Measurement – AP Book 7, Part 1: Unit 6

AP Book ME7-1
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1. a) 2 320
   b) 0.254
   c) 360
   d) 0.005 07
   e) 43
   f) 0.000 79
2. b) i) 1 000; bigger
      ii) 1 000; fewer
      iii) divide; 1 000; 3.7
   c) i) 1 000; bigger
      ii) 1 000; fewer
      iii) divide; 1 000; 2.7
   d) i) 1 000; smaller
      ii) 1 000; more
      iii) multiply; 1 000; 345.6
3. a) 0.700
   b) 930
   c) 0.037
   d) 2.340
   e) 15 400
   f) 0.000 05
   g) 7 430
   h) 930
   i) 0.037
   j) 0.002 34
   k) 22 600
   l) 0.000 08
   m) 3 569 000
   n) 6 789 000
   o) 20

   BONUS

   p) 569; 569 000
   q) 67.890; 0.067 890
   r) 90.875; 0.090 875
4. 1 000; 100 000; 1 000 000
5. b) 10, smaller; 10, more; multiply, 10, 350
   c) 1 000, bigger; 1 000, fewer; divide, 1 000, 0.035
   d) 4 600
   e) 30
   f) 0.08
   g) 0.026
   h) 30
   i) 0.023

   BONUS

   j) 0.000 076 6
   k) 70 000
   l) 0.000 008
6. 5.28 m
7. Pennies
8. Longer
9. 24 m
10. Longer
11. $3.60
12. Jane
13. a) 175 000 g
    b) 2
    c) 1 167 times

AP Book ME7-2
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1. a) 7
   b) 0.2; 1.4
   c) 7
   d) $1.4 \div 0.2 = 1.4 \times 10 \div (0.2 \times 10)$
   e) No decimals
2. a) 18; 6; 18; 6; 3
   b) 42; 7; 42; 7; 6
   c) 9
   d) 20
   e) 16
   f) 16
   g) 13
3. a) 81; 3; 27
   b) 720; 6; 120
   c) 350; 7; 50
4. a) 264; 2; 132
   b) 890; 5; 178
   c) 726; 3; 242
5. a) 137
   b) 254
   c) 400
   d) 860
6. a) 30
   b) 1 700
   c) 80
   d) 500
   e) 1 600
   f) 12 000
   g) 3 000
   h) 5
   i) 0.2
   j) 2.1
   k) 84
   l) 3

AP Book ME7-3
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1. a) 270
   b) 0.29
   c) 45
   d) 0.036
   e) 43 000
   f) 0.003 7
   g) 1 800
   h) 0.000 59
   i) 62 530
   j) 0.003 456
   k) 413 100
   l) 0.327 8
2. a) 1 m^2; 1 cm^2; 10 000 cm^2
   b) A, C; 1 m^2 = 10 000 cm^2

Box: 10 000, 10 000; 100, 100, 100, 10 000

3. a) iii) 10 000
   b) i) 10 000; larger
      ii) 10 000; fewer
      iii) divide; 10 000; 0.37 m^2
   c) i) 10 000; smaller
      ii) 10 000; more
      iii) multiply; 10 000; 290 000
   d) i) 10 000; smaller
      ii) 10 000; more
      iii) multiply; 10 000; 4 798
4. a) 5 000 000
   b) 9 000
   c) 0.000 3
   d) 0.195
   e) 0.001 54
   f) 500
5. a) cm^2
   b) cm
   c) cm^2
   d) m
   e) m
   f) mm

AP Book ME7-4
page 170

1. a) Yes, require same # of squares to fill.
   b) They are the same.
   c) They are equal.
   d) Area = base × height
3. a) 35 cm^2
   b) 12 cm^2
   c) 48 cm^2
   d) 22.2 cm^2
4. a) Top figure:
      height 2.5 cm;
      base 5 cm;
      area 12.5 cm^2

      Bottom figure:
      height 4.5 cm;
      base 3 cm;
      area 13.5 cm^2
   b) Top figure:
      height 3 cm,
      base 3 cm;
      area 9 cm^2

      Bottom figure:
      height 3 cm;
      base 3 cm;
      area 9 cm^2
5. Left figure:
   height 3 cm;
   base 3 cm;
   area 9 cm^2

   Right figure:
   height 2.5 cm;
   base 6.5 cm;
   area 16.25 cm^2
6. a) No, they are not in the same units.
   b) 12 000 cm^2
   c) 1.2 m^2

d) Yes, they represent the same area.

7. $246.48

8. a) One area is 3 times larger than the other.

b) One area is 3 times larger than the other.

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1. 4; 6; 2; 8

2. b) (in square units) 8; 5; 10; 6

3. No, the base of the triangle is not the same as the length of the rectangle.

4. a) $\frac{1}{2}$; 6; 3; 9

b) 3

c) area of ΔEDC

d) 6

5. (in square units)
12; 6; 6
12; 4; 8
8; 4; 4
6; 2; 4

INVESTIGATION

A. a) width = base

b) height of triangle = 2 × (height of rectangle)

c) Area = (base) × (height) ÷ 2

B. a) base = 2 × (width)

b) Both are equal.

c) Area = (base) × (height) ÷ 2

C. b) Jan's height equals Ian's width.
Jan's width equals Ian's height.

c) Both rectangles have the same dimensions.

6. a) 7 cm; 2 cm; 7 cm^2

b) 3 cm; 2.5 cm; 3.75 cm^2

c) 4.5 cm; 2.5 cm; 5.625 cm^2

7. Teacher to check.

8. b) BC

c) AB

d) CA

9. Yes

AP Book ME7-6
page 175

1. area of A = $\frac{1}{2}$ area of parallelogram B

2. 10

3. A = b × h ÷ 2

4. 4 x 4 ÷ 2 = 8

5. a) 6 cm^2

b) 6 cm^2

c) 12 cm^2

d) 12.8 cm^2

6. c) Both are the same.

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1. b) Area of rectangle = length × width

c) Area of triangle = base × height ÷ 2

2. b) Area = length × width

c) B

3. b) Area = base × height

c) C

4. Teacher to check sketches.

a) Area = base × height ÷ 2 = 27.5 cm^2

b) Area = base × height = 75 cm^2

c) Area = length × width = 6 m^2

BONUS
Area = (area of square) + (area of triangle) = 150 cm^2

5. a) i) base

ii) 10; 10 cm; 5 cm

iii) 100; 25

iv) 2; 100, 50, 150

b) i) base × height

ii) base

iii) 15 cm; 10 cm

iv) 150 cm^2

6. a) cm; 120; 30

b) 3 600 cm^2 or 0.36 m^2

7. The areas in Q4 are:

a) Area = 27.5 cm^2

b) Area = 75 cm^2

c) Area = 6 m^2

d) Area = 150 cm^2

8. 30 cm^2

9. 0.019 2 m^2

10. b) Area of parallelogram = base × height

d) height

11. a) 15 = 3x

b) 3 = 0.5 x

c) 24 = 6x

12. No. Explanations will vary.

13. a) cm^2

b) cm

c) m

d) m

e) mm^2

f) m^2

14. a) cm

b) 30 000; 30

c) 30 000 = 30x

d) x = 1 000 cm

15. Explanation for a), b), c): did not convert to the same units.

16. 6 m

17. 3.2 m

18. 144 cm^2

19. 50 m

20. 120 cm

21. 1.125 cm^2

22. 2 600 cm^2

23. No, one of 5, 12 or 13 would have to be the base and none will give an area of 30 cm^2:

$\frac{10 \times 5}{2}$ = 25 cm^2

$\frac{10 \times 12}{2}$ = 60 cm^2

$\frac{10 \times 13}{2}$ = 65 cm^2

24. a) 6 cm

BONUS 6 kaans

AP Book ME7-8
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1. b) 12; 6; 18

c) 4; 10; 14

d) 6; 4.5; 10.5

e) 6; 3; 9

2. b) 4; 4; 6; 14

c) 3; 3; 6; 12

d) 6; 3; 3; 12

BONUS

3. 9

4. a) 1 cm

b) 9 cm^2

5. a) 3.25 m^2

b) 16 km^2

c) 11.9 cm^2

6. 15; 15; 15; 15; No
Two times the number is equal to the sum at each step.

7. a) 6

b) 9

c) 4.5

8. b) 7

c) 6.5

d) $(a + b) \div 2$

9. 1st, 2nd, 3rd, and 5th expressions

10. b) 3; 3; 9

c) 3; 2; 6

d) 7

11. b) 4.5

c) 3.3

12. a) 6, 2
4
2
8

b) 2, 6
4
3
12

c) 7, 4
5.5
2
11

d) a, b
$\frac{a + b}{2}$
h
$h \times \frac{a + b}{2}$

13. $(6 + 3) \times 4 \div 2 = 18$ cm^2

BONUS

14. Teacher to check.

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page 185

1. b) 3 + 1; 2
c) 4 + 2; 3
2. a) 5
b) 12 m
c) $a + b$
3. a) 18
b) 8
c) 18
4. a) 2
b) 2
c) A: 9
B: 1, 3, 2;
4, 2, 4
C: $(4 + 2) \times 3 \div 2$
$= 6 \times 3 \div 2$
$= 9$
5. $(a + b) \times h \div 2$
6. b) Teacher to check.
c) Teacher to check.
d) a) 16.65 m^2
b) 13.46 m^2
c) 19.4 cm^2

AP Book ME7-10
page 186

1. a) 8; 4; 12;
Area of C = Area of A + Area of B
b) 12; 8; 20;
A + B
c) 3; 12; 15;
A + B
d) 8; 8; 16;
A + B
2. a) 36; 4;
A – B
b) i) $(3 \times 4) + \frac{3 \times 2}{2}$
$= 12 + 3 = 15$
ii) A – B
$= (3 \times 6) - \frac{3 \times 2}{2}$
$= 18 - 3 = 15$
iii) $3 \times \frac{4 + 6}{2}$
$= 3 \times 5 = 15$
3. a) 44 m^2
b) 52 m^2
c) 41 m^2
4. a) 3
b) 40
5. a) 2; 4; 28
b) 7; 3; 30
c) 1.7; 4; 46.8
6. a) 26 km^2
b) 55 cm^2
c) 4 021.6 cm^2
7. a) 7.5 cm^2
b) 40 m^2
c) 22
8. a) 21.2 cm^2
b) 39 cm^2
c) 45.57 km^2
9. a) 5; $\frac{5}{9}$
b) 1; $\frac{1}{4}$
c) 2; $\frac{1}{4}$
10. a) 5 m
b) 5 m^2
c) 30 m^2
d) $165
11. 196 m^2

AP Book ME7-11
page 189

1. a) ii) 3:1
iii) 2:3
iv) 1:1
b) ii) 3:7, $\frac{3}{7}$
iii) 2:3, $\frac{2}{3}$
iv) 3:4, $\frac{3}{4}$
2. b) days in January : days in June, 31:30
c) vowels in cat : letters in cat, 1:3
d) vowels in dog : consonants in dog, 1:2
e) Atlantic provinces : all Cdn provinces, 4:10
3. b) squares : shapes
c) squares : triangles
4. Part b)
5. Answers may vary a bit. Teacher to check.
a) shaded circles : circles
b) shaded squares : squares
c) small squares : shapes
d) shaded shapes : shapes
e) circles : shapes
f) light circles : circles
g) light circles : shaded circles
6. Teacher to check.
7. a) 1, 2:1
b) 5, 2:5
c) 2, 3:2
d) 7, 2:7
e) 3, 4:3
f) 2, 4:2
g) 3, 1:3
h) 2, 3:2

AP Book ME7-12
page 191

1. Answers may vary.
b) 2:12
c) 4:14
d) 10:4
2. a) 4:3
b) 1:2
c) 4:5
d) Answers may vary, example: 2:3
3. a) ii) 1, 2, 3, 4, 6, 12
iii) 1, 2, 3, 5, 6, 10 15, 30
iv) 1, 3, 5, 15, 25, 75
b) i) 2
ii) 10
iii) 5
iv) 6
v) 3
vi) 15
c) i) 5:2
ii) 1:3
iii) 4:25
iv) 6:5
v) 15:2
vi) 2:5
4. a) 5:7
b) 7:2
c) 5:3
d) 2:3
e) 28:9
f) 6:5

AP Book ME7-13
page 192

1. a) 16
b) 5
c) 20
d) 30
e) 24
f) 8
g) 25
h) 100
i) 20
j) 25

k) 21
l) 20
m) 2
n) 8
o) 11
p) 7

2. a) 3
b) 50
c) 33
d) 2

3. a) 2
b) 6
c) 12

4. a) $\frac{8}{10} = \frac{4}{5} = \frac{12}{15}$
b) $\frac{4}{6} = \frac{2}{3} = \frac{6}{9}$
c) $\frac{60}{100} = \frac{3}{5} = \frac{27}{45}$
d) $\frac{24}{30} = \frac{4}{5} = \frac{40}{50}$
e) $\frac{70}{100} = \frac{7}{10} = \frac{21}{30}$
f) $\frac{16}{24} = \frac{2}{3} = \frac{50}{75}$

5. a) 4
b) 10
c) 65
d) 15
e) 10
f) 14

AP Book ME7-14
page 193

1. 12 laps
2. 15 minutes
3. 24 girls
4. 27 tickets
5. 120 students
6. 630 students
7. 80 rap songs
8. 4 students
9. 27 students
10. 10 games
11. a) 18 red fish
b) 50 blue fish
12. 4:5

AP Book ME7-15
page 194

1. b) ← × 3, 6
c) ← × 4, 5
d) ← × 3, 14
e) ← × 7, 1
f) ← × 3, 2
g) ← × 5, 0.30
h) → × 2, 12

2. b) $2.50
c) $15
d) 8 m
e) $17
f) $5
BONUS $10

3. a) 160 km
b) 100 words
c) 180 times

4. a) $64 for 4 CDs
b) $46.20 for 3 cans
c) 6 golf balls for $10

5. 18 km

6. a) 80 km/h
b) 120 km/h

7. a) 2.5 hours
b) 7 hours
c) 14.5 hours

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page 195

1. a) 5 cm
b) 0.25 m
c) 3.2 km
d) 4.5 L
e) 6.9 g
f) 4 min
g) 70 h
h) 5 days

2.

Distance on Map	Distance in Real Life
2.2 cm	220 km
2.3 cm	230 km
4.3 cm	430 km

3. 97.5 km

4. David: 572.5 km
Felicity: 638 km
Jack: 1 900 km

5. 14 cans

6. $16.80

BONUS $450

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page 196

1. a) 4 km / 1 h
b) 12 km / 1 h
c) 1 cup of sugar : 12 cups of flour
d) 9 km / 20 L of gas
e) 19 mL of ginger ale : 4 mL of oj

2. a) $\frac{12}{20}$
b) $\frac{50}{9} = \frac{250}{45}$
c) $\frac{38}{2} = \frac{19}{1}$
d) $\frac{60}{21} = \frac{20}{7}$
e) $\frac{72}{32} = \frac{9}{4}$
f) $\frac{54}{6} = \frac{18}{2}$

3. a) 72 km
b) 72 days
c) 875 m
d) $\frac{1}{2}$ cup milk

AP Book ME7-18
page 197

1. Teacher to check.

2. a) Teacher to check.
b) Teacher to check.
c) Both are radii.

3. a) 5 cm
b) 1 m
c) 12 mm

4. a) 68 mm
b) 86 cm
c) 48 m

5.

Radius	3	4	12	***2***
Diameter	6	***8***	***24***	4

6	38	***0.5***	***0.8***	r
12	***76***	1	1.6	***2r***

6. a) 3 cm
b) 2.5 cm

7. a) 1 cm
b) 1.2 cm

8. Teacher to check.

9. a) 90°
b) 360°

10. a) ∠AHD
b) Teacher to check.
c) 45°; 45°; 135°; 90°
d) 360°
e) ∠CHI, 360°
f) No

11. 60° (since 360 ÷ 6 = 60)

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page 199

1. a), b)

4 cm 4:1	8 cm 8:2	12 cm 12:3
6 cm 6:2	12 cm 12:4	18 cm 18:6
24 cm 24:8	12 cm 12:4	36 cm 36:12

c) Equivalent ratios
d) 3:1, 3
3:1, 3

INVESTIGATION

A. b) 28 mm;
11 mm;
88 mm;
about 88 mm
c) 32 mm;
13 mm;
104 mm;
about 104 mm

B. a) 64:22 = 2.9:1
b) 88:28 = 3.14:1
c) 104:32 = 3.25:1
Ratio is about 3:1

C. Notice: all the same.
3.14:1
3.14:1
3.14:1

2. a) 21.98
b) $C = \pi \times 10$ m
≈ 31.4 m
c) $C = \pi \times 8$ m
≈ 25.12 m
d) $C = \pi \times 5$ cm
≈ 15.7 cm

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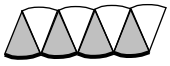
page 201

1. a) 12 9 5
5
81 9
12
b) ≈ 133
c) ≈ 4 × 133 ≈ 532
2. 13; $532 \div 13^2 \approx 3.14$ and this is what we use for π.
3. Teacher to check.

INVESTIGATION

A. Teacher to check.
B. Teacher to check.
C. Teacher to check.
D. The radius, since the height is about the same as the length of the straight side of each segment.
E. It's $\frac{1}{2}$ the circumference:



F. $\frac{2\pi r}{2} = \pi r$
G. $r \times \pi r$
H. $r \times C \div 2$
$= r \times 2\pi \times r \div 2$
$= r \times \pi \times r \times 2 \div 2$
$= \pi \times r^2$

4. b) 314 cm^2
c) 78.5 km^2
d) 153.86 m^2
5. a) 113.04 m^2
b) 907.46 cm^2
c) 706.5 dm^2
d) 0.785 m^2

AP Book ME7-21
page 203

1. b) 39.25 m^2
c) 14.13 cm^2
2. a) 62.8 cm
b) It is half of C:
$\approx \frac{1}{2} \times 62.8$
≈ 31.4 cm
c) It's the diameter which is equal to 2r or 20 cm.
d) 20 + 31.4 = 51.4 cm
e) Because of the bottom straight edge – half the circumference would just be the length of the curved part of it.
f) 25.7 cm
15.42 cm
3. a) 113.04 m^2
37.68 m
b) 31.792 5 cm^2
23.12 cm
c) 226.865 km^2
53.38 km
d) 12.56 m^2
14.28 m
e) 18.28 m^2
16.28 m
4. a) 35 cm
b) 219.8 cm
5. a) 360°
b) $\frac{1}{6}$; 360 ÷ 60 = 6
c) 12.56 m^2
d) 2.093 m^2
6. 1 256 m^2
7. 8 cm^2
4 cm
25.12 cm^2
8 + 25.12 = 33.12 cm^2
8. a) 6.28 + 12 + 14.13
= 32.41 cm^2
b) 4 + 3.14 + 4
= 11.14 m^2
c) 1.57 + 8 + 1.57
= 11.14 cm^2
9. a) 423.9 m
b) 1 413 s
c) 82 m
10. About 32 times
11. a) 3
b) 2 cm
c) 6.28 cm
d) 18.84 cm
12. 15.7 cm
13. a) 37.58 mm
b) 0.318 m