 20. (a)
 21. (c) 22. (b) 23. (a) 24. (b) 25. (e) 26. (c) 27. (c) 28. (e) 29. (b) 30. (d)
 31. (a) 32. (c) 33. (c) 34. (a) 35. (a) 36. (b) 37. (b) 38. (d) 39. (b) 40. (d)
 41. (d) 42. (c) 43. (a) 44. (c) 45. (b) 46. (d) 47. (b) 48. (a) 49. (a) 50. (a)

51. $x - \frac{1}{x} = 4$

$$x^2 + \frac{1}{x^2} = 4^2 + 2 = 18$$

52. $x(x^2 + 3x + 3)$
we add and subtract 1

$$(x+1)^3$$

$$= (103)^3 + 1$$

$$= 1092728 + 1$$

$$= 1092729$$

53. $f(n) = 2n^2 - n$ for $n > 5$
 $n^2 + n$ for $n \leq 5$

then, $f(1) + f(2) + f(3) + \dots + f(10)$
 $= [(1)^2 + 1] + [(2)^2 + 2] + [(3)^2 + 3] + [(4)^2 + 4] +$
 $[(5)^2 + 5] + [2(6)^2 - 6] + [2(7)^2 - 7] + [2(8)^2 - 8]$
 $+ [2(9)^2 - 9] + [2(10)^2 - 10]$
 $= 2 + 6 + 12 + 20 + 30 + 66 + 91 + 120 + 153 +$
 $190 = 690$

54. Divide by x

$$\frac{5}{x} = \frac{1}{3}$$

$$\frac{2x^2}{x} + \frac{5x}{x} + \frac{1}{x} = \frac{1}{3}$$

$$\frac{5}{2x + \frac{1}{x} + 5} = \frac{1}{3}$$

$$\left(2x + \frac{1}{x} + 5\right) = 15 = \left(2x + \frac{1}{x}\right) = 10$$

divide by 2 both sides

$$x + \frac{1}{x} = \frac{10}{2} = 5$$

55. $g[h\{f(i(16,3),2),7\},3] \div$

33 $= g[h\{f[5,2],7\},3]$ [since $i(x,y) = \text{Quotient}$,
when x is divided by y .]

$$= g[h\{625,7\},3] \text{ [since } g(x,y) = y^{x^2}]$$

$$= g[2,3]$$

[since $h(x,y) = \text{Remainder}$, when x is divided by y]

$$= 3^{2^2} = 3^4 = 81 \text{ [since } g(x,y) = y^{x^2}]$$

56. $a^3 + b^3 + c^3 - 3abc = a + b + c$ (by formula)

$$(a^2 + b^2 + c^2 - ab - bc - ca)$$

$$\frac{1}{2}(a+b+c)[(a-b)^2 + (b-c)^2 + (c-a)^2]$$

Expression

$$= \frac{1}{2}(a+b+c)[(a-b)^2 + (b-c)^2 + (c-a)^2]$$

$$(a-b)^2 + (b-c)^2 + (c-a)^2$$

$$= \frac{1}{2}(a+b+c) = \frac{1}{2}(25 + 15 - 10) = 15$$

57. $(64)^{x+1} = \frac{64}{4^x}$

$$(4^3)^{x+1} \times 4^x = 64$$

$$4^{3x+3+x} = 4^3$$

$$4^{4x+3} = 4^3$$

$$4x + 3 = 3$$

$$x = 0$$

58. (c) $2x + \frac{2}{x} = 3$ $x + \frac{1}{x} = \frac{3}{2}$

$$x^3 + \frac{1}{x^3} + 2 = \left(\frac{3}{2}\right)^3 - 3 \times \frac{3}{2} + 2 = \frac{7}{8}$$

59. (b) $3x + \frac{1}{2x} = 5$ Multiply by $\frac{2}{3}$

$$2x + \frac{1}{3x} = \frac{10}{3} \text{ Cubing}$$

$$8x^3 + \frac{1}{27x^3} = \frac{1000}{27} - \frac{20}{3}$$

$$\frac{1000 - 180}{27} = \frac{820}{27} = 30 \frac{10}{27}$$

60. (d) $\sqrt{3+\sqrt{5}} = \sqrt{(3+\sqrt{5}) \frac{2}{5}}$

$$= \sqrt{\frac{6+2\sqrt{5}}{2}} = \sqrt{\frac{(\sqrt{5}+1)^2}{2}} = \sqrt{\frac{5}{2}} + \sqrt{\frac{1}{2}}$$

61. (a) $x = 3^{1/3}$ cubing

$$x^3 = 3 - \frac{1}{3} - 3 \times 3^{1/3} \times 3^{-1/3}(x)$$

$$= x^3 = \frac{8}{3} - 3x$$

$$= 3x^3 + 9x = 8$$