Algebraic Concepts pg 226 Chapter 4 Practice Test Solutions

For #1-6, remember the rules:

If the number's divisible by. . . .	Then it. . .
2	Ends in 0, 2, 4, 6, or 8 (even number)
5	Ends in 5 or 0
10	Ends in 0
3	Has a digit-sum divisible by 3
9	Has a digit-sum divisible by 9

1. 2, 3, 9 2. 2, 5, 10 3. 2, 3, 5, 9, 10
4. 2, 3 (8+4 = 12 is not divisible by 3, not 9)
5. 3, 5 (5+5+5 = 15 is divisible by 3, not 9)
6. None of the numbers divide 49 (49's only factors are 1, 7, and 49)

7. 1, 2, 4, 8, 16
8. 1, 2, 3, 5, 6, 10, 15, 30
9. 1, 41 (41 is a prime number)
10. 1, 23 (23 is also a prime number)
11. 1, 5, 11, 55
12. 1, 2, 4, 8, 16, 32, 64
13. $5^3 = (5)(5)(5) = 125$
14. $2^0 \cdot 2^3 = 1 \cdot 2^3 = 1 \cdot 8 = 8$
15. $3^2 + 3^3 = 9 + 27 = 36$
16. $4^2 \cdot 1^3 = 16 \cdot 1 = 16$
17. $(-9)^2 = (-9)(-9) = 81$
18. $(7-6)^4 = (1)^4 = 1$
19. $-2(3+2)^2 = -2(5)^2 = -2(25) = -50$
20. $-6^2 + 6 = -36 + 6 = -30$

For 22-27, a = -2 and b = 3

22. $(a \cdot b)^2 = (-2 \cdot 3)^2 = (-6)^2 = 36$
23. $a^2b = (-2)^2(3) = (4)(3) = 12$
24. $b^3 \cdot b^0 = b^3$ [added exponents]$= (3)^3 = 27$
25. $(a+b)^5 = (-2 + 3)^5 = (1)^5 = 1$
26. $b^2 - a = (3)^2 - (-2) = 9 - (-2) = 9 + 2 = 11$
27. $2(a^2 + b^3) = 2[(-2)^2 + (3)^3] = 2[4 + 27] = 2[31] = 62$

For composites in 28-33, use factor trees.

28. Composite: $2^3 \cdot 3$

29. Prime

30. Composite: $2 \cdot 3 \cdot 7$

31. Composite: $2 \cdot 3^3$

32. Composite: $2^3 \cdot 3^2$

33. Composite: $2^2 \cdot 5^2$

34. $56 = 2 \cdot 2 \cdot 2 \cdot 7$ GCF = $2 \cdot 2 \cdot 2 = 8$
$96 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

35. $36 = 2 \cdot 2 \cdot 3 \cdot 3$ GCF = $2 \cdot 2 \cdot 3 = 12$
$60 = 2 \cdot 2 \cdot 3 \cdot 5$

36. $14 = 2 \cdot 7$ GCF = 1
$25 = 5 \cdot 5$ (Nothing in common → 1 is a factor of everything)

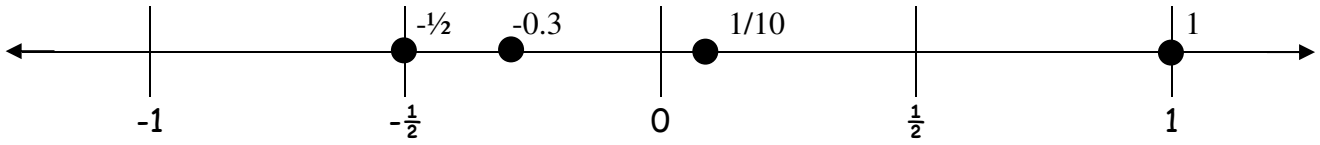
37. $15x = 3 \cdot 5 \cdot x$ GCF = $3x$
$24x^2 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot x \cdot x$

38. $14a^2b^3 = 2 \cdot 7 \cdot a \cdot a \cdot b \cdot b \cdot b$ GCF = $7ab^2$
$21ab^2 = 3 \cdot 7 \cdot a \cdot b \cdot b$

39. $\frac{1}{4}$ 40. $\frac{11}{13}$ 41. $\frac{5}{21}$

42. a 43. $5b^3$ 44. $\frac{m^3 n}{5}$

45-48. See number line below.



For 50-55, x = 4 and y = -3

50. $\frac{2y}{x^2} = \frac{2(-3)}{(4)^2} = \frac{-6}{16} = -\frac{3}{8}$

51. $\frac{xy}{5x} = \frac{y}{5} = \frac{(-3)}{5} = -\frac{3}{5}$

52. $\frac{(x+y)^3}{x} = \frac{(4+^-3)^3}{4} = \frac{(1)^3}{4} = \frac{1}{4}$

53. $\frac{x+3y}{10} = \frac{(4)+3(-3)}{10} = \frac{4+^-9}{10} = \frac{-5}{10} = -\frac{1}{2}$

54. $\frac{y^2-x}{5} = \frac{(-3)^2-(4)}{5} = \frac{9-4}{5} = \frac{5}{5} = 1$

55. $\frac{x-y}{x+y} = \frac{(4)-(-3)}{(4)+(-3)} = \frac{7}{1} = 7$

56. $a^4 \cdot a = a^5$ (add exponents when multiplying powers with the same base
57. $(y^3)^6 = y^{18}$ (multiply exponents when raising a power to a power)
58. $x^3 \cdot x^6 \cdot y^2 = x^9 \cdot y^2$ (can only combine powers with same base)
59. $(a^3)^2 = a^6$ (multiply exponents when raising a power to a power)
60. $6b^7 \cdot 5b^2 = 30b^9$ (multiply numbers regularly, use rule for exponents)
61. $\frac{9^8}{9^2} = 9^{8-2} = 9^6 = 531{,}441$ (subtract the exponents, then use calculator)
62. $\frac{6a^7}{15a^3} = \frac{2}{5}a^{7-3} = \frac{2a^4}{5}$ (simplify the numerical part, subtract the exponents)
63. $\frac{b^8}{b^{11}} = b^{8-11} = b^{-3} = \frac{1}{b^3}$ (subtract exponents, use your negative exponent rule)
64. $\frac{2x^2y^5}{8x^3y^5} = \frac{1}{4}x^{-1}y^0 = \frac{1}{4x}$ (simplify numerical part, subtract exponents, use your negative exponent rule and $y^0=1$)