Answer Key

1. $\frac{4}{7}$
2. $\frac{5}{8}$
3. $\frac{4}{7}$
4. $\frac{3}{6}$
5. $\frac{3}{5}$
6. $\frac{4}{6}$
7. $\frac{2}{4}$
8. $\frac{2}{4}$
9. $\frac{4}{6}$
10. $\frac{5}{7}$
11. 4
12. 12
13. 10
14. 20
15. 12
16. 12
17. 27
18. 27
19. 20
20. 25
21. 78.549
22. 10.6
23. 0.416
24. 96.494
25. 3.328
26. 41.55
27. 5.421
28. 32.85
29. 7.99
30. 69.76
31. 18
32. 43
33. 49
34. 27
35. 46
36. 39
37. 17
38. 10
39. 26
40. 19
41. 5
42. 5
43. 6
44. 7
45. 7
46. 4
47. 8
48. 5
49. 20
50. 16
51. 0
52. 101
53. 6÷2 = 3
    3×5 = 15 lb
54. 165÷15 = 11 hours
55. 6×35 = 210
    210 - 13 = 197
56. 5 - 1.20 = $3.80
57. 2400÷12 = $200
58. 9:00 - 0:25 = 8:35 A.M.
59. 15 + 25 = 40
    3:40 + 0:40 = 4:20 P.M.
60. 30 (of Jul)
61. 3×24 + 9 = 81
62. (a) 2 candies 3rd witch
    (b) 5 candies 2nd witch
    (c) 10 candies 1st witch
63. 6×2 = 12
    28 - 12 = 16
    16÷4 = 4 donkeys
64. 39 - 10 + 1 = 30
65. (a) 9:20 – 0:40 = 8:40 P.M.
    (b) 9:20 – 2:50 = 6:30 P.M.
66. C
67. (a) 20×20 = 400 sq. inches
    (b) 4×20 = 80 inches
68. 10 ÷ 2 = 5
    82 + 5 = 87
69. (a) 3.20 - 2.00 = $1.20 (each pencil)
    (b) 2.00 - 1.20 = $0.80 (each eraser)
70. (a) pencil = $1.30
    (b) eraser = $0.65

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MAP 230 (T1) Issue 9

71. 72 - 8 = 64
    64 - 8 = 56
    …
    40 - 8 = <u>32</u>
72. 1 - $\frac{1}{4}$ - $\frac{1}{4}$ = $\frac{1}{2}$ = 1/2
73. 2002 - 1957 = <u>45</u>
74. $\frac{2}{3}$×12 = <u>8 inches</u>
75. 1994 - 350 = 1644
76. 36÷4 =9
    9×9 = 81 in^2
77. $3\frac{1}{2}$ + $1\frac{1}{2}$ = 5 hours
78. 14.25 - 9.75 = <u>$4.50</u>
79. 3.5×8 = <u>$28</u>
80. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ (Divide by two)
    Ans = 1/2 &1/4 & 1/8
81. 20÷2 = 10
    4÷2 = 2
    10 + 2 = <u>12</u>
82. 200÷10 = 20
83. 5×6.2 = $31
84. 28÷4 = 7 (drivers)
    28 + 7 = 35
85. 6×6 = 36
86. $\frac{4}{24}$= $\frac{1}{6}$ = 1/6
87. 10÷2 = 5
    5×7 = 35 min
88. 31 + 28 + 31 = 90
    90÷3 = 30
89. 14×4 = 56 yrs old
90. 7 dimes & 3 quarters

Answer Key

1. $21\frac{1}{4}$
2. $5\frac{1}{2}$
3. $20\frac{1}{6}$
4. $2\frac{1}{2}$
5. $19\frac{1}{8}$
6. $2\frac{5}{8}$
7. $3\frac{2}{9}$
8. $2\frac{1}{3}$
9. $6\frac{1}{6}$
10. $1\frac{8}{9}$
11. $1\frac{4}{9}$
12. $\frac{1}{7}$
13. $1\frac{5}{9}$
14. $\frac{2}{5}$
15. $1\frac{1}{10}$
16. $\frac{3}{10}$
17. $1\frac{3}{8}$
18. $\frac{3}{4}$
19. $1\frac{4}{8}$
20. $1\frac{5}{9}$

21. 4/7
22. 6/7
23. 5/6
24. 2/3
25. 4/5
26. 7/9
27. 5/80
28. 3/52
29. 2/74
30. 8/95
31. 1/2
32. 2/3
33. 6/7
34. 2/7
35. 8/11
36. 3/8
37. 7/8
38. 7/9
39. 5/7
40. 5/6

41. 8/9
42. 9/11
43. 7/11
44. 2/5
45. 6/11
46. 4/9
47. 5/9
48. 7/10
49. 3/4
50. 5/8
51. 4/9
52. 4/7
53. 9/20
54. 10/27
55. 8/9
56. 9/16
57. 8/15
58. 15/16
59. 9/10
60. 15/16

61. $\frac{15}{2} = 7\frac{1}{2}$
62. $\frac{34}{3} = 11\frac{1}{3}$
63. $\frac{25}{4} = 6\frac{1}{4}$
64. $\frac{35}{4} = 8\frac{3}{4}$
65. $\frac{19}{5} = 3\frac{4}{5}$
66. $\frac{29}{6} = 4\frac{5}{6}$
67. $\frac{41}{8} = 5\frac{1}{8}$
68. $\frac{29}{9} = 3\frac{2}{9}$
69. $\frac{21}{10} = 2\frac{1}{10}$
70. $\frac{89}{10} = 8\frac{9}{10}$
71. $\frac{2}{3}$
72. $\frac{4}{7}$
73. $\frac{4}{9}$
74. $\frac{5}{18}$
75. $\frac{24}{25}$
76. $\frac{3}{32}$
77. $\frac{7}{45}$
78. $\frac{21}{64}$
79. $\frac{1}{2}$
80. $\frac{2}{5}$

81. 42
82. 33
83. 7
84. 18
85. 7
86. 26
87. 15
88. 42
89. 17
90. 34
91. $1
92. 10 hr
93. $80
94. $95
95. $25
96. 8
97. $12.15
98. 12 (Frank)
99. 12 (Tom)
100. 18 (Ken)

101. 1600÷4÷2 = 200 mi
102. 33 – 15 + 1 = 19 rows (not just 18)
19×6 = 114
103. 2×1.50 = 3
3 – 2 = 1
1÷2 = $0.50
0.5 + 2 = $2.50
104. 2 × 8+ 3 × 16 = 64
2(3×8 + 4×16) = 176
64 + 176 = 240 books
105. 60÷2 = 30
60÷3 = 20
60 – 30 – 20 = $10
106. Parakeet: 2
Canary: 4 (= 6 – 2)
Goldfish: 5 (= 4 + 1)
Turtle: 1 (= 5 – 4)
2 + 4 + 5 + 1 = 12 (pets)
107. 6×20 = 120
⅝×120 = 75
⅔×75 = 50 sq. ft.
108. (2.50 – 1)÷2 = $0.75
109. 30 + 10 = 40
40 ÷ 2 = 20
110. 3×16 + 2 = 50 (oz)
4 ÷ 50 = $0.08

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Answer Key

1. 62
2. 56
3. 52
4. 60
5. 66
6. 70
7. 74
8. 78
9. 72
10. 68
11. 1/3
12. 7/8
13. 7/12
14. 7/20
15. 4/27
16. 7/40
17. 50/63
18. 64/75
19. 2/3
20. 4/7

21. 375
22. 6
23. 2.4
24. 6.25
25. 0.05
26. 40
27. 3000
28. 1.25
29. 62.5
30. 24
31. 27 4/9
32. 31 1/14
33. 34 2/15
34. 38 2/35
35. 14 7/18
36. 15 23/30
37. 15 1/6
38. 17 1/15
39. 16 1/3
40. 16 1/14

41. 10 1/2
42. 8 2/3
43. 9 1/4
44. 5 1/5
45. 4 1/6
46. 7 5/6
47. 2 3/8
48. 6 2/9
49. 4 3/10
50. 5 1/11
51. 1/36
52. 11/180
53. 17/42
54. 23/216
55. 29/84
56. 37/140
57. 43/48
58. 5/54
59. 7/160
60. 9/160

61. 5.75
62. 2/5
63. 1 1/4
64. 0.5
65. 1/5
66. 0.1
67. 2/5
68. 0.75
69. 1/2
70. 0.4
71. 33/10
72. 25
73. 50/63
74. 9/20
75. 110/7
76. 15
77. 25
78. 11
79. 100
80. 56

81. 6 2/3
82. 10 1/2
83. 4+1/7=4 1/7
84. 9+1/7=9 1/7
85. 15+1/2=15 1/2
86. 67 2/3
87. 58 1/2
88. 37 8/9
89. 84 4/5
90. 28 1/9
91. 21 2/3
92. 18 7/8
93. 3 1/4
94. 2 2/3
95. 2 2/3
96. 5, 7, and 9
97. 60 mph
98. \$39.00
99. 27 hours
100. 24 ft

1. $60 \div 4 = 15$
   $15^2 = \underline{225\ in^2}$
2. $(22+18) \times 12 = 480$ muffins
3. $8/24 = \frac{1}{3}$
4. $1 - \frac{1}{3} = \frac{2}{3}$
5. $\frac{1}{3} = 0.33\frac{1}{3} = 33\frac{1}{3}\%$
6. $\frac{2}{3} = 0.66\frac{2}{3} = 66\frac{2}{3}\%$
7. $5 + 2 \times 3 = \$11$
8. \$25 – \$5 = \$20,
   \$20÷3 = 6R2, thus
   you can park at most
   6 + 1 = 7 (hr)
9. $3.5 \div 5 = \$0.70$
10. 500÷30 = 16R20
    16 + 1 = 17

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Answer Key

1. -4
2. 6
3. -23
4. 2
5. 2
6. -1
7. 0
8. -14
9. -23
10. 14
11. 7.4
12. 11.0
13. 0.4
14. -4.0
15. 5.7
16. 7.2
17. 3.9
18. 7.2
19. 7.2
20. 5.7

21. 5
22. -13
23. -11
24. -18
25. -46
26. 7
27. -10
28. 5
29. -10
30. 45
31. -17
32. 15
33. 15
34. -7
35. 5
36. -4
37. -3
38. -4
39. 6
40. -2

41. 77
42. 76
43. 78
44. 34
45. 1860
46. 5
47. 99°F
48. 14th floor
49. −450 ft
50. −12°
51. $-3x-2y$
52. $5x-3y$
53. $-16x-4y-1$
54. $-15x+5y$
55. $3x-7y$
56. $-x-8y$
57. $6x-4$
58. $-5x-13$
59. $-6x-5y$
60. $8x-y$

61. $2\frac{31}{108}$
62. 4 & 10
63. 150
64. 125
65. $\frac{7}{9}$
66. $38\frac{2}{3}$
67. 9
68. $13\frac{1}{2}$
69. $\frac{3}{11}$
70. 9
71. $4\frac{9}{20}$
72. $5\frac{1}{5}$
73. $5\frac{11}{20}$
74. $2\frac{9}{25}$
75. $2\frac{8}{25}$
76. 12%
77. 120%
78. 252%
79. 257.5%
80. 158.75%

81. -3
82. 4
83. 9
84. 3
85. 5
86. 4
87. 7
88. 8
89. -4
90. 4
91. $21\frac{2}{3}$
92. $18\frac{7}{8}$
93. $3\frac{1}{4}$
94. $2\frac{2}{3}$
95. $2\frac{2}{3}$
96. $2\frac{3}{4}$
97. $4\frac{5}{6}$
98. $4\frac{2}{9}$
99. $12\frac{2}{3}$
100. $3\frac{1}{6}$

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MAP 260+ (T1) Issue 9

101. $\frac{1}{2}\times12\times12 = 72$
$72\div4 = 18$
$18\times6 =$ 108 plants

102. 1 gallon = 16 cups
$16\div\frac{4}{3} = 16\times\frac{3}{4} = 12$ pies

103. 14 ft $6\frac{1}{2}$ in – 13 ft $10\frac{3}{4}$ in
$= 1\frac{1}{4} + 6\frac{1}{2}$ in
$= 7\frac{3}{4}$ in
= 7 3/4 in

104. $576 \div 8 = 72$
$72\times5 = 360$ gal

105. Sharon must have \$50 more than Lindsey.
Sharon = \$80.00

106. LCM(4, 6) = 12

107. $8 \times 16 = 128$ oz

108. 1:30 + 4:20+ 3:00 = 8:50 pm

109. 12:00 – 4:20 + 3:00 = 10:40 am

110. $320\times16 = 5120$ oz

111. $38\div4 = 9.5$ gal

112. -15 + 8 – 2 = -9

113. $\frac{1}{2}(50°) = 25°$

114. $1.80\div3 = 0.60$ (each eraser)
$0.60\times12 =$ \$7.20 (a dozen)

115. D
-5 + 20 – 8 = 7° F

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Answer Key

1. 32, 80, 27
2. 8, –72, 18
3. 32, –112, 4
4. 18, 96, 22
5. 1, 1.2, 14
6. 1, 1, 0.8, –31.64
7. 1, 1, 0.9, 16.19
8. 2, 1, –0.5, 3.5
9. 2, 1, 0.3, 9.82
10. 2, 2, –3, –12
11. 4.5
12. -1.6
13. 0.5
14. $\frac{5}{3}$
15. -2
16. 0
17. -14
18. -2
19. 1.5
20. 2

21. $y = 4$
22. y–intercept = 4
23. $x = -3$
24. x–intercept=–3
25. $\sqrt{(-3)^2 + (4)^2} = 5$
26. (6, 0)
27. (0, 3)
28. $x = 6$
29. $y = 3$
30. (4, 3)
31. (-4, -3)
32. (0, -3)
33. (-3, 0)
34. B
35. A B
36. A B
37. B C
38. A C
39. $b = 3$
40. 10

41. 4, 6
42. 7, 3
43. 9
44. 7
45. 24
46. 6
47. 3
48. 4
49. -81
50. 81
51. x^6
52. 9
53. $-8t^5$
54. $-81t^{12}$
55. $\frac{7}{x^7}$
56. $\frac{-3}{x^9}$
57. $\frac{125}{x^3}$
58. 384
59. 981
60. 2.3

61. $30x^4y^4z^5$
62. $5x^5y^3z^5$
63. $\frac{4}{xyz^2}$
64. $\frac{1}{3y^2z}$
65. $1\frac{1}{2}x^3z$
66. $\frac{4}{5}xz^3$
67. $\frac{1}{10}\frac{1}{z}$
68. $15\frac{x^2}{y}$
69. $5x^3z^3$
70. x^4z^3
71. 3×10^{11}
72. 6.3×10^9
73. 7.2×10^{19}
74. 1×10^{12}
75. 8.1×10^{14}
76. 5×10^{44}
77. 1.44×10^{15}
78. 1.6×10^{19}
79. 5×10^{24}
80. 2.56×10^{25}

81. 2
82. 40 cm.
83. 20 (W) & 12 (L)
84. $3.68
85. 34.25 in
86. 26 kg
87. B
88. 12
89. 5 5/8 gal
90. $16
91. $393
92. 1/4 mph
93. 2/5 in
94. $\frac{1}{8} \times 12 = 1.5$ (billion)
95. 1/2

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Answer Key

1. BD = DC (midpoint)
   ∠ADB = ∠ADC (= 90°, given)
   AD = AD (common)
   ΔADB ≅ ΔACD (SAS)
   Thus, AB = AC

2. AB = AC (given)
   ∠BAD = ∠CAD (bisector)
   AD = AD (common)
   ΔADB≅ΔACD (SAS)
   Thus, BD = CD

3. AB = AC (given)
   BD = DC (midpoint)
   AD = AD (common)
   ΔADB ≅ ΔACD (SSS)
   Thus, ∠ADB = ∠ADC (= 90°).

4. AB = AC (hypotenuse, given)
   AD = AD (leg, common)
   BD = CD (leg, Pythagorean theorem)
   ΔADB ≅ ΔADC (SSS)
   Thus, ∠ABD = ∠ACD.

5. Let AD be the bisector of ∠BAC.
   ∠BAD = ∠CAD (bisector)
   ∠B = ∠C (given)
   AD = AD (common)
   Therefore,
   ΔABD ≅ ΔACD (AAS)
   It follows that
   AB = AC

6. Let D be the midpoint of BC.
   BD = CD (midpoint)
   AB = AC (given)
   AD = AD (common)
   Therefore,
   ΔABD ≅ ΔACD (SSS)
   It follows that
   ∠B = ∠C

7. ΔABC≅ΔDCB (SSS)
   ∠3 = ∠4 (congruency)
   ∠1 = ∠2 (∠1 = ∠ABC-∠3 = ∠BCD-∠4 = ∠2)
   ΔAEB≅ΔDEC (AAS for ∠AEB = ∠DEC, vertical angle, AB = DC, given, ∠1 = ∠2 previous result)

8. ∠4 = ∠3 (given)
   BC = BC (common)
   ∠ABC = ∠DCB (∠1 = ∠2 and ∠3 = ∠4, additive)
   Therefore,
   ΔABC≅ΔDCB (ASA).
   Thus, AB = CD and AC = BD.

9. One more assumption is needed. For instance, if we assume
   BC//DE
   Then we can have
   PD = QE
   Proof:
   ∠5 = ∠3 = ∠4 = ∠6
   AP = AQ (isosceles)
   PD = AD-AP = AE-AQ = QE

10. Yes. AP = AD - AP = AE - QE = AQ, therefore,
    ∠5 = ∠6
    ∠APB = ∠AQE
    BP = CQ
    Therefore, ΔAPB ≅ ΔAQC, it follows that AB = AC.

11. ∠1 = ∠2
    ∠3 = ∠4
    BC//DE

12. AB = AC (∠1 = ∠2)
    ∠1 = ∠3 (given)
    BD = CE (given)
    ΔABD ≅ ΔACE (SAS)
    Thus, ∠BDA = ∠CEA

13. AB = AC (given)
    1) BD = ($\frac{1}{2}$AB = $\frac{1}{2}$AC =) CE
    2) ∠B = ∠C (AB = AC, given)
    CG = BF (given)
    3) BG = (BC - CG = BC - BF =) CF
    Therefore, from 1), 2) and 3) we conclude that
    ΔDBG ≅ ΔECF (SAS)
    Thus, DG = EF.

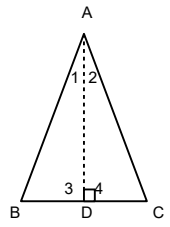
14. 1) BF = (AB = AC =) CD (given)
    ∠ABC = ∠ACB (AB = AC)
    2) ∠EBC = (90° + ∠ABC = 90° + ∠ACB =) ∠BCD
    3) BC = BC (common)
    Therefore, from 1), 2) and 3), we conclude that
    ΔFBC ≅ ΔDCB (SAS).
    Thus, CF = BD.

15. AB = AC (given)
    AD = AD (common)
    BD = DC (midpoint)
    ΔABD ≅ ΔACD (SSS)
    Thus, ∠BAE = ∠CAE.
    AE = AE (common)
    ΔABE≅ΔACE (SAS)

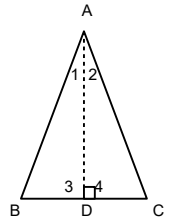
16. ∠CBD = ∠ECD (AB = CE)
    BE = CE (given)
    BD = CD (midpoint)
    DE = DE (common)
    ΔBDE ≅ ΔCDE (SSS)
    ∠BED = ∠CED
    ∠BEA = 180° - ∠BED
    ∠CEA = 180° - ∠CEA
    ∠BEA = ∠CEA (transitivity)
    AE = AE (common)
    ΔABE ≅ ΔACE (SAS)

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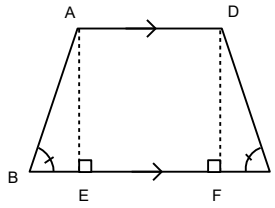
17. Choose AD as the angle bisector of ∠BAC, then
∠1 = ∠2.
Also, we have
∠B = ∠C (given)
∠3 = 180° - (∠1 + ∠B)
= 180° - (∠2 + ∠C)
= ∠4
Since
AD = AD (common side),
we have established
ΔADB ≅ ΔADC (ASA)
thus
AB = AC.



18. Choose AD as the angle bisector of ∠BAC, then
∠1 = ∠2.
Since
AB = AC (given)
AD = AD (common side)
we have established
ΔADB ≅ ΔADC,
thus
∠B = ∠C.

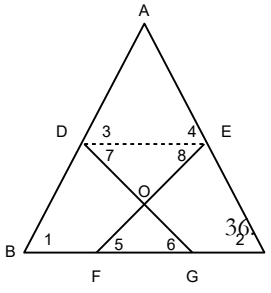


19. $\frac{1}{3}\times 180° = 60°$
20. It follows from the previous the statement.
21. 80
22. 55
23. 12
24. 4.5
$5x - 4 = 3x + 5$
$2x = 9$
$x = 4.5$
25. 0.5
$5x^2 + 8x - 6 = -x^2 + x - 1$
$6x^2 + 7x - 5 = 0$
$(3x + 5)(2x - 1) = 0$
$x = 0.5$ or $-5/3$
26. Draw two auxiliary lines (altitudes) AE and DF.



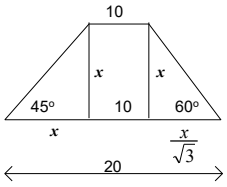
AE = DF (AEFD is a rectangle, esp. a parallelogram)
∠B = ∠C
∠AEB = ∠DFC (= 90°, altitudes)
ΔABE ≅ ΔDCF (AAS)
Thus, AB = DC

27. Once you prove that ΔABC≅ΔDCB, then it is obvious that ∠3 = ∠4, therefore, ∠1 = ∠2. Similarly, ∠7 = ∠8 (because ΔABC≅ΔDCB), it follows that ∠5 = ∠6.
28. 1) AB = CD (proved)
2) ∠1 = ∠2 (proved)
∠BAD = 180° - ∠ABC (consec. int. AD//BC)
∠CDA = 180° - ∠DCB (consec. int. AD//BC)
3) ∠BAD = ∠CDA (transitivity)
Combining 1), 2) and 3), we can conclude that ΔBAD ≅ ΔCDA (AAS). Thus, we have
AC = BD
29. ∠6 = 35°,
∠1 = 180°-60°-35° = 85° = ∠4.
∠2 = ∠6 = 35° = ∠3 (alternate interior).
∠5 = 25°.
∠7 = 180° - 2×35° = 110°.
30. ΔADE is an isosceles. ∠1 = ∠2 = ∠3 = ∠4. DE//BC (for congruent corresponding angles). Since ∠7 = ∠8 (for OD = OE), ∠5 = ∠8 (alternate interior) and ∠6 = ∠7 (alternate interior). Therefore, ∠5 = ∠6 (transitivity of equality), or equivalently, OF = OG.



31. First, we claim
∠B = ∠C,
since ∠B
= ∠1 (corresponding angle)
= ∠2 (given)
= ∠C (corresponding angle)
Then, we claim
AB = AC (∠B = ∠C)
AD = AE (∠1 = ∠2)
Last, we establish
BD = EC
since BD = AB - AD = AC - AE = EC.
32. ∠1 = ∠2 = ∠3
33. ∠1 = ∠3 (given)
∠B = ∠C (AB = AC, given)
∠4 = ∠1 + ∠B
∠5 = ∠3 + ∠C
∠4 = ∠5 (transitivity)
34. ΔABE≅ΔACD (SAS). So, ∠ABE = ∠ACD and AB = AC. Now that ΔABC is an isosceles, ∠ABC = ∠ACB. We have ∠1 = ∠ACB-∠ACD = ∠ABC-∠ABE = ∠2.
35. It is not sufficient. The point F must be conditioned properly to have ∠3 = ∠4. For instance, F is the midpoint of BC, then the statement is true. Use ΔCFD and ΔBFE as container triangles. They are congruent for SAS. Now that ∠CFD = ∠BFE, we have ∠3 = ∠4.
Sufficient, the rest four pairs in the list are congruent since ΔABD ≅ ΔACE for ASA.

37. Sufficient, the rest four pairs in the list are congruent since $\Delta ABD \cong \Delta ACE$ for SAS.
38. Insufficient
39. Sufficient, the rest four pairs in the list are congruent since $\Delta ABD \cong \Delta ACE$ for AAS.
40. Sufficient, the rest of four pairs in the list are congruent since $\Delta ABD \cong \Delta ACE$ for ASA.
41. $x = 4$
    $y = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$
42. $x = 2(\frac{8}{\sqrt{2}}) = 8\sqrt{2}$
    $y = 4\sqrt{6}$
43. $x = 6\sqrt{2}$
    $y = 3\sqrt{2}$
44. $x = 6 + 5 = 11$
    $y = 5\sqrt{3}$
45. $x = 4\sqrt{3}$
    $y = 2\sqrt{37}$
46. $BD = 3$
    $3x = 5^2 \Rightarrow x = \frac{25}{3}$
    $y^2 = x \cdot (CD) = \frac{25}{3}(\frac{25}{3} - 3) = \frac{25 \cdot 16}{9} \Rightarrow y = \frac{20}{3}$
47. Let x be the height, then the base is $20 = x + 10 + \frac{x}{\sqrt{3}}$
    $\Rightarrow x = \frac{10\sqrt{3}}{\sqrt{3}+1} = 5\sqrt{3}(\sqrt{3} - 1) = 15 - 5\sqrt{3}$



48. 5
49. $5\sqrt{3}$
50. $5(\sqrt{3}-1)$
    $x = CD = AC - AD$
    $= 5\sqrt{3} - 5 = 5(\sqrt{3}-1)$
51. $AE = \frac{5}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$
52. $\frac{5(3-\sqrt{3})}{3}$
    $y = BE = AB - AE =$
    $5 - \frac{5\sqrt{3}}{3} = \frac{5(3-\sqrt{3})}{3}$
53. 6
54. $6\sqrt{2}$
55. $3\sqrt{6}$
56. $6 + 6\sqrt{3}$
57. $3(\sqrt{2} + \sqrt{6})$
    $AB = 12$,
    $BF = 6$ (30°-60°-90°)
    $BE = 6\sqrt{2}$ (45°-45°-90°)
    $DE = 3\sqrt{2}$
    $CD = BD = \sqrt{3} \times DE = 3\sqrt{6}$
    $CE = CD + DE = 3\sqrt{2} + 3\sqrt{6} = 3(\sqrt{2} + \sqrt{6})$
58. $45 + 27\sqrt{3}$
    area(ΔABC)
    = area(ΔABE) + area(ΔBCE)
    $\frac{1}{2}(BF \times AE + BD \times CE)$
    $= \frac{1}{2}(90 + 54\sqrt{3})$
    $= 45 + 27\sqrt{3}$
59. $18 + 3\sqrt{2} + 12\sqrt{3} + 3\sqrt{6}$
60. The height of the parallelogram is $3\sqrt{3}$. The area is $3\sqrt{3} \times 10 = 30\sqrt{3}$.

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