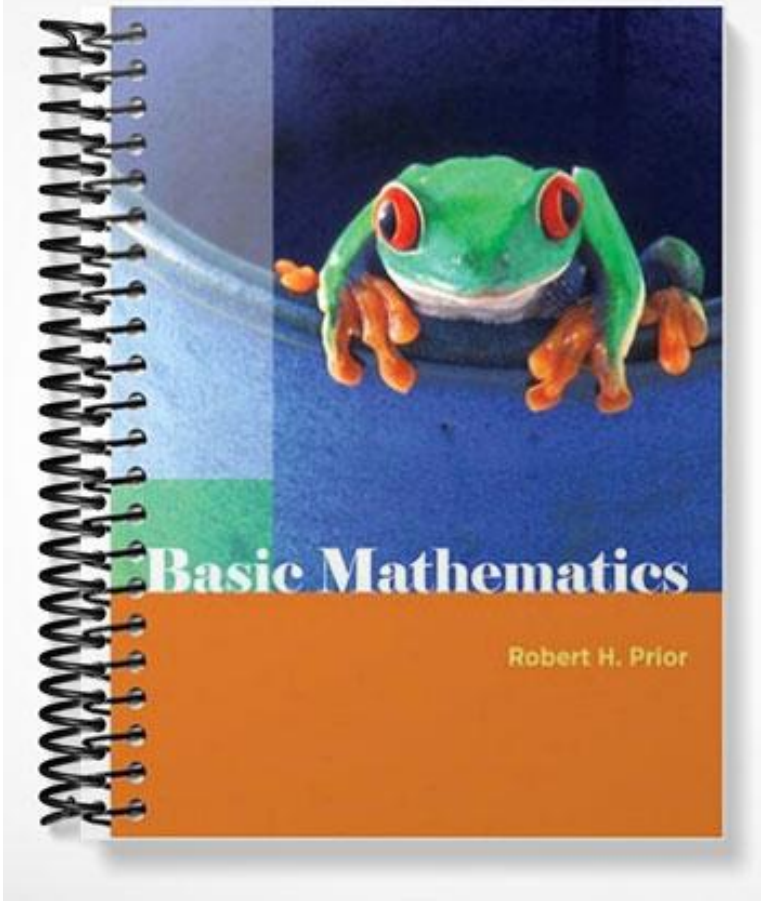
SOLUTIONS MANUAL



Basic Mathematics

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Chapter 2
Factors and the Order of Operations

Section 2.1 You Try It Exercises

1) a) Yes. A square with 6 units on each side will have 36 square units within it because $6 \cdot 6 = 36$.
   b) No. There is no whole number that when multiplied by itself will give 12.
   c) Yes. A square with 7 units on each side will have 49 square units within it because $7 \cdot 7 = 49$.

2) a) $6 \cdot 6 = 36$
   b) $10 \cdot 10 = 100$
   c) $18 \cdot 18 = 324$

$$\begin{array}{r} 18 \\ \times 18 \\ \hline 144 \\ +180 \\ \hline 324 \end{array}$$

3) a) $6^2 = 6 \cdot 6 = 36$
   b) $2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = (2 \cdot 2) \cdot (2 \cdot 2) = 4 \cdot 4 = 16$
   c) $9^3 = 9 \cdot 9 \cdot 9 = (9 \cdot 9) \cdot 9 = 81 \cdot 9 = 729$

$$\begin{array}{r} 81 \\ \times \ 9 \\ \hline 729 \end{array}$$

4) a) 2^3 is three factors of 2: $2 \cdot 2 \cdot 2$
   b) 3^5 is five factors of 3: $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

5) a) $2^1 = 2$
   b) $9^1 = 9$
   c) $17^1 = 17$
   d) $1^1 = 1$

6) a) 10^5 is 1 followed by five zeros: $= 100{,}000$
   b) 10^7 is 1 followed by seven zeros: $= 10{,}000{,}000$
   c) 10^1 is 1 followed by one zero: $= 10$

7) a) 100 is 1 followed by two zeros: $100 = 10^2$
   b) 10,000 is 1 followed by four zeros: $10{,}000 = 10^4$
   c) 1,000,000 is 1 followed by six zeros: $1{,}000{,}000 = 10^6$

8) a) $240 = 24 \cdot 10$ 24 followed by one zero
   b) $5600 = 56 \cdot 10^2$ 56 followed by two zeros
   c) $380{,}000{,}000 = 38 \cdot 10^7$ 38 followed by seven zeros
   d) $7{,}260{,}000 = 726 \cdot 10^4$ 726 followed by four zeros

9) a) 2 b) 3 c) 8 d) 10

10) a) 48 is not a perfect square.
    b) 121 is a perfect square, a square root is 11.
    c) 144 is a perfect square, a square root is 12.

11) a) $\sqrt{4} = 2$ b) $\sqrt{9} = 3$ c) $\sqrt{121} = 11$
    d) $\sqrt{36} = 6$ e) $\sqrt{100} = 10$ f) $\sqrt{81} = 9$

Section 2.1 Exercises

4) 2^5
$= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
$= (2 \cdot 2 \cdot 2) \cdot (2 \cdot 2)$
$= 8 \cdot 4$
$= 32$

The expanded notation is $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ and its value is 32.

6) 3^3
$= 3 \cdot 3 \cdot 3$
$= (3 \cdot 3) \cdot 3$
$= 9 \cdot 3$
$= 27$

The expanded notation is $3 \cdot 3 \cdot 3$ and its value is 27.

8) $8^1 = 8$
The expanded notation and value are both equal to 8.

10) 5^4
$= 5 \cdot 5 \cdot 5 \cdot 5$
$= (5 \cdot 5) \cdot (5 \cdot 5)$
$= 25 \cdot 25$
$= 625$

$$\begin{array}{r} 25 \\ \times 25 \\ \hline 125 \\ +500 \\ \hline 625 \end{array}$$

The expanded notation is $5 \cdot 5 \cdot 5 \cdot 5$ and its value is 625.

12) 10^4 is 1 followed by four zeros: $= 10{,}000$
The expanded notation is $10 \cdot 10 \cdot 10 \cdot 10$ and its value is 10,000.

14) 10^3 is 1 followed by three zeros: $= 1{,}000$
The expanded notation is $10 \cdot 10 \cdot 10$ and its value is 1,000.

16) 10,000 is 1 followed by four zeros: $10{,}000 = 10^4$

18) 100 is 1 followed by two zeros: $100 = 10^2$

20) 10,000,000 is 1 followed by seven zeros: $10{,}000{,}000 = 10^7$

22) 100,000,000 is 1 followed by eight zeros: $100{,}000{,}000 = 10^8$

24) $5{,}000 = 5 \cdot 10^3$ 5 followed by three zeros

26) $60{,}000 = 6 \cdot 10^4$ 6 followed by four zeros

28) $70{,}000{,}000 = 7 \cdot 10^7$ 7 followed by seven zeros

30) $9{,}000{,}000{,}000 = 9 \cdot 10^9$ 9 followed by nine zeros

32) $94{,}000 = 94 \cdot 10^3$ 94 followed by three zeros

34) $230{,}000 = 23 \cdot 10^4$ 23 followed by four zeros

36) $7{,}100 = 71 \cdot 10^2$ 71 followed by two zeros

38) $3{,}700{,}000 = 37 \cdot 10^5$ 37 followed by five zeros

40) $2{,}590{,}000 = 259 \cdot 10^4$ 259 followed by four zeros

42) $10{,}800{,}000 = 108 \cdot 10^5$ 108 followed by five zeros

44) $\sqrt{25} = 5$

46) $\sqrt{1} = 1$

48) $\sqrt{16} = 4$

50) $\sqrt{64} = 8$

52) $(30 \div 6)^2$ evaluate parenthesis
$= 5^2$ exponent
$= 25$

54) $(2\cdot 5)^3$ evaluate parenthesis
$= 10^3$ exponent
$= 1{,}000$

56) $\sqrt{(86-5)}$ evaluate parenthesis
$= \sqrt{81}$ square root
$= 9$

58) $\sqrt{(28\div 7)}$ evaluate parenthesis
$= \sqrt{4}$ square root
$= 2$

Section 2.2 You Try It Exercises

1) expression	two operations	the first to apply
a) $24\div 6+2$ $=4+2$ $=6$	division, addition	division
b) $24\div(6+2)$ $=24\div 8$ $=3$	division, addition	addition
c) $10-3\cdot 2$ $=10-6$ $=4$	subtraction, multiplication	multiplication
d) $(10-3)\cdot 2$ $=7\cdot 2$ $=14$	subtraction, multiplication	subtraction
e) $12\div 2^2$ $=12\div 4$ $=3$	division, exponentiation	exponentiation
f) $(12\div 2)^2$ $=6^2$ $=36$	division, exponentiation	division

2) a) $36\div 3+3\cdot 2$ division
$=12+3\cdot 2$ multiplication
$=12+6$ addition
$=18$

b) $36\div(3+3)\cdot 2$ addition
$=36\div 6\cdot 2$ division
$=6\cdot 2$ multiplication
$=12$

c) $36\div(3+3\cdot 2)$ multiplication
$=36\div(3+6)$ addition
$=36\div 9$ division
$=4$

d) $11+4\cdot 6-1$ multiplication
$=11+24-1$ addition
$=35-1$ subtraction
$=34$

e) $(11+4)\cdot(6-1)$ addition and subtraction have equal rank because of order of operations
$=15\cdot 5$ multiplication
$=75$

f) $11+\left[4\cdot(6-1)\right]$ subtraction
$=11+\left[4\cdot 5\right]$ multiplication
$=11+20$ addition
$=31$

g) $2\cdot 3^2\div(6+3)$ addition
$=2\cdot 3^2\div 9$ expontiation
$=2\cdot 9\div 9$ multiplication
$=18\div 9$ division
$=2$

h) $(2\cdot 3)^2\div(6+3)$ addition and multiplication have same rank because of order of operations
$=6^2\div 9$ exponentiation
$=36\div 9$ division
$=4$

3) a) $\sqrt{4\cdot 9}$ multiply
$=\sqrt{36}$ radical
$=6$

b) $\sqrt{25}-\sqrt{9}$ both radicals have same rank because of order of operations
$=5-3$ subtract
$=2$

c) $\sqrt{1+(12\cdot 4)}$ multiply
$=\sqrt{1+48}$ add
$=\sqrt{49}$ radical
$=7$

d) $\sqrt{(6-2)\cdot 5^2}$ subtract
$=\sqrt{4\cdot 5^2}$ exponent
$=\sqrt{4\cdot 25}$ multiply
$=\sqrt{100}$ radical
$=10$

Section 2.2 Exercises

4) $30 \div (5+1)$ add
$= 30 \div 6$ divide
$= 5$

6) $8 + 5 \cdot 2$ multiply
$= 8 + 10$ add
$= 18$

8) $5 \cdot (6 \div 3)$ divide
$= 5 \cdot 2$ multiply
$= 10$

10) $2^3 \cdot 2^2$ evaluate both exponents
$= 8 \cdot 4$ multiply
$= 32$

12) $28 \div (7 \cdot 2)$ multiply
$= 28 \div 14$ divide
$= 2$

14) $16 \div 4 - 2$ divide
$= 4 - 2$ subtract
$= 2$

16) $30 \div (2 \cdot 3)$ multiply
$= 30 \div 6$ divide
5

18) $5 \cdot 2^2 - 7$ exponent
$= 5 \cdot 4 - 7$ multiply
$= 20 - 7$ subtract
$= 13$

20) $4^2 \div 2 + 2$ exponent
$= 16 \div 2 + 2$ divide
$= 8 + 2$ add
$= 10$

22) $(6+12) \div (2 \cdot 3)$ evaluate both parentheses
$= 18 \div 6$ divide
$= 3$

24) $12 + [28 \div (7-3)]$ subtract
$= 12 + [28 \div 4]$ divide
$= 12 + 7$ multiply
$= 19$

26) $(6+12) \div (2 \cdot 3)$ evaluate both parentheses
$= 18 \div 6$ divide
$= 3$

28) $[(6-2) \cdot 3]^2$ subtract
$= [4 \cdot 3]^2$ multiply
$= 12^2$ exponent
$= 144$

30) $3 + \sqrt{16}$ square root
$= 3 + 4$ add
$= 7$

32) $11 - \sqrt{49}$ square root
$= 11 - 7$ subtract
$= 4$

34) $\sqrt{64} - \sqrt{25}$ square roots
$= 8 - 5$ subtract
$= 3$

36) $\sqrt{4 \cdot 9}$ multiply
$= \sqrt{36}$ square root
$= 6$

38) $\sqrt{8 \cdot 6 + 1}$ multiply
$= \sqrt{48 + 1}$ add
$= \sqrt{49}$ square root
$= 7$

40) $\left(\sqrt{32+4}\right)^2$ add
$= \left(\sqrt{36}\right)^2$ square root
$= 6^2$ square
$= 36$

42) The square root symbol is a grouping symbol so they both can be evaluated at the same time.
$\sqrt{12 \cdot 3} + \sqrt{8+41}$ multiply and add at the same time
$= \sqrt{36} + \sqrt{49}$ evaluate both square roots
$= 6 + 7$ add
$= 13$

44) $(3-2)^3 \cdot (12 \div 6)^3$ subtract and divide at the same time
$= 1^3 \cdot 2^3$ evaluate both exponents
$= 1 \cdot 8$ multiply
$= 8$

46) The long division bar is a grouping symbol, so you can evaluate the numerator and denominator at the same time.

$$\frac{\sqrt{64}+12}{9-2^2}$$ radical in numerator and exponent in denominator

$$=\frac{8+12}{9-4}$$ add in numerator and subtract in denominator

$$=\frac{20}{5}$$ divide

$$=4$$

48) The long division bar is a grouping symbol, so you can evaluate the numerator and denominator at the same time.

$$\frac{2\cdot 16+8}{3^2-\sqrt{25}}$$ multiply in numerator and radical and exponent in denominator

$$=\frac{32+8}{9-5}$$ add in numerator and subtract in denominator

$$=\frac{40}{4}$$ divide

$$=10$$

50) $$\frac{33-25}{\frac{8}{\sqrt{4}}}$$ subtract in the numerator, square root in the denominator

$$=\frac{8}{\frac{8}{2}}$$ divide in denominator

$$=\frac{8}{4}$$

$$=2$$

Section 2.3 You Try It Exercises

1) a) Use the formula $F=9\cdot(C\div 5)+32$.

$F=9\cdot(40\div 5)+32$

$F=9\cdot 8+32$

$F=72+32$

$F=104$

This means that 40° C is equivalent to 104° F.

b) Use the formula $F=9\cdot(C\div 5)+32$.

$F=9\cdot(20\div 5)+32$

$F=9\cdot 4+32$

$F=36+32$

$F=68$

This means that 10° C is equivalent to 68° F.

c) Use the formula $C=5\cdot\left[(F-32)\div 9\right]$.

$C=5\cdot\left[(86-32)\div 9\right]$

$C=5\cdot[54\div 9]$

$C=5\cdot 6$

$C=30$

This means that 86° F is equivalent to 30° C.

d) Use the formula $C=5\cdot\left[(F-32)\div 9\right]$.

$C=5\cdot\left[(41-32)\div 9\right]$

$C=5\cdot[9\div 9]$

$C=5\cdot 1$

$C=5$

This means that 41° F is equivalent to 5° C.

2) a) $d=r\cdot t$

$d=15\cdot 3$

$d=45$

b) $z=(x-m)\div s$

$z=(24-16)\div 2$

$z=8\div 2$

$z=4$

c) $E=9\cdot R\div I$

$E=9\cdot 20\div 60$

$E=180\div 60$

$E=3$

d) $c=\sqrt{a^2+b^2}$

$c=\sqrt{8^2+6^2}$

$c=\sqrt{64+36}$

$c=\sqrt{100}$

$c=10$

3) You have distance and time, you don't have the rate so use $r=d\div t$.

$r=147\div 3$

$r=49$

$$3\overline{)\,147}\quad 49,\ -12,\ 27,\ -27,\ 0$$

Sentence: Ben averaged 49 miles per hour for the trip.

4) You know the rate and distance, you don't have the time so use $t=d\div r$.

$t=1920\div 240$

$t=8$

$$240\overline{)\,1920}\quad 8,\ -1920,\ 0$$

Sentence: Veronica's flight took 8 hours.

5) You know the distance and time, but you don't have the rate so use $r=d\div t$.

$r=162\div 9$

$r=18$

$$9\overline{)\,162}\quad 18,\ -9,\ 72,\ -72,\ 0$$

Sentence: Banjo ran 18 feet per seconds on that chase.

6) You know the rate and time, but you don't know the distance so use $d = r \cdot t$.

$d = 385 \cdot 6$ $\quad 385$

$d = 2310$ $\quad \times \ 6$

$\quad 2310$

Sentence: The jet will travel 2,310 miles.

Section 2.3 Exercises

4) Use the formula $F = 9 \cdot (C \div 5) + 32$.

$F = 9 \cdot (30 \div 5) + 32$

$F = 9 \cdot 6 + 32$

$F = 54 + 32$

$F = 86$

This means that 30° C is equivalent to 86° F.

6) Use the formula $C = 5 \cdot [(F - 32) \div 9]$.

$C = 5 \cdot [(95 - 32) \div 9]$

$C = 5 \cdot [63 \div 9]$

$C = 5 \cdot 7$

$C = 35$

This means that 95° F is equivalent to 35° C.

8) $A = (a + b + c) \div 3$

$A = (13 + 41 + 33) \div 3$

$A = 87 \div 3$

$A = 29$

10) $A = b \cdot h \div 2$

$A = 5 \cdot 8 \div 2$

$A = 40 \div 2$

$A = 20$

12) $A = d \div t$

$A = 108 \div 9$

$A = 12$

14) $c = \sqrt{a^2 + b^2}$

$c = \sqrt{4^2 + 3^2}$

$c = \sqrt{16 + 9}$

$c = \sqrt{25}$

$c = 5$

16) $C = 2 \cdot W \div E^2$

$C = 2 \cdot 18 \div 3^2$

$C = 2 \cdot 18 \div 9$

$C = 36 \div 9$

$C = 4$

18) $I = A \div (T - B)$

$I = 60 \div (10 - 6)$

$I = 60 \div 4$

$I = 15$

20) You have rate and time, you don't have the distance so use $d = r \cdot t$.

$d = r \cdot t$ $\quad 65$

$r = 65 \cdot 8$ $\quad \times \ 8$

$\quad 520$

Sentence: Reggie will be able to travel 520 miles.

22) You have distance and time, you don't have the rate so use $r = d \div t$.

$r = 78 \div 3$

$r = 26$

$$3\overline{)\,78}\quad 26$$

$$-6$$

$$18$$

$$-18$$

$$0$$

Sentence: Jorge's average rate of speed was 26 miles per hour.

24) You know the rate and distance, you don't have the time so use $t = d \div r$.

$t = 925 \div 185$

$t = 5$

$$185\overline{)\,925}\quad 5$$

$$-925$$

$$0$$

Sentence: It should take Luisa 5 hours to complete the flight.

26) You know the rate and distance, you don't have the time so use $t = d \div r$.

$t = 390 \div 65$

$t = 6$

$$65\overline{)\,390}\quad 6$$

$$-390$$

$$0$$

Sentence: It will take the group 6 hours to get to Phoenix.

28) First find the total distance by adding the individual distances.

$23 + 16 + 17 + 22 + 14 = 92$ miles

Next find the total time by adding the individual times.

$31 + 20 + 22 + 28 + 19 = 120$ minutes $= 2$ hours

Finally, use $r = d \div t$

$r = 92 \div 2$

$r = 46$

Sentence: Georgia's average rate of speed was 46 miles per hour.

Section 2.4 You Try It Exercises

1) a) 2,4,6,8,10,12,14,16

b) 3,6,9,12,15,18,21,24
c) 5,10,15,20,25,30,35,40
d) 6,12,18,24,30,36,42,48
e) 9,18,27,36,45,54,63,72
f) 10,20,30,40,50,60,70,80

2) a) 20 is a multiple of 4 and 5
20 is divisible by 4 and 5
4 and 5 divide evenly into 20
4 and 5 are factors of 20
b) 72 is a multiple of 8 and 9
72 is divisible by 8 and 9
8 and 9 divide evenly into 72
8 and 9 are factors of 72

3) a)
	12
1	12
2	6
3	4

The factors of 12 are 1, 2, 3, 4, 6, and 12.

b)
	16
1	16
2	8
4	4

The factors of 16 are 1, 2, 4, 8, and 16.

c)
	18
1	18
2	9
3	6

The factors of 18 are 1, 2, 3, 6, 9, and 18.

d)
	20
1	20
2	10
4	5

The factors of 20 are 1, 2, 4, 5, 10, and 20.

4) a) 15 is a composite number because it has more than two factors. The factors of 15 are 1, 3, 5, and 15.
b) 13 is a prime number because the only factors of 13 are 1 and 13.
c) 1 is neither a prime nor a composite because it only has one factor 1.
d) 4 is a composite number because it has more than two factors. The factors of 4 are 1, 2, and 4.

5) a) The first prime number is even.
b) All other primes are odd.
c) No, many odd numbers are not prime. The number 9 is an example of an odd number that is not prime. Other examples of odd numbers that are not prime are 15, 21, 25, 27, and 33.

6) a) 2 is a factor of 52 (because 52 is an even number).
b) 2 is not a factor of 61 (because 61 is an odd number).
c) 2 is a factor of 70 (because 70 is an even number).

7) a) 5 is a factor of 90 because 90 has a 0 in the ones place.
b) 5 is a factor of 175 because 175 has a 5 in the ones place.
c) 5 is not a factor of 608 because 608 does not have a 5 nor a 0 in the ones place.

8) a) Because $8+7=15$ and because 3 is a factor of 15, 3 is a factor of 87

$$3\overline{)87}\quad 29,\ -6,\ 27,\ -27,\ 0$$

b) Because $6+7+1=14$ and because 3 is not a factor of 14, 3 is not a factor of 671.

$$3\overline{)671}\quad 223,\ -6,\ 07,\ -6,\ 11,\ -09,\ 2$$

c) Because $8+3+9+5=25$ and because 3 is not a factor of 25, 3 is not a factor of 8395.

$$3\overline{)8395}\quad 2798,\ -6,\ 23,\ -21,\ 29,\ -27,\ 25,\ -24,\ 1$$

d) Because $2+5+0+7+4=18$ and because 3 is a factor of 18, 3 is a factor of 25,074.

$$3\overline{)25074}\quad 8358,\ -24,\ 10,\ -9,\ 17,\ -15,\ 24,\ -24,\ 0$$

9) a) Because $5+4+8=17$ and because 9 is not a factor of 17, 9 is not a factor of 548.

$$9\overline{)548}\quad 60,\ -54,\ 08,\ -0,\ 8$$

b) Because $3+5+8+2=18$ and because 9 is a factor of 18, 9 is a factor of 3,582.

$$9\overline{)3582}\quad 398,\ -27,\ 88,\ -81,\ 72,\ -72,\ 0$$

c) Because $8+5+1+1=15$ and because 9 is not a factor of 15, 9 is not a factor of 8,511.

$$\begin{array}{r} 945 \\ 9\overline{)\,8511} \\ -81 \\ \hline 41 \\ -36 \\ \hline 51 \\ -45 \\ \hline 6 \end{array}$$

d) Because $2+0+1+4+2=9$ and because 9 is a factor of 9, 9 is a factor of 20,142.

$$\begin{array}{r} 2238 \\ 9\overline{)\,20142} \\ -18 \\ \hline 21 \\ -18 \\ \hline 34 \\ -27 \\ \hline 72 \\ -72 \\ \hline 0 \end{array}$$

10) a)
- 213 is not even
- $2+1+3=6$ (3)
- doesn't end in 0 or 5

3

b)
- 390 is even (2)
- $3+9+0=12$ (3)
- ends in 0 (5)

2, 3, and 5

c)
- 419 is not even
- $4+1+9=14$
- doesn't end in 0 or 5

none

d)
- 2835 is not even
- $2+8+3+5=18$ (3)
- ends in 5 (5)

3 or 5

11) a) 2 and 3 are factors of 78
b) 2 and 5 are factors of 90
c) 5 and 7 are factors of 140

12) a) 6 is also a factor of 96 (because $2\cdot 3=6$)
b) 10 is also a factor of 130 (because $2\cdot 5=10$)
c) 33 is also a factor of 231 (because $3\cdot 11=33$)
d) 14 is also a factor of 434 (because $7\cdot 2=14$)
e) 6, 14, 21, and 42 are also factors of 546 (because $2\cdot 3=6$, $2\cdot 7=14$, $3\cdot 7=21$, and $2\cdot 3\cdot 7=42$)

Section 2.4 Exercises

6) 5, 10, 15, 20, 25, 30, 35, and 40

8) 9, 18, 27, 36, 45, 54, 63, and 72

10)

1	40
2	20
4	10
5	8

The factor pairs of 40 are: 1 and 40; 2 and 20; 4 and 10; and 5 and 8.

12)

1	42
2	21
3	14
6	7

The factor pairs of 42 are: 1 and 42; 2 and 21; 3 and 14; and 6 and 7.

14)
- 80 is even (2)
- $8+0=8$
- 80 ends in 0 (5)

2 and 5

16)
- 414 is even (2)
- $4+1+4=9$ (3)
- 414 does not end in 0 or 5

2 and 3

18)
- 57 isn't even
- $5+7=12$ (3)
- 57 does not end in 0 or 5

3

20)
- 390 is even (2)
- $3+9+0=12$ (3)
- 390 end in 0 (5)

2, 3, and 5

22)
- 860 is even (2)
- $8+6+0=14$
- 860 end in 0 (5)

2 and 5

24)
- 4,231 isn't even
- $4+2+3+1=10$
- 4,231 does not end in 0 or 5

none

26)
- 41,592 is even (2)
- $4+1+5+9+2=21$ (3)
- 41,592 does not end in 0 or 5

2 or 3

28)
- 994,515 isn't even
- $9+9+4+5+1+5=33$ (3)
- 994,515 end in 5 (5)

3 and 5

30) Because $4+7+9+7=27$ and 9 is a factor of 27, so 9 is a factor 4,797.

Check:
$$\begin{array}{r} 533 \\ 9\overline{)\,4797} \\ -45 \\ \hline 29 \\ -27 \\ \hline 27 \\ -27 \\ \hline 0 \end{array}$$
remainder 0, so 9 is a factor

32) Because $2+0+6+0+1=9$ and 9 is a factor of 9, so 9 is a factor 20,601.

Check:
$$\begin{array}{r} 2289 \\ 9\overline{)\,20601} \\ -18 \\ \hline 26 \\ -18 \\ \hline 80 \\ -72 \\ \hline 81 \\ -81 \\ \hline 0 \end{array}$$
remainder 0, so 9 is a factor

34) $7 \cdot 11 = 77$ is a composite factor of 1,309.

36) 15, 21, 35, and 105 are composite factors of 1,785

38) Prime: 37, 19, and 41

Composite: 15, 32, 63

Factors of 15: 1, 3, 5 and 15
Factors of 32: 1, 2, 4, 8, 16, and 32
Factors of 63: 1, 3, 7, 9, 21, and 63

Neither: 1

40) 4 and 7

42) 2 and 24

44) 15 and 2

46) 10 and 6

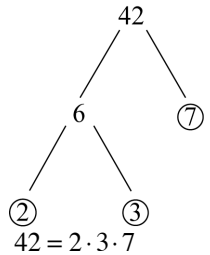
48) $7 \cdot 13$

50) $13 \cdot 19$

Section 2.5 You Try It Exercises

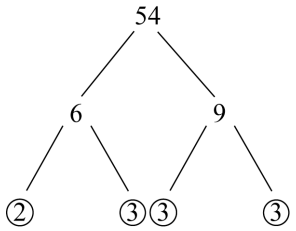
1) a) $21 = 3 \cdot 7$ b) $22 = 2 \cdot 11$
c) $35 = 5 \cdot 7$ d) $77 = 7 \cdot 11$

2) a)



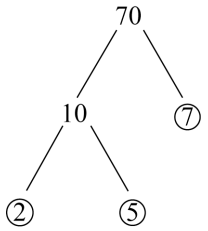
$42 = 2 \cdot 3 \cdot 7$

b)



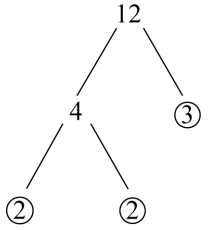
$54 = 2 \cdot 3 \cdot 3 \cdot 3$

c)



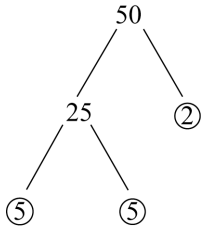
$70 = 2 \cdot 5 \cdot 7$

3) a)



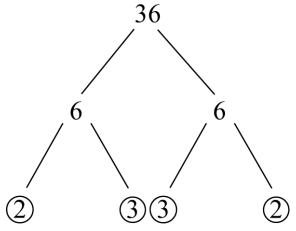
$12 = 2 \cdot 2 \cdot 3$ or $2^2 \cdot 3$

b)



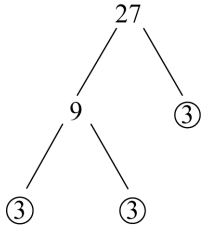
$50 = 2 \cdot 5 \cdot 5$ or $2 \cdot 5^2$

c)



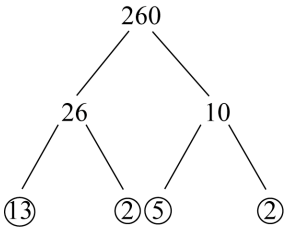
$36 = 2 \cdot 2 \cdot 3 \cdot 3$ or $2^2 \cdot 3^2$

d)



$27 = 3 \cdot 3 \cdot 3$ or 3^3

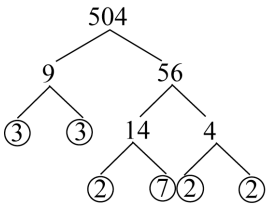
4) a)



$260 = 2 \cdot 2 \cdot 5 \cdot 13$

$260 = 2^2 \cdot 5 \cdot 13$

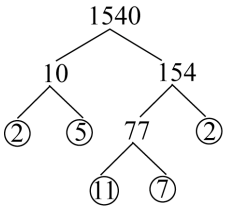
b)



$504 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 7$

$504 = 2^3 \cdot 3^2 \cdot 7$

c)



$1540 = 2 \cdot 2 \cdot 5 \cdot 7 \cdot 11$

$1540 = 2^2 \cdot 5 \cdot 7 \cdot 11$

5) a) 24 is even, so 2 is a factor $2|24$
12 is even, so 2 is again a factor $2|12$
6 is even, so 2 is again a factor $2|6$
3 is prime 3

$24 = 2 \cdot 2 \cdot 2 \cdot 3$

$24 = 2^3 \cdot 3$

b) 60 is even, so 2 is a factor $2|60$
30 is even, so 2 is again a factor $2|30$
$1 + 5 = 6$, so 3 is a factor $3|15$
5 is prime 5

$60 = 2 \cdot 2 \cdot 3 \cdot 5$

$60 = 2^2 \cdot 3 \cdot 5$

c) 175 ends in a 5, so 5 is a factor $5|175$
35 ends in a 5, so 5 is again a factor $5|35$
7 is prime 7

$175 = 5 \cdot 5 \cdot 7$

$175 = 5^2 \cdot 7$

d) 252 is even, so 2 is a factor $2|252$
126 is even, so 2 is again a factor $2|126$
$6 + 3 = 9$, so 3 is a factor $3|63$
$2 + 1 = 3$, so 3 is a factor $3|21$
7 is prime 7

e) $4 + 0 + 5 = 9$, so 3 is a factor $3|405$
$1 + 3 + 5 = 9$, so 3 is again a factor $3|135$
$4 + 5 = 9$, so 3 is again a factor $3|45$
$1 + 5 = 6$, so 3 is a factor $3|15$
5 is prime 5

$405 = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 5$

$405 = 3^4 5$

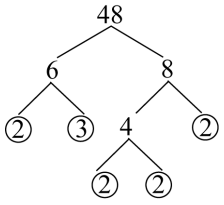
f) 660 is even, so 2 is a factor $2|660$
330 is even, so 2 is again a factor $2|330$
$1 + 6 + 5 = 12$, so 3 is a factor $3|165$
55 ends in a 5, so 5 is a factor $5|55$
11 is prime 11

$660 = 2 \cdot 2 \cdot 3 \cdot 5 \cdot 11$

$660 = 2^2 \cdot 3 \cdot 5 \cdot 11$

Section 2.5 Exercises

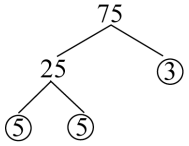
4)



$48 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

$= 2^4 \cdot 3$

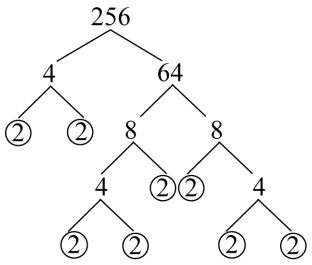
6)



$75 = 3 \cdot 5 \cdot 5$

$= 3 \cdot 5^2$

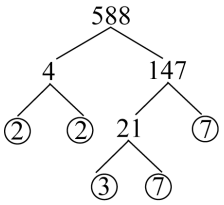
8)



$256 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

$= 2^8$

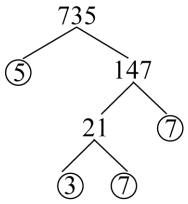
10)



$588 = 2 \cdot 2 \cdot 3 \cdot 7 \cdot 7$

$= 2^2 \cdot 3 \cdot 7^2$

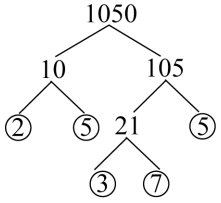
12)



$735 = 3 \cdot 5 \cdot 7 \cdot 7$

$= 3 \cdot 5 \cdot 7^2$

14)



$1050 = 2 \cdot 3 \cdot 5 \cdot 5 \cdot 7$

$= 2 \cdot 3 \cdot 5^2 \cdot 7$

16) 5 is a factor of 45 $5\overline{)45}$
3 is a factor of 9 $3\overline{)\ 9}$
3 is prime 3

$45 = 3 \cdot 3 \cdot 5$

$= 3^2 \cdot 5$

18) 72 is even, so 2 is a factor $2\overline{)72}$
36 is even, so 2 is again a factor $2\overline{)36}$
18 is even, so 2 is again a factor $2\overline{)18}$
3 is a factor of 9 $3\overline{)\ 9}$
3 is prime 3

$72 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$

$= 2^3 \cdot 3^2$

20) 88 is even, so 2 is a factor $2\overline{)88}$
44 is even, so 2 is again a factor $2\overline{)44}$
22 is even, so 2 is again a factor $2\overline{)22}$
11 is prime 11

$88 = 2 \cdot 2 \cdot 2 \cdot 11$

$= 2^3 \cdot 11$

22) 3 is a factor of 111 $3\overline{)111}$
37 is prime 37

$111 = 3 \cdot 37$

$= 3 \cdot 37$

24) 5 is a factor of 135 $5\overline{)135}$
3 is a factor of 27 $3\overline{)27}$
3 is a factor of 9 $3\overline{)\ 9}$
3 is prime 3

$135 = 3 \cdot 3 \cdot 3 \cdot 5$

$= 3^3 \cdot 5$

26) 224 is even, so 2 is a factor $2\overline{)224}$
112 is even, so 2 is again a factor $2\overline{)112}$
56 is even, so 2 is again a factor $2\overline{)56}$
28 is even, so 2 is again a factor $2\overline{)28}$
14 is even, so 2 is again a factor $2\overline{)14}$
7 is prime 7

$224 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 7$

$= 2^5 \cdot 7$

28) Since you are given that $2 \cdot 3 = 6$ is part of the prime factorization 780, to finish you need to find the prime factorization of $780 \div 6 = 130$.

130 is even, so 2 is a factor $2\overline{)130}$
5 is a factor of 65 $5\overline{)\ 65}$
13 is prime 13

Now put everything together
$780 = 6 \cdot 130 = 2 \cdot 3 \cdot 2 \cdot 5 \cdot 13$.

$780 = 2 \cdot 2 \cdot 3 \cdot 5 \cdot 13$

$= 2^2 \cdot 3 \cdot 5 \cdot 13$

30) Since you are given that $5 \cdot 13 = 65$ is part of the prime factorization 10,010, to finish you need to find the prime factorization of $10010 \div 65 = 154$.

154 is even, so 2 is a factor $2\overline{)154}$
7 is a factor of 77 $7\overline{)\ 77}$
11 is prime 11

Now put everything together
$10010 = 65 \cdot 154 = 5 \cdot 13 \cdot 2 \cdot 7 \cdot 11$.

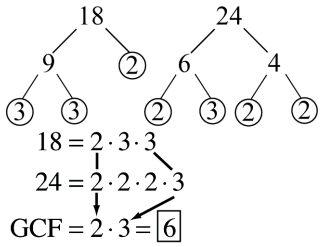
$10{,}010 = 2 \cdot 5 \cdot 7 \cdot 11 \cdot 13$

$= 2 \cdot 5 \cdot 7 \cdot 11 \cdot 13$

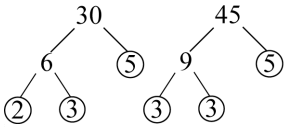
Section 2.6 You Try It Exercises

1) Factors of 12: 1, 2, 3, 4, 6, 12
Factors of 30: 1, 2, 3, 5, 6, 10, 15, 30
Factors that are common to both: 1, 2, 3, 6

2) a)



b)

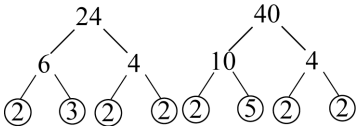


$30 = 2 \cdot 3 \cdot 5$

$45 = 3 \cdot 3 \cdot 5$

$\text{GCF} = 3 \cdot 5 = \boxed{15}$

c)

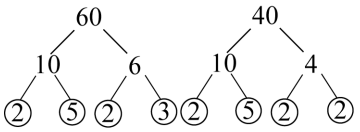


$24 = 2 \cdot 2 \cdot 2 \cdot 3$

$40 = 2 \cdot 2 \cdot 2 \cdot 5$

$\text{GCF} = 2 \cdot 2 \cdot 2 = \boxed{8}$

d)



$40 = 2 \cdot 2 \cdot 2 \cdot 5$

$60 = 2 \cdot 2 \cdot 3 \cdot 5$

$\text{GCF} = 2 \cdot 2 \cdot 5 = \boxed{20}$

3) a) The prime bases that match up are 2 and 3. Of the matched bases of 2, the smallest exponent is 1. Of the matched bases of 3, the smallest exponent is 1.

$\text{GCF} = 2^1 \cdot 3^1 = \boxed{6}$

b) The prime base that matches up is 2. Of the matched bases of 2, the smallest exponent is 3.

$\text{GCF} = 2^3 = \boxed{8}$

c) The prime bases that match up are 2, 5, and 7. Of the matched bases of 2, the smallest exponent is 2. Of the matched bases of 5, the smallest exponent is 1. Of the matched bases of 7, the smallest exponent is 1.

$\text{GCF} = 2^2 \cdot 5^1 \cdot 7^1 = \boxed{140}$

4) a) GCF = 2 (both numbers are even)
b) GCF = 1 (the numbers are relatively prime)
c) GCF = 5 (both numbers end in a 5)
d) GCF = 1 (the numbers are relatively prime)
e) GCF = 1 (the numbers are relatively prime)
f) GCF = 3 (both numbers are divisible by 3)

5) a)

$12 = 2 \cdot 2 \cdot 3$

$24 = 2 \cdot 2 \cdot 2 \cdot 3$

$\text{GCF} = 2 \cdot 2 \cdot 3 = 2^2 \cdot 3 = \boxed{12}$

b) $16 = 2 \cdot 2 \cdot 2 \cdot 2$, $21 = 3 \cdot 7$ — no common prime factors

$\text{GCF} = \boxed{1}$

c)

$30 = 2 \cdot 3 \cdot 5$

$42 = 2 \cdot 3 \cdot 7$

$\text{GCF} = 2 \cdot 3 = \boxed{6}$

d)

$30 = 2 \cdot 3 \cdot 5$

$60 = 2 \cdot 2 \cdot 3 \cdot 5$

$\text{GCF} = 2 \cdot 3 \cdot 5 = \boxed{30}$

e)

$18 = 2 \cdot 3 \cdot 3$

$54 = 2 \cdot 3 \cdot 3 \cdot 3$

$\text{GCF} = 2 \cdot 3 \cdot 3 = \boxed{18}$

f) $35 = 5 \cdot 7$, $54 = 2 \cdot 3 \cdot 3 \cdot 3$ — no common prime factors

$\text{GCF} = \boxed{1}$

6) a)
$3 \mid 15 \;\; 24$ ← Divide 15 and 24 by 3
$5 \;\; 8$ ← Stop! 5 and 8 relatively prime

$\text{GCF} = \boxed{3}$

b)
$2 \mid 20 \;\; 28$ ← Divide 20 and 28 by 2
$2 \mid 10 \;\; 14$ ← Divide 10 and 14 by 2
$5 \;\; 7$ ← Stop! 5 and 7 relatively prime

$\text{GCF} = 2 \cdot 2 = \boxed{4}$

c)
$2 \mid 12 \;\; 36$ ← Divide 12 and 36 by 2
$2 \mid 6 \;\; 18$ ← Divide 6 and 18 by 2
$3 \mid 3 \;\; 6$ ← Divide 6 and 18 by 3
$1 \;\; 2$ ← Stop! 1 and 2 relatively prime

$\text{GCF} = 2 \cdot 2 \cdot 3 = \boxed{12}$

d)
$2 \mid 40 \;\; 96$ ← Divide 40 and 96 by 2
$2 \mid 20 \;\; 48$ ← Divide 20 and 48 by 2
$2 \mid 10 \;\; 24$ ← Divide 10 and 24 by 2
$5 \;\; 12$ ← Stop! 5 and 12 relatively prime

$\text{GCF} = 2 \cdot 2 \cdot 2 = \boxed{8}$

e)
$2 \mid 20 \;\; 50$ ← Divide 20 and 50 by 2
$5 \mid 10 \;\; 25$ ← Divide 10 and 25 by 5
$2 \;\; 5$ ← Stop! 2 and 5 relatively prime

$\text{GCF} = 2 \cdot 5 = \boxed{10}$

f) $2\,|\,48\ \ 72$ ← Divide 48 and 72 by 2
$2\,|\,24\ \ 36$ ← Divide 24 and 36 by 2
$2\,|\,12\ \ 18$ ← Divide 12 and 18 by 2
$3\,|\,6\ \ 9$ ← Divide 6 and 9 by 3
$2\ \ 3$ ← Stop! 2 and 3 relatively prime

GCF $= 2 \cdot 2 \cdot 2 \cdot 3 = \boxed{24}$

g) $3\,|\,15\ \ 60$ ← Divide 15 and 60 by 3
$5\,|\,5\ \ 20$ ← Divide 5 and 20 by 5
$1\ \ 4$ ← Stop! 1 and 4 relatively prime

GCF $= 3 \cdot 5 = \boxed{15}$

h) $2\,|\,36\ \ 54$ ← Divide 36 and 54 by 2
$3\,|\,18\ \ 27$ ← Divide 18 and 27 by 3
$3\,|\,6\ \ 9$ ← Divide 6 and 9 by 3
$2\ \ 3$ ← Stop! 2 and 3 relatively prime

GCF $= 2 \cdot 3 \cdot 3 = \boxed{18}$

7) a) $10\,|\,80\ \ 120$ ← Divide 80 and 120 by 10
$4\,|\,8\ \ 12$ ← Divide 8 and 12 by 4
$2\ \ 3$ ← Stop! 2 and 3 relatively prime

GCF $= 10 \cdot 4 = \boxed{40}$

b) $6\,|\,42\ \ 54$ ← Divide 42 and 54 by 6
$7\ \ 9$ ← Stop! 7 and 9 relatively prime

GCF $= \boxed{6}$

c) The numbers 35 and 48 have no common prime factors, so they are relatively prime.
GCF $= \boxed{1}$

d) The numbers 25 and 49 have no common prime factors, so they are relatively prime.
GCF $= \boxed{1}$

e) $2\,|\,16\ \ 50$ ← Divide 16 and 50 by 2
$8\ \ 25$ ← Stop! 8 and 25 relatively prime

GCF $= \boxed{2}$

f) $14\,|\,56\ \ 70$ ← Divide 56 and 70 by 14
$4\ \ 5$ ← Stop! 4 and 5 relatively prime

GCF $= \boxed{14}$

g) $10\,|\,150\ \ 240$ ← Divide 150 and 240 by 10
$3\,|\,15\ \ 24$ ← Divide 15 and 24 by 3
$5\ \ 8$ ← Stop! 5 and 8 relatively prime

GCF $= 10 \cdot 3 = \boxed{30}$

h) $11\,|\,55\ \ 99$ ← Divide 55 and 99 by 11
$5\ \ 9$ ← Stop! 5 and 9 relatively prime

GCF $= \boxed{11}$

i) The numbers 64 and 75 have no common prime factors, so they are relatively prime.
GCF $= \boxed{1}$

j) $7\,|\,28\ \ 49$ ← Divide 28 and 49 by 7
$4\ \ 7$ ← Stop! 4 and 7 relatively prime

GCF $= \boxed{7}$

Section 2.6 Exercises

4)
$36 = 2 \cdot 2 \cdot 3 \cdot 3$
$48 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$
GCF $= 2 \cdot 2 \cdot 3 = \boxed{12}$

6)
$35 = 5 \cdot 7$
$90 = 2 \cdot 3 \cdot 3 \cdot 5$
GCF $= \boxed{5}$

8)
$50 = 2 \cdot 5 \cdot 5$
$125 = 5 \cdot 5 \cdot 5$
GCF $= 5 \cdot 5 = \boxed{25}$

10)
$60 = 2 \cdot 2 \cdot 3 \cdot 5$
$105 = 3 \cdot 5 \cdot 7$
GCF $= 3 \cdot 5 = \boxed{15}$

12) The prime bases that match are 2 and 3.
Of the matched bases of 2, the smallest exponent is 1.
Of the matched bases of 3, the smallest exponent is 1.
GCF $= 2^1 \cdot 3^1 = \boxed{6}$

14) The prime bases that match are 3 and 5.
Of the matched bases of 3, the smallest exponent is 1.
Of the matched bases of 5, the smallest exponent is 1.
GCF $= 3^1 \cdot 5^1 = \boxed{15}$

16) The prime bases that match are 2, 5, and 11
Of the matched bases of 2, the smallest exponent is 2.
Of the matched bases of 5, the smallest exponent is 1.
Of the matched bases of 11, the smallest exponent is 1.
GCF $= 2^2 \cdot 5^1 \cdot 11^1 = \boxed{220}$

18) $8\,|\,40\ \ 72$ ← Divide 40 and 72 by 8
$5\ \ 9$ ← Stop! 5 and 9 relatively prime

GCF $= \boxed{8}$

20) $10\,|\,50\ \ 70$ ← Divide 50 and 70 by 10
$5\ \ 7$ ← Stop! 5 and 7 relatively prime

GCF $= \boxed{10}$

22) $4 \mid 16\ 24$ ← Divide 16 and 24 by 4
$2 \mid 4\ 6$ ← Divide 4 and 6 by 2
$2\ 3$ ← Stop! 2 and 3 relatively prime

GCF $= 4 \cdot 2 = \boxed{8}$

24) $3 \mid 42\ 105$ ← Divide 42 and 105 by 3
$7 \mid 14\ 35$ ← Divide 14 and 35 by 7
$2\ 5$ ← Stop! 2 and 5 relatively prime

GCF $= 3 \cdot 7 = \boxed{21}$

26) $21 = 3 \cdot 7$
$32 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ } no common factors

GCF $= \boxed{1}$

28) $5 \mid 105\ 135$ ← Divide 105 and 135 by 5
$3 \mid 21\ 27$ ← Divide 21 and 27 by 3
$7\ 9$ ← Stop! 7 and 9 relatively prime

GCF $= 5 \cdot 3 = \boxed{15}$

30) $2 \mid 42\ 154$ ← Divide 42 and 154 by 2
$7 \mid 21\ 77$ ← Divide 21 and 77 by 7
$3\ 11$ ← Stop! 3 and 11 relatively prime

GCF $= 2 \cdot 7 = \boxed{14}$

32) $10 \mid 120\ 840$ ← Divide 120 and 840 by 10
$12 \mid 12\ 84$ ← Divide 12 and 84 by 12
$1\ 7$ ← Stop! 1 and 7 relatively prime

GCF $= 10 \cdot 12 = \boxed{120}$

34) $6 \mid 60\ 96$ ← Divide 60 and 96 by 6
$2 \mid 10\ 16$ ← Divide 10 and 16 by 2
$5\ 8$ ← Stop! 5 and 8 relatively prime

GCF $= 6 \cdot 2 = \boxed{12}$

36) $12 \mid 24\ 72$ ← Divide 24 and 72 by 12
$2 \mid 2\ 6$ ← Divide 2 and 6 by 2
$1\ 3$ ← Stop! 1 and 3 relatively prime

GCF $= 12 \cdot 2 = \boxed{24}$

38) $4 \mid 32\ 96$ ← Divide 32 and 96 by 4
$8 \mid 8\ 24$ ← Divide 8 and 24 by 8
$1\ 3$ ← Stop! 1 and 3 relatively prime

GCF $= 4 \cdot 8 = \boxed{32}$

40) $12 \mid 96\ 144$ ← Divide 96 and 144 by 12
$4 \mid 8\ 12$ ← Divide 8 and 12 by 4
$2\ 3$ ← Stop! 2 and 3 relatively prime

GCF $= 12 \cdot 4 = \boxed{48}$

42) $9 \mid 9\ 27\ 36$ ← Divide 9, 27, and 36 by 9
$1\ 3\ 4$ ← Stop! 1, 3, and 4 have no common factors

GCF $= \boxed{9}$

44) $5 \mid 30\ 45\ 90$ ← Divide 30, 45, and 90 by 5
$3 \mid 6\ 9\ 18$ ← Divide 6, 9, and 18 by 3
$2\ 3\ 6$ ← Stop! 2, 3, and 6 have no common factors

GCF $= 5 \cdot 3 = \boxed{15}$

46) $12 \mid 48\ 72\ 108$ ← Divide 48, 72, and 108 by 12
$4\ 6\ 9$ ← Stop! 4, 6, and 9 have no common factors

GCF $= \boxed{12}$

Chapter 2 Review

1) exponent
2) base
3) radical
4) prime
5) composite
6) relatively prime
7) $1^6 = 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 = 1$
The expanded notation is $1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1$ and its value is 1.
8) $2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = (2 \cdot 2) \cdot (2 \cdot 2) = 4 \cdot 4 = 16$
The expanded notation is $2 \cdot 2 \cdot 2 \cdot 2$ and its value is 16.
9) 3^5
$= 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$
$= (3 \cdot 3 \cdot 3) \cdot (3 \cdot 3)$
$= 27 \cdot 9$
$= 243$

$$\begin{array}{r} 27 \\ \times\ 9 \\ \hline 243 \end{array}$$

The expanded notation is $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$ and its value is 243.
10) 4^3
$= 4 \cdot 4 \cdot 4$
$= (4 \cdot 4) \cdot 4$
$= 16 \cdot 4$
$= 64$

$$\begin{array}{r} 16 \\ \times\ 4 \\ \hline 64 \end{array}$$

The expanded notation is $4 \cdot 4 \cdot 4$ and its value is 64.
11) $16^1 = 16$
The expanded notation and value are both equal to 16.
12) 17^2
$= 17 \cdot 17$
$= 289$

$$\begin{array}{r} 17 \\ \times 17 \\ \hline 119 \\ +170 \\ \hline 289 \end{array}$$

The expanded notation is $17 \cdot 17$ and its value is 289.
13) $20^3 = 20 \cdot 20 \cdot 20 = (20 \cdot 20) \cdot 20 = 400 \cdot 20 = 8000$
$400 \cdot 20$ is $4 \cdot 2 = 8$ followed by 3 zeros
The expanded notation is $20 \cdot 20 \cdot 20$ and its value is 8,000.

14) $10^7 = 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 10000000$
$10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$ is 1 followed by 7 zeros
The expanded notation is $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$ and its value is 10,000,000.

15) 1,000 is 1 followed by 3 zeros
$1000 = 10^3$

16) 10,000,000 is 1 followed by 7 zeros
$10000000 = 10^7$

17) 100,000 is 1 followed by 5 zeros
$100000 = 10^5$

18) 10 is 1 followed by 1 zero
$10 = 10^1$

19) 70 is 7 followed by 1 zero
$70 = 7 \cdot 10^1$

20) 8,400 is 84 followed by 2 zeros
$8400 = 84 \cdot 10^2$

21) 300,000 is 3 followed by 5 zeros
$300000 = 3 \cdot 10^5$

22) 1,200,000 is 12 followed by 5 zeros
$1200000 = 12 \cdot 10^5$

23) 6

24) 2

25) 3

26) 10

27) $3 \cdot 5 - 1$ multiply
$= 15 - 1$ subtract
$= 14$

28) $3 \cdot (5 - 1)$ subtract
$= 3 \cdot 4$ multiply
$= 12$

29) $(18 - 4) \div 2$ subtract
$= 14 \div 2$ divide
$= 7$

30) $18 - 4 \div 2$ divide
$= 18 - 2$ subtract
$= 16$

31) $54 \div 3^2$ exponent
$= 54 \div 9$ divide
$= 6$

32) $2^3 - 2^2$ exponents
$= 8 - 4$ subtract
$= 4$

33) $2^3 + 3^2$ exponents
$= 8 + 9$ add
$= 17$

34) $6^2 - 5 \cdot 3$ exponent
$= 36 - 5 \cdot 3$ multiply
$= 36 - 15$ subtract
$= 21$

35) $8 \div 2^2 + 7$ exponent
$= 8 \div 4 + 7$ divide
$= 2 + 7$ add
$= 9$

36) $(8 \div 2)^2 + 7$ divide
$= 4^2 + 7$ exponent
$= 16 + 7$ add
$= 23$

37) $4^2 \cdot 2 - 2$ exponent
$= 16 \cdot 2 - 2$ multiply
$= 32 - 2$ subtract
$= 30$

38) $4^2 \cdot (2 - 2)$ subtract
$= 4^2 \cdot 0$ exponent
$= 16 \cdot 0$ multiply
$= 0$

39) The two parentheses can be evaluated at the same time.
$(6 - 2) \cdot (12 \div 3)$ subtract and divide at the same time
$= 4 \cdot 4$ multiply
$= 16$

40) $12 - 30 \div (6 + 4)$ add
$= 12 - 30 \div 10$ divide
$= 12 - 3$ subtract
$= 9$

41) $24 \div 3 \cdot 4 - 2$ divide
$= 8 \cdot 4 - 2$ multiply
$= 32 - 2$ subtract
$= 30$

42) $24 \div 3 \cdot (4 - 2)$ subtract
$= 24 \div 3 \cdot 2$ divide
$= 8 \cdot 2$ multiply
$= 16$

43) $13 - \sqrt{16}$ square root
$= 13 - 4$ subtract
$= 9$

44) $\sqrt{36} \div 2$ square root
$= 6 \div 2$ divide
$= 3$

45) $\sqrt{4^2+9}$ exponent
$=\sqrt{16+9}$ add
$=\sqrt{25}$ square root
$=5$

46) $\sqrt{3\cdot 20+4}$ multiply
$=\sqrt{60+4}$ add
$=\sqrt{64}$ square root
$=8$

47) Use the formula $F=9\cdot(C\div 5)+32$.
$F=9\cdot(100\div 5)+32$
$F=9\cdot 20+32$
$F=180+32$
$F=212$
This means that 100° C is equivalent to 212° F.

48) Use the formula $F=9\cdot(C\div 5)+32$.
$F=9\cdot(15\div 5)+32$
$F=9\cdot 3+32$
$F=27+32$
$F=59$
This means that 15° C is equivalent to 59° F.

49) Use the formula $C=5\cdot[(F-32)\div 9]$.
$C=5\cdot[(122-32)\div 9]$
$C=5\cdot[90\div 9]$
$C=5\cdot 10$
$C=50$
This means that 122° F is equivalent to 50° C.

50) Use the formula $C=5\cdot[(F-32)\div 9]$.
$C=5\cdot[(59-32)\div 9]$
$C=5\cdot[27\div 9]$
$C=5\cdot 3$
$C=15$
This means that 59° F is equivalent to 15° C.

51) $A=(a+b)\div 2$
$A=(77+91)\div 2$
$A=168\div 2$
$A=84$

52) $W=A\div L$
$W=192\div 12$
$W=16$

53) $A=h\cdot(b+c)\div 2$
$A=5\cdot(6+4)\div 2$
$A=5\cdot 10\div 2$
$A=50\div 2$
$A=25$

54) $z=(x-m)\div s$
$z=(53-45)\div 4$
$z=8\div 4$
$z=2$

55) $a=\sqrt{c^2-b^2}$
$a=\sqrt{13^2-12^2}$
$a=\sqrt{169-144}$
$a=\sqrt{25}$
$a=5$

56) $C=2\cdot W\div E^2$
$C=2\cdot 12\div 2^2$
$C=2\cdot 12\div 4$
$C=24\div 4$
$C=6$

57) You have distance and time, you don't have the rate so use $r=d\div t$.
$r=52\div 4$
$r=13$

$$\begin{array}{r} 13 \\ 4\overline{)\,52} \\ \underline{-4} \\ 12 \\ \underline{-12} \\ 0 \end{array}$$

Sentence: Tracy's average rate of speed was 13 miles per hour.

58) You have rate and time, you don't have the distance so use $d=r\cdot t$.
$d=145\cdot 6$
$d=870$

$$\begin{array}{r} 145 \\ \times\quad 6 \\ \hline 870 \end{array}$$

Sentence: Timara can fly 870 miles in 6 hours.

59) You know the rate and distance, you don't have the time so use $t=d\div r$.
$t=495\div 55$
$t=9$

$$\begin{array}{r} 9 \\ 55\overline{)\,495} \\ \underline{-495} \\ 0 \end{array}$$

Sentence: It will take Charles 9 hours to get there.

60) You have distance and time, you don't have the rate so use $r = d \div t$.

$r = 87 \div 3$

$r = 29$

$$3\overline{)87}\quad 29,\ -6,\ 27,\ -27,\ 0$$

Sentence: Peetey's average rate of speed was 29 centimeters per minute.

61) 3, 6, 9, 12, and 15

62) 6, 12, 18, 24, and 30

63) 11, 22, 33, 44, and 55

64) 12, 24, 36, 48, and 60

65)

	18
1	18
2	9
3	6

The factor pairs of 18 are: 1 and 18; 2 and 9; 3 and 6

66)

	36
1	36
2	18
3	12
4	9
6	6

The factor pairs of 36 are: 1 and 36; 2 and 18; 3 and 12; 4 and 9; 6 and 6

67)

	45
1	45
3	15
5	9

The factor pairs of 45 are: 1 and 45; 3 and 15; 5 and 9

68)

	60
1	60
2	30
3	20
4	15
5	12
6	10

The factor pairs of 60 are: 1 and 60; 2 and 30; 3 and 20; 4 and 15; 5 and 12; 6 and 10

69) Prime:17, 29, and 11

Composite: 15, 81, and 45

Factors of 15: 1, 3, 5, and 15
Factors of 81: 1, 3, 9, 27, and 81
Factors of 45: 1, 3, 5, 9, 15, and 45

Neither: 0

70) Prime: 2, 61, 43, and 31

Composite: 70, 62, and 57

Factors of 70: 1, 2, 5, 7, 10, 14, 35, and 70
Factors of 62: 1, 2, 31, and 62
Factors of 57: 1, 3, 19, and 57

Neither: 0

71) • 75 is not even
• $7 + 5 = 12$ (3)
• 75 ends in 5 (5)
3 and 5

72) • 91 is not even
• $9 + 1 = 10$
• 91 doesn't end in 0 or 5
none

73) • 112 is even (2)
• $1 + 1 + 2 = 4$
• doesn't end in 0 or 5
2

74) • 120 is even (2)
• $1 + 2 + 0 = 3$ (3)
• 120 end in 0 (5)
2, 3, and 5

75) • 147 is not even
• $1 + 4 + 7 = 12$ (3)
• 147 doesn't end in 0 or 5
3

76) • 230 is even (2)
• $2 + 3 + 0 = 5$
• 230 ends in 0 (5)
2 and 5

77) • 625 is not even
• $6 + 2 + 5 = 13$
• 625 ends in 5 (5)
5

78) • 1782 is even (2)
• $1 + 7 + 8 + 2 = 18$ (3)
• 1,782 doesn't end in 0 or 5
2 and 3

79) Because $1 + 7 + 1 = 9$ and because 9 is a factor of 9, 9 is a factor of 171.

Check:
$$9\overline{)171}\quad 19,\ -9,\ 81,\ -81,\ 0$$
remainder 0, so 9 is a factor

80) Because $5 + 2 + 9 + 2 = 18$ and because 9 is a factor of 18, 9 is a factor of 5,292.

Check:
$$9\overline{)5292}\quad 588,\ -45,\ 79,\ -72,\ 72,\ -72,\ 0$$
remainder 0, so 9 is a factor

81) Because $6+7+0+8=21$ and because 9 is not a factor of 21, 9 is not a factor of 6,708.

Check:
$$\begin{array}{r} 745 \\ 9\overline{)\,6708} \\ -63 \\ \hline 40 \\ -36 \\ \hline 48 \\ -45 \\ \hline 3 \end{array}$$
remainder 3, so 9 is not a factor

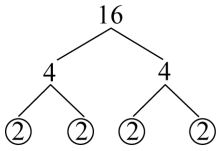
82) Because $1+7+4+5+1=18$ and because 9 is a factor of 18, 9 is a factor of 17,451.

Check:
$$\begin{array}{r} 1939 \\ 9\overline{)\,17451} \\ -\ 9 \\ \hline 84 \\ -81 \\ \hline 35 \\ -27 \\ \hline 81 \\ -81 \\ \hline 0 \end{array}$$
remainder 0, so 9 is a factor

83) $3\cdot 13=39$ is a composite factor of 741

84) $5\cdot 7=35$ is a composite factor of 1,505

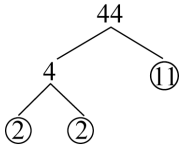
85)



$16=2\cdot 2\cdot 2\cdot 2$

$=2^4$

86)



$44=2\cdot 2\cdot 11$

$=2^2\cdot 11$

87) 50 is even, so 2 is a factor $2\overline{|50}$
5 is a factor of 25 $5\overline{|25}$
5 is prime 5

$50=2\cdot 5\cdot 5$

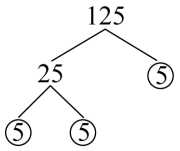
$=2\cdot 5^2$

88) 96 is even, so 2 is a factor $2\overline{|96}$
48 is even, so 2 is again a factor $2\overline{|48}$
24 is even, so 2 is again a factor $2\overline{|24}$
12 is even, so 2 is again a factor $2\overline{|12}$
6 is even, so 2 is again a factor $2\overline{|6}$
3 is prime 3

$96=2\cdot 2\cdot 2\cdot 2\cdot 2\cdot 3$

$=2^5\cdot 3$

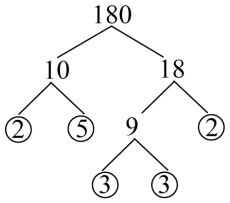
89)



$125=5\cdot 5\cdot 5$

$=5^3$

90)



$180=2\cdot 2\cdot 3\cdot 3\cdot 5$

$=2^2\cdot 3^2\cdot 5$

91) 5 is a factor of 325 $5\overline{|325}$
5 is a factor of 65 $5\overline{|65}$
13 is prime 13

$325=5\cdot 5\cdot 13$

$=5^2\cdot 13$

92) 5 is a factor of 1225 $5\overline{|1225}$
5 is a factor of 245 $5\overline{|245}$
7 is a factor of 49 $7\overline{|49}$
7 is prime 7

$1225=5\cdot 5\cdot 7\cdot 7$

$=5^2\cdot 7^2$

93) $5\overline{|15\ \ 20}$ ← Divide 15 and 20 by 5
3 4 ← Stop! 3 and 4 relatively prime

GCF = $\boxed{5}$

94)

$40=2\cdot 2\cdot 2\cdot 5$

$48=2\cdot 2\cdot 2\cdot 2\cdot 3$

GCF = $2\cdot 2\cdot 2=\boxed{8}$

95) $7\overline{|14\ \ 56}$ ← Divide 14 and 56 by 7
$2\overline{|2\ \ 8}$ ← Divide 2 and 8 by 2
1 4 ← Stop! 1 and 4 relatively prime

GCF = $7\cdot 2=\boxed{14}$

96) $6\overline{|36\ \ 90}$ ← Divide 36 and 90 by 6
$3\overline{|6\ \ 15}$ ← Divide 6 and 15 by 3
2 5 ← Stop! 2 and 5 relatively prime

GCF = $6\cdot 3=\boxed{18}$

97) $35=5\cdot 7$
$48=2\cdot 2\cdot 2\cdot 2\cdot 3$ } no common factors

GCF = $\boxed{1}$

The numbers 35 and 48 are relatively prime.

98) $2\,|\,54\ \ 96$ ← Divide 54 and 96 by 2
$3\,|\,27\ \ 48$ ← Divide 27 and 48 by 3
$9\ \ 16$ ← Stop! 9 and 16 relatively prime

$\text{GCF} = 2 \cdot 3 = \boxed{6}$

99) $6\,|\,60\ \ 84$ ← Divide 60 and 84 by 6
$2\,|\,10\ \ 14$ ← Divide 10 and 14 by 2
$5\ \ 7$ ← Stop! 5 and 7 relatively prime

$\text{GCF} = 6 \cdot 2 = \boxed{12}$

100)
$75 = 3 \cdot 5 \cdot 5$
$105 = 3 \cdot 5 \cdot 7$
$\text{GCF} = 3 \cdot 5 = \boxed{15}$

101) $10\,|\,90\ \ 120$ ← Divide 90 and 120 by 10
$3\,|\,9\ \ 12$ ← Divide 9 and 12 by 3
$3\ \ 4$ ← Stop! 3 and 4 relatively prime

$\text{GCF} = 10 \cdot 3 = \boxed{30}$

102)
$96 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$
$72 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$
$\text{GCF} = 2 \cdot 2 \cdot 2 \cdot 3 = \boxed{24}$

103)
$45 = 3 \cdot 3 \cdot 5$
$135 = 3 \cdot 3 \cdot 3 \cdot 5$
$\text{GCF} = 3 \cdot 3 \cdot 5 = \boxed{45}$

104) $81 = 3 \cdot 3 \cdot 3 \cdot 3$
$110 = 2 \cdot 5 \cdot 11$
} no common factors

$\text{GCF} = \boxed{1}$

The numbers 81 and 110 are relatively prime

105) The only prime base that matches up is 2.
Of the matched bases of 2, the smallest exponent is 2.

$\text{GCF} = 2^2 = \boxed{4}$

106) The prime bases that match up are 3 and 5.
Of the matched bases of 3, the smallest exponent is 1.
Of the matched bases of 5, the smallest exponent is 2.

$\text{GCF} = 3^1 \cdot 5^2 = \boxed{75}$

107) The prime bases that match up are 2, 3, and 7.
Of the matched bases of 2, the smallest exponent is 1.
Of the matched bases of 3, the smallest exponent is 2.
Of the matched bases of 7, the smallest exponent is 1.

$\text{GCF} = 2^1 \cdot 3^2 \cdot 7^1 = \boxed{126}$

Chapter 2 Test

1) $5 \cdot 5 \cdot 5 =$
$(5 \cdot 5) \cdot 5 =$
$25 \cdot 5 =$
125

$\begin{array}{r} {\scriptstyle 2}\\ 2\ 5\\ \times\quad 5\\ \hline 1\ 2\ 5 \end{array}$

2) $20 \cdot 20 =$
400

$\begin{array}{r} 2\ 0\\ \times\ 2\ 0\\ \hline 0\ 0\\ +\ 4\ 0\ 0\\ \hline 4\ 0\ 0 \end{array}$

3) $740{,}000 = 74 \cdot 10^4$

4) $900 = 9 \cdot 10^2$

5) $\sqrt{16} = 4$ because $4 \cdot 4 = 16$

6) $\sqrt{81} = 9$ because $9 \cdot 9 = 81$

7) $36 \div 4 \cdot 3 =$
$9 \cdot 3 =$
27
two operations division and multiplication, and no grouping symbols, work left to right

8) $2 \cdot 3^2 - 1 =$
$2 \cdot 9 - 1 =$
17
two operations multiplication and exponents, evaluate exponent first

9) $2 \cdot (4+1)^2 =$
$2 \cdot 5^2 =$
$2 \cdot 25 =$
50
three operations and one grouping symbol, since addition is inside the parenthesis, the addition is done first followed by the exponent

10) $F = 9 \cdot (95 \div 5) + 32$
$F = 9 \cdot 19 + 32$
$F = 171 + 32$
$F = 203$

$\begin{array}{r} 1\ 9\\ 5\overline{)\ 9\ 5}\\ -\ 5\\ \hline 4\ 5\\ -\ 4\ 5\\ \hline 0 \end{array}$

$\begin{array}{r} {\scriptstyle 8}\\ 1\ 9\\ \times\quad 9\\ \hline 1\ 7\ 1 \end{array}$

This means that 95° C is equivalent to 203° F.

11) $C = 5 \cdot [(95 - 32) \div 9]$
$C = 5 \cdot [63 \div 9]$
$C = 5 \cdot 7$
$C = 35$

$\begin{array}{r} 9\ 5\\ -\ 3\ 2\\ \hline 6\ 3 \end{array}$

This means that 95° F is equivalent to 35° C.

12) $A = h \cdot (b+c)^2 \div 2$
$A = 5 \cdot (6+4)^2 \div 2$
$A = 5 \cdot 10 \div 2$
$A = 50 \div 2$
$A = 25$

13) Since time is unknown we use $t = \frac{d}{r}$.

$t = \frac{455}{65}$

$t = 7$

Sentence: It will take Rogelio 7 hours to get there.

14)

Prime: 41, 19, 2

Composite: 77, 38 77 is composite since $77 = 7 \cdot 11$
38 is composite since $38 = 2 \cdot 19$

Neither: 1

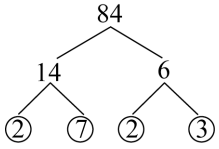
15) • 135 is not even
• $1+3+5=9$ (3)
• ends in 5 (5)
3 and 5

16) • 84 is even (2)
• $8+4=12$ (3)
• does not end in 5 or 0
2 and 3

17) • 149 is not even
• $1+4+9=14$
• does not end in 5 or 0
none of these

18) • 172 is even (2)
• $1+7+2=10$
• does not end in 5 or 0
2

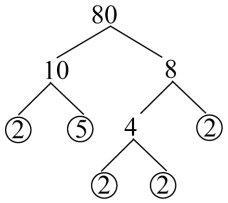
19) Use a factor tree



$84 = 2 \cdot 2 \cdot 3 \cdot 7$

$= 2^2 \cdot 3 \cdot 7$

20) Use a factor tree



$80 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 5$

$= 2^4 \cdot 5$

21) Use the division method

• 540 is even, so 2 is a factor $2\overline{)540}$
• 270 is even, so 2 is a factor $2\overline{)270}$
• since $1+3+5=9$, 3 is a factor of 135 $3\overline{)135}$
• since $4+5=9$, 3 is a factor of 45 $3\overline{)\ 45}$
• 3 is a factor of 15 $3\overline{)\ 15}$
5

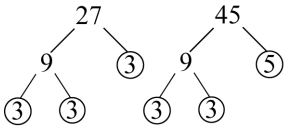
$2 \cdot 2 \cdot 3 \cdot 3 \cdot 3 \cdot 5 =$

$2^2 \cdot 3^3 \cdot 5$

22) Factors of 16: 1, 2, 4, 8, 16
Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24

GCF = $\boxed{8}$

23) Use factor trees to factor 27 and 45.



$27 = 3 \cdot 3 \cdot 3$

$45 = 3 \cdot 3 \cdot 5$

GCF = $3 \cdot 3 = \boxed{9}$

24) Use the division method

$2\overline{)\ 70\ \ 112}$ ⇐ Divide 70 and 112 by 2

$7\overline{)35\ \ 56}$ ⇐ Divide 35 and 56 by 7

5 8 ⇐ STOP! 5 and 8 are relatively prime.

GCF = $2 \cdot 7 = \boxed{14}$

Chapters 1 and 2 Cumulative Review

1) seventy thousand
2) five hundred thousand, twenty-six
3) 500
4) 8,000
5) 8,000
6) 210,000
7) Commutative Property of Multiplication
8) Additive Identity
9) Distributive Property of Multiplication over Addition
10) Associative Property of Addition

11)
$$\begin{array}{r} {\scriptstyle 1\ 1\ 1} \\ 2549 \\ +0487 \\ \hline 3036 \end{array}$$

12)
$$\begin{array}{r} {\scriptstyle 1\ 1\ 1} \\ 1908 \\ +0093 \\ \hline 2{,}001 \end{array}$$

13)
$$\begin{array}{r} {\scriptstyle 14} \\ {\scriptstyle 0\ \not{4}\ 14} \\ \not{1}\not{5}\not{4}8 \\ +\ 673 \\ \hline 875 \end{array}$$

14)
$$\begin{array}{r} {\scriptstyle 9\ 9\ 9\ 9\ 10} \\ {\scriptstyle 0\ \not{10}\ \not{10}\ \not{10}\ \not{10}\ 10} \\ \not{1}\not{0}\not{0}\not{0}\not{0} \\ +\ 571 \\ \hline 9{,}429 \end{array}$$

15) $P = 43 + 24 + 28 + 17$
$P = 112$ cm

$$\begin{array}{r} 43 \\ 24 \\ 28 \\ +17 \\ \hline 112 \end{array}$$

16) $P = 72 + 59 + 72 + 59$

$P = 262$ in.

$$\begin{array}{r} 72 \\ 59 \\ 72 \\ +59 \\ \hline 262 \end{array}$$

17) $A = 25 \cdot 18$

$A = 450 \text{ yd}^2$

$$\begin{array}{r} 25 \\ \times 18 \\ \hline 200 \\ +250 \\ \hline 450 \end{array}$$

18) $$\begin{array}{r} {\scriptstyle 7\ 11\ 5\ 9\ 10\ 11} \\ 8\,\cancel{1}\,\cancel{6}\,\cancel{0}\,\cancel{1}5 \\ -\ 5\,6\,1\,0\,9\,4 \\ \hline 2\,5\,4\,9\,2\,1 \end{array}$$

Sentence: Gore received 254,921 more votes than Bush.

19) $80 \cdot 700 = 56{,}000$ $7 \cdot 8 = 56$ followed by three zeros

20) $$\begin{array}{r} 165 \\ \times\ 28 \\ \hline 1320 \\ +\ 3300 \\ \hline 4{,}620 \end{array}$$

21) $$\begin{array}{r} 47 \\ 8\overline{)\ 379} \\ -32 \\ \hline 59 \\ -56 \\ \hline 3 \end{array}$$

$379 \div 8 = 47$ r 3

22) $$\begin{array}{r} 52 \\ 28\overline{)\ 1456} \\ -140 \\ \hline 56 \\ -56 \\ \hline 0 \end{array}$$

$1456 \div 28 = 52$

23) $\boxed{\text{number of pages}} \cdot \boxed{\text{number of members}} = \boxed{\text{total pages}}$

$34 \cdot 15 = 510$

$$\begin{array}{r} 34 \\ \times 15 \\ \hline 170 \\ +340 \\ \hline 510 \end{array}$$

Sentence: Lydia photocopied a total of 510 pages.

24) $540 \div 45 = 12$

$$\begin{array}{r} 12 \\ 45\overline{)\ 540} \\ -45 \\ \hline 90 \\ -90 \\ \hline 0 \end{array}$$

Sentence: Each teacher received 12 whiteboard markers.

25) $n + 45 = 72$

$n + 45 - 45 = 72 - 45$

$n = 27$

Check: $27 + 45 = 72$

$72 = 72$ $\sqrt{}$ True

26) $455 = 13 \cdot n$

$455 \div 13 = 13 \div 13 \cdot n$

$35 = n$

$n = 35$

Check: $455 = 13 \cdot 35$

$455 = 455$ $\sqrt{}$ True

27) Legend: n = money needed to meet goal

$\boxed{\text{friday money}} + \boxed{\text{saturday money}} + \boxed{\text{sunday money}} = \boxed{\text{total money}}$

$138 + 249 + n = 500$

$387 + n = 500$

$387 - 387 + n = 500 - 387$

$n = 113$

Sentence: Ben and Adrian need to raise \$113 on Sunday to meet their goal.

28) Legend: $n =$ number of red vines each girl received

$\boxed{\text{number of girls}} \cdot \boxed{\text{red vines per girl}} = \boxed{\text{total red vines}}$

$7 \cdot n = 245$

$7 \div 7 \cdot n = 245 \div 7$

$n = 35$

Sentence: Each girl received 35 red vines.

29) $9^3 = 9 \cdot 9 \cdot 9 = (9 \cdot 9) \cdot 9 = 81 \cdot 9 = 729$

The expanded notation is $9 \cdot 9 \cdot 9$ and its value is 729.

30) $5^4 = 5 \cdot 5 \cdot 5 \cdot 5 = (5 \cdot 5) \cdot (5 \cdot 5) = 25 \cdot 25 = 625$

The expanded notation is $5 \cdot 5 \cdot 5 \cdot 5$ and its value is 625.

31) 10^4

32) 10^9

33) $6 \cdot 10^4$

34) $52 \cdot 10^5$

35) 8

36) 11

37) $36 \div 3^2 + 3$

$= 36 \div 9 + 3$

$= 4 + 3$

$= 7$

38) $(36 \div 3)^2 + 3$

$= 12^2 + 3$

$= 144 + 3$

$= 147$

39) $\sqrt{36 + 4 \cdot 7}$

$= \sqrt{36 + 28}$

$= \sqrt{64}$

$= 8$

40) $\sqrt{36}+4\cdot 7$
$=6+4\cdot 7$
$=6+28$
$=34$

41) Use $F=9\cdot(C\div 5)+32$
$F=9\cdot(60\div 5)+32$
$F=9\cdot 12+32$
$F=108+32$
$F=140$
The equivalent temperature is 140° F

42) Use $C=5\cdot[(F-32)\div 9]$
$C=5\cdot[(113-32)\div 9]$
$C=5\cdot[81\div 9]$
$C=5\cdot 9$
$C=45$
The equivalent temperature is 45° C

43) $a=\sqrt{c^2-b^2}$
$a=\sqrt{10^2-8^2}$
$a=\sqrt{100-64}$
$a=\sqrt{36}$
$a=6$

44) $C=2\cdot A\div h-b$
$C=2\cdot 15\div 5-2$
$C=30\div 5-2$
$C=6-2$
$C=4$

45) Use $r=d\div t$
$r=2610\div 6$
$r=435$

$$\begin{array}{r} 435 \\ 6\overline{)\,2610} \\ -24 \\ \hline 21 \\ -18 \\ \hline 30 \\ -30 \\ \hline 0 \end{array}$$

Sentence: The jet's average speed was 435 miles per hour.

46) Use $d=r\cdot t$
$d=95\cdot 3$
$d=285$

$$\begin{array}{r} 95 \\ \times\ \ 3 \\ \hline 285 \end{array}$$

Sentence: Jasper will go 285 miles.

47) Prime: 5, 31, and 43
Composite: 18 and 55
Neither: 1

48) 150 is even, so 2 is a factor; $1+5+0=6$, so 3 is a factor; 150 ends in zero, so 5 is a factor
2, 3, and 5

49) 197 is not even, so 2 is not a factor; $1+9+7=17$, so 3 is not a factor; 197 doesn't end in a 0 or 5, so 5 is not a factor
none

50) 282 is even, so 2 is a factor; $2+8+2=12$, so 3 is a factor; 282 doesn't end in a 0 or a 5, so 5 is not a factor
2 and 3

51) 765 is not even, so 2 is not a factor; $7+6+5=18$, so 3 is a factor; 765 ends in a 5, so 5 is a factor
3 and 5

52) Because $1+7+1=9$ and because 9 is a factor of 9, 9 is a factor of 171

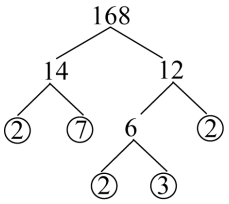
Check:
$$\begin{array}{r} 19 \\ 9\overline{)\,171} \\ -\ 9 \\ \hline 81 \\ -81 \\ \hline 0 \end{array}$$
remainder is 0, so 9 is a factor

53) Because $5+2+9+2=18$ and because 9 is a factor of 18, 9 is a factor of 5292.

Check:
$$\begin{array}{r} 588 \\ 9\overline{)\,5292} \\ -45 \\ \hline 79 \\ -72 \\ \hline 72 \\ -72 \\ \hline 0 \end{array}$$
remainder is 0, so 9 is a factor

54) $2\cdot 17=34$ is a composite factor of 816.

55)



$168=2\cdot 2\cdot 2\cdot 3\cdot 7$
$=2^3\cdot 3\cdot 7$

56) 300 is even, so 2 is a factor $2\,|\,300$
150 is even, so 2 is again a factor $2\,|\,150$
5 is a factor of 75 $5\,|\,75$
5 is a factor of 15 $5\,|\,15$
3 is prime 3
$300=2\cdot 2\cdot 3\cdot 5\cdot 5$
$=2^2\cdot 3\cdot 5^2$

57)
$48=2\cdot 2\cdot 2\cdot 2\cdot 3$
$64=2\cdot 2\cdot 2\cdot 2\cdot 2\cdot 2$
$\text{GCF}=2\cdot 2\cdot 2\cdot 2=\boxed{16}$

58) $3\overline{)63\ 105}$ ← Divide 63 and 105 by 3

$7\overline{)21\ 35}$ ← Divide 21 and 35 by 7

3 5 ← Stop! 3 and 5 relatively prime

GCF = $3 \cdot 7 = \boxed{21}$