

Patterns and Algebra: Variables, Expressions, and Equations – AP Book 5.2: Unit 8











AP Book PA5-8















page 1

1. a) 8
b) 10
c) 24
d) 12
e) 16
f) 6
g) 9
h) 3
i) 8
2. b) 5
c) 6
d) 1
e) 15
f) 6
3. a) Circle parts a) and i) in Question 1.
b) $2 + 5 + 1 = 10 - (4 \div 2)$
4. b) $= 8 \times 5 = 40$
 $= 40$
c) $= 14 = 4 + 10 = 14$
d) $= 14 = 5 + 9 = 14$

AP Book PA5-9

page 2

1. b) 
c) 

d) 

2. a) 
2
b) 
 $7 = 4 + 3$
c) 
 $3 + 1 = 4$
d) 

 $4 + 4 = 8$
3. a) 3
b) $9 = 7 + 2$
c) $11 = 5 + 6$
d) $17 = 9 + 8$

4. a) 

b) 

5. a) 

7
b) 

7
6. b) 5
c) 4
d) 3
e) 2
f) 11
g) 4
h) 3
i) 1
7. a) 5, 5
b) Teacher to check picture.
 $4 + 4 + 4 = 12$
8. b) 

5
c) 

6
d) 

4

9. b) 2
c) 2
d) 2
e) 18
f) 12
g) 24
h) 28

9. b) 2
c) 2
d) 2
e) 18
f) 12
g) 24
h) 28

BONUS

- 60
10. Teacher to check pictures.
a) 12
b) 6
11. a) 5
b) 9
c) 12
d) 6

- e) 4
f) 30
g) 2
h) 4
12. a) 6
b) 4
c) 20
d) 2
e) 4
f) 35
g) 6
h) 15

AP Book PA5-10

page 5

1. a) 6 divided by 3
 $= 6 \div 3$
2 less than 6
 $= 6 - 2$
product of 6 and 4
 $= 4 \times 6$
6 decreased by 3
 $= 6 - 3$
b) 2 divided into 11
 $= 11 \div 2$
11 reduced by 4
 $= 11 - 4$
11 times 3
 $= 11 \times 3$
twice as many as 11
 $= 2 \times 11$
11 increased by 3
 $= 11 + 3$
2. b) $15 - 8$
c) $24 \div 8$
e) $67 + 29$
f) $4 + 35$
g) 5×2
h) $15 \div 5$
i) 7×4
j) 5×8
3. b) $6 \div 2$
c) $34 + 9$
d) $7 - 5$
e) 42×2
f) $3 - 2$
g) $(8 + 4) \div 3$
h) $(8 \div 4) + 5$
i) $(4 \div 2) + 10 - 4$

j) $((6 \times 5) - 20) \div 2$

4. Answers may vary.
Sample answers:
b) Add 6 and 1. Then multiply by 2.
c) Multiply 5 and 2. Then subtract from 12.
d) Subtract 2 from 3. Then multiply by 4.

BONUS

- Subtract 1 from 3. Then add 5. Then multiply by 4.
5. b) 80×4
c) 70×5
6. a) ii) 5×2
iii) 5×4
b) ii) 2
iii) 5
7. a) ii) 3×2
iii) 3×4
b) ii) 2
iii) 5
8. a) $11 + 2$
b) $(11 + 2) \times 3$

BONUS

Answers will vary.
Sample answer:
19 people buy lunch. A sandwich costs \$11 and a drink costs \$2. How much would 19 sandwiches and 19 drinks cost?

9. $5 \times (2 + 2)$

BONUS

- a) $(20 \times 5) + 13 + 16$
b) $((20 \times 5) + 13 + 16) \div 30$
 $= (100 + 13 + 16) \div 30$
 $= 129 \div 30$
 $= 4 \text{ R } 9$
5 buses will be needed.

AP Book PA5-11

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1. b) 3×5
c) 3×6
d) 3×8

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(continued)

2. a) 2×60
b) 3×80
c) $h \times 70$
3. b) $5 \times t, 5t$
c) $5 \times x, 5x$
d) $5 \times n, 5n$
4. c) $A + 2 = B$
d) $A \times 3 = B$
or $A3 = B$
e) $A \times 5 = B$
or $A5 = B$
5. b) $3 \times 2, 6$
c) $4 \times 2, 8$
e) $4 \times 2 - 2, 8 - 2$
6
f) $6 \times 2 + 3, 12 + 3$
15
6. b) $5(2) + 1$
 $= 10 + 1 = 11$
c) $3(2) - 2$
 $= 6 - 2 = 4$
d) $2(2) + 3$
 $= 4 + 3 = 7$
e) $4(2) - 3$
 $= 8 - 3 = 5$
f) $2(2) - 4$
 $= 4 - 4 = 0$
7. b) $2(6) + 3$
 $= 12 + 3 = 15$
c) $5(4) - 2$
 $= 20 - 2 = 18$
d) $3(8) + 9$
 $= 24 + 9 = 33$
e) $9 - 4 = 5$
f) $3(5) + 2$
 $= 15 + 2 = 17$
8. b) $2(5) + 3$
 $= 10 + 3 = 13$
c) $2(5) + 3$
 $= 10 + 3 = 13$
9. The answers are the same. The variable changes but the value of the variable does not.

AP Book PA5-12

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1. b) 15, 13, x , $15 + 3$
c) 18, x , 31, $18 + x$
d) x , 17, 23, $x + 17$

- e) 21, 34, x , $21 + 34$
2. b) Circle x balloons
 $12 + 14 = x$
c) Circle 27 balloons
 $19 + x = 27$
d) Circle 27 apples
 $13 + x = 27$
e) Circle 39 apples
 $x + 14 = 39$
f) Circle x apples
 $55 + 16 = x$
3. a) Circle x pets
 $9 + 12 = x$
 $21 = x$
b) Circle 19 stickers
 $19 - 11 = x$
 $8 = x$
c) Circle 9 friends
 $9 - 6 = x$
 $3 = x$
4. b) 12, \textcircled{X} 9, $x - 12$
c) 6, $\textcircled{7}$ x , $7 - 6$
d) x , $\textcircled{19}$ 8, $19 - x$
e) \textcircled{X} 27, 13, $x - 27$
5. b) Circle 13 oranges
 $13 - 5 = x$
c) Circle x apples
 $x - 12 = 5$
6. a) $7 - x = 5$
 $7 - 5 = x$
 $2 = x$
b) Circle 12 books
 $12 - x = 6$
 $12 - 6 = x$
 $6 = x$
c) Circle 29 books
 $29 - 12 = x$
 $17 = x$
d) Circle 17 pens
 $17 - x = 8$
 $17 - 8 = x$
 $9 = x$
e) Circle x stickers
 $x - 19 = 13$
 $x = 13 + 19$
 $x = 32$
f) Circle 34 students
 $34 - x = 6$
 $34 - 6 = x$
 $28 = x$

7. b) red balloons, $\textcircled{21}$
green balloons, 9
 $21 - 9 = x$
 $12 = x$
c) apples, 7
oranges, \textcircled{X}
 $x - 7 = 4$
 $x = 4 + 7$
 $x = 11$
d) females, x
males, $\textcircled{38}$
 $38 - x = 4$
 $38 - 4 = x$
 $34 = x$
8. b) $32 - x = 18$
 $32 - 18 = x$
 $14 = x$
c) $36 - x = 11$
 $36 - 11 = x$
 $25 = x$
d) $x - 13 = 5$
 $x = 5 + 13$
 $x = 18$
e) $68 - 39 = x$
 $29 = x$

BONUS

$$x - 658 = 18$$

$$x = 18 + 658$$

$$x = 676$$

AP Book PA5-13

page 12

1. b) Saturday, 9
Sunday, 12
Cross out Difference
Total: x
 $9 + 12 = x$
 $21 = x$
c) January, 36
February, x
Difference: 17
Cross out Total
 $36 - x = 17$
 $36 - 17 = x$
 $19 = x$
d) Leviathan, 93
Yukon Striker, x
Difference: 25
Cross out Total
 $93 - x = 25$
 $93 - 25 = x$
 $68 = x$

- e) white, 76
yellow, x
Cross out Difference
Total: 164
 $76 + x = 164$
 $x = 164 - 76$
 $x = 88$
2. a) 12 blue marbles
9 more red marbles
than blue marbles
 $x - 12 = 9$
 $x = 12 + 9$
 $x = 21$
21 red marbles
b) 21 red marbles
7 fewer green
marbles than red
marbles
 $21 - x = 7$
 $21 - 7 = x$
 $14 = x$
14 green marbles
c) $12 + 21 + 14$
 $= 47$ marbles
altogether
3. a) $13 + x = 32$
 $x = 32 - 13$
 $x = 19$
19 students don't
wear eyeglasses.
b) $19 - 13 = 6$
There are 6 more
students who don't
wear eyeglasses.
4. a) $8 + 10 = x$
 $18 = x$
She bought 18 cards
altogether.
b) $18 - 3 = x$
 $15 = x$
She has 15 cards
left.
5. $x - 9 = 3$
 $x = 9 + 3$
 $x = 12$
Neka is 12 years old.
6. a) $11 - 7 = x$
 $4 = x$
The science-fiction
novel is \$4 more
expensive.
b) $11 + 7 = x$
 $18 = x$
The books cost \$18
in total.

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(continued)

7. $60 - x = 20$
 $60 - 20 = x$
 $40 = x$
 Nina spent 40 minutes on homework.
8. $23 - x = 8$
 $23 - 8 = x$
 $15 = x$
 The movie pass costs \$15.
9. $553 - 442 = x$
 $111 = x$
 The CN Tower is 111 m taller than the Willis Tower.

AP Book PA5-14

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1. b) Blue

5

 Red

5	5	5	5
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 c) Red

12

 Green

12	12	12	12
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 d) Yu

4

 Nora

4	4	4	4	4
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2. b) Rats

7

 Hamsters

7	7
---	---

 $7 + 14 = 21$,
 so Randi has
 21 animals
 altogether.
 c) Chocolate chip

12

 Oatmeal

12	12	12
12	12	12

 $12 + 72 = 84$, so
 there are 84 cookies
 in the box altogether.
 d) Math

17

 Science

17	17	17	17
----	----	----	----

 $17 + 68 = 85$, so
 there are 85 books in
 the library altogether.
3. Teacher to check models.
 b) Seniors: 30
 c) Shoes: 24
 d) Math: 30
4. b) 16
 c) 9
 d) 8

5. Teacher to check models.
 b) Vicky is 20 years old
 and Ella is 5 years
 old.
 c) There are 36 party
 balloons and
 6 streamers.

BONUS

- Anna needs
 48 tablespoons
 of butter and
 144 tablespoons
 of sugar.
6. Shoes

17	17
----	----

 } 51
 Wallet

17

- The pair of shoes costs
 \$34 and the wallet costs
 \$17.

BONUS

- $(2 \times 34) + (3 \times 17)$
 $= 68 + 51$
 $= 119$
 Glen would pay \$119 for
 two pairs of shoes and
 three wallets.

AP Book PA5-15

page 16

1. b) Cross out the first
 equation.
 $m = 6 \div 3$
 c) $v = 12 \times 2$
 Cross out the second
 equation.
2. b) Circle mangoes,
 underline kiwis.
 mangoes, 16
 kiwis, n
 $16 \div 2 = n$
 c) Circle dogs,
 underline cats.
 dogs, n
 cats, 6
 $n = 6 \times 3$
3. c) $14 \div 7 = p$
 d) $2 \times 11 = p$
4. b) $x, 5, 8, 5 \times 8 = x$
 40 balloons
 c) $35, 7, x, 35 \div 7 = x$
 5 students on each
 team

- d) $x, 6, 9, 6 \times 9 = x$
 54 books
- e) $48, x, 6, 48 \div 6 = x$
 8 packs of juice
5. a) $6 \times 2 = x$
 $12 = x$
 The store sold 12
 hamsters.
 b) $6 + 12 = x$
 $18 = x$
 18 rats and hamsters
 were sold altogether.
 c) $12 - 6 = x$
 $6 = x$
 6 more hamsters
 than rats were sold.
6. a) $35 \div 5 = x$
 $7 = x$
 Eddy is 7 years old.
 b) $35 - 7 = x$
 $28 = x$
 Emma is 28 years
 older than Eddy.
7. a) $100 \div 5 = x$
 $20 = x$
 The male angler fish
 is 20 cm long.
 b) $100 - 20 = x$
 $80 = x$
 The female angler
 fish is 80 cm longer
 than the male.

AP Book PA5-16

page 18

1. a) red: $12 \div 3 = 4$
 yellow: $12 - 7 = 5$
 b) Ronin: $6 \times 3 = 18$
 Karen: $6 + 4 = 10$
2. $10 + 2 = 12$
 $10 - 7 = 3$
 Zara is 12 years old and
 Carl is 3 years old.
3. a) 8
 b) \$96
4. a) $7 \times 12 = \$84$
 b) $10 \times 15 = \$150$
 c) $84 + 150 = \$234$
5. b) How old is Lela?
 c) How much money
 did Ryder spend
 altogether?

6. $(3 \times 15) + (2 \times 15)$
 $+ (2 \times 15)$
 $= 45 + 30 + 30 = 105$
 Tina earned \$105 in these
 three days.
7. a) Yellow = 3
 Blue = $3 + 12 = 15$
 Red = $15 + 3 = 5$
 b) $3 + 15 + 5 = 23$
8. a) $18 + 20 = 38$
 The geese travelled
 for 38 hours.
 $(160 \times 38) \div 2$
 $= 6080 \div 2$
 $= 3040$
 The geese travelled
 3040 km.
 b) $3200 - 3040 = 160$
 They need to fly
 another 160 km.
 $38 + 2 = 40$
 The geese need
 40 hours to fly from
 BC to Texas.
9. Adult narwhal: $5 + 3 = 8$ m
 Baby narwhal: $8 \div 4 = 2$ m
 A baby narwhal is 2 m
 long.
10. a) The pencil is three
 times as long as the
 eraser.
 b) The pencil is 10 cm
 longer than the
 eraser.
11. Yes.
 $4000 \div 4 = 1000$, so the
 scale factor is 1000.
12. $8 \times 2 = 16$ slices
 $16 \div 5 = 3$ R 1
 Each person can have
 3 slices with one slice left
 over.
13. $52 - 13 = 39$ avocados
 $39 \div 5 = 7$ R 4
 Zack can make 7 full bags.
14. $24 + 23 = 47$ students
 $47 \div 4 = 11$ R 3
 12 cars are needed to
 transport all the students.