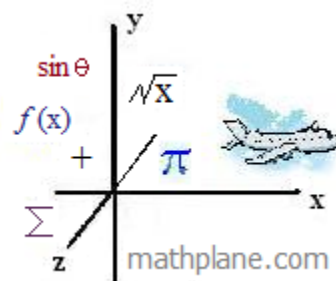# Pre-Algebra Review 3

## Test and Solutions

*Topics include decimals, fractions, percentages, proportions, angles, graphs, and more.*

Pre-Algebra Review Questions

I. Proportions

$$\frac{x}{5} = \frac{3}{15}$$

$$\frac{21}{x} = \frac{7}{11}$$

$$\frac{6}{9} = \frac{x}{12}$$

$$\frac{5}{8} = \frac{9}{x}$$

$$\frac{3}{90} = \frac{2}{x}$$

$$\frac{x}{48} = \frac{17}{34}$$

$$\frac{2}{5} = \frac{x}{55}$$

$$\frac{8}{x} = \frac{24}{9}$$

II. Fractions

$$\frac{1}{3} + \frac{8}{16} =$$

$$\frac{7}{6} - \frac{5}{18} =$$

$$\frac{2}{7} \times \frac{1}{5} =$$

$$\frac{3}{8} - \frac{2}{5} =$$

$$\frac{120}{130} \times \frac{26}{52} =$$

$$\frac{-11}{13} + \frac{40}{39} =$$

$$3\frac{1}{2} \times 2\frac{5}{6} =$$

$$3\frac{5}{7} \div 1\frac{2}{3} =$$

$$\frac{7}{24} \times \frac{12}{35} =$$

III. Decimals

3 x .456 =          .002 x .214 =          3.45 x 23.11 =          1.11 x 11.11 =

38 ÷ .02 =          convert 3/11 into decimals.          convert .32 into a simplified fraction

convert 7/5 into decimals.          .005 x .005 =          convert 11.43 into a mixed fraction

IV. Absolute Value

$|-7| =$          $|3 - 8| =$          $|4 + 11| + |4 - 11| =$

$16 + |-5| =$          $3|4 - 7| =$          $4|11 - 7| + 3|6 - 9| =$

$|y| = 14$          $|x + 5| = 10$          $|z - 11| = 17$

## V. Variables and "like terms"

$5a^2 + 3a^2 =$

$3b + 11b =$

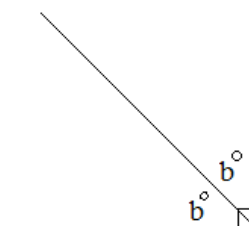$2x + 4y - (x + 3y) =$
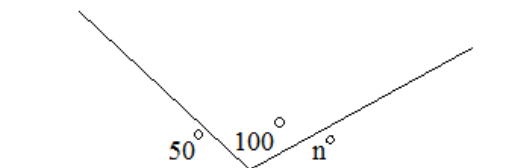
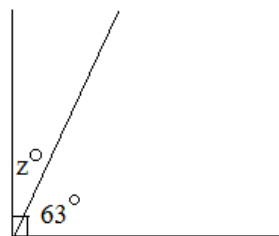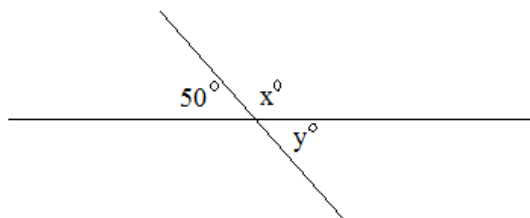$\dfrac{3x^2}{x^5} =$

$\dfrac{9s^4}{3s} =$

$5cd + 2c + 3cd + 4c =$

$4x^2 + 5x^3 + 3x^2 =$

$b^4 \times b^2 =$

$\left(x^2\right)^3 =$

## VI. Supplementary, Complementary, and Vertical Angles

VII. Linear Equations

Which point is <u>not</u> on the line $2x + 4y = 12$ ?

    a) $(4, 1)$
    b) $(-2, 4)$
    c) $(0, 3)$
    d) $(6, 0)$
    e) $(3, 1)$

Which equation represents the graph?

a)   $y = 3x + 2$

b)   $y = 2x + 3$

c)   $2x + y = 3$

d)   $2x - y = 3$
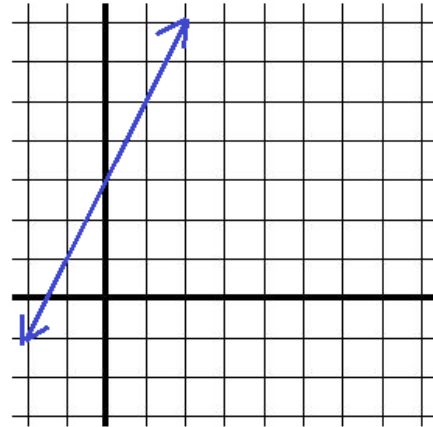


a)   $y = -2x + 4$

b)   $2x + 4y = 4$

c)   $y = \frac{1}{2}x + 4$

d)   $x + 2y = 8$



For the line $y = 3x + 5$,

         $(2, ?\,)$

         $(-1, ?)$

     y-intercept?

     x-intercept?

VIII. Comparison Exercise

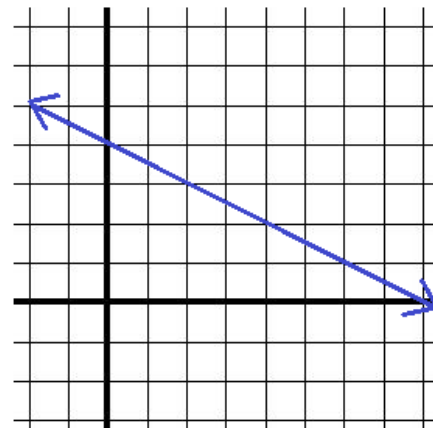Write each group of numbers *from largest to smallest.*

Group 1:

$3.7 \qquad 3\frac{3}{4} \qquad \frac{26}{8} \qquad \frac{9}{2} \qquad 3.07$

Group 2:

$-.55 \qquad -\frac{4}{11} \qquad -.5\overline{5} \qquad -.5 \qquad -\frac{6}{9}$

Group 3:

$6\frac{2}{3} \qquad 6\frac{11}{15} \qquad \frac{19}{3} \qquad \frac{37}{6} \qquad 6.6$

Group 4:

$8.08 \qquad 8.8 \qquad 8.008 \qquad 8.808 \qquad 8.0\overline{8}$

Group 5:

$.64 \qquad \frac{2}{3} \qquad \frac{5}{8} \qquad \frac{7}{13} \qquad .641$

Group 6:  Arrange the portions from *largest to smallest.*

$4\% \qquad .8\% \qquad \frac{1}{10} \qquad \frac{2}{16} \qquad .07$

Bonus:  If these portions were added together, what is the total amount?

IX. Finding factors

Circle the factors of each number:

*Example:* 20

(1) (2) 3 (4) (5) 6  8  12  15  19 (20)

a) 21

    1  2  3  4  5  6  7  8  9  10

b) 12

    1  2  3  4  5  6  7  8  9  10  11  12

c) 90

    1  2  3  4  5  6  7  8  9  10  11  12  15  16  17  18  20  25  30  35  40  45

d) 52

    2  3  4  5  6  7  8  10  12  13  15  20  21  24  26  30

e) 210

    2  3  4  5  6  7  8  9  10  11  12  14  15  20  21  24  27  29  30  40  50  60  70

f) 100

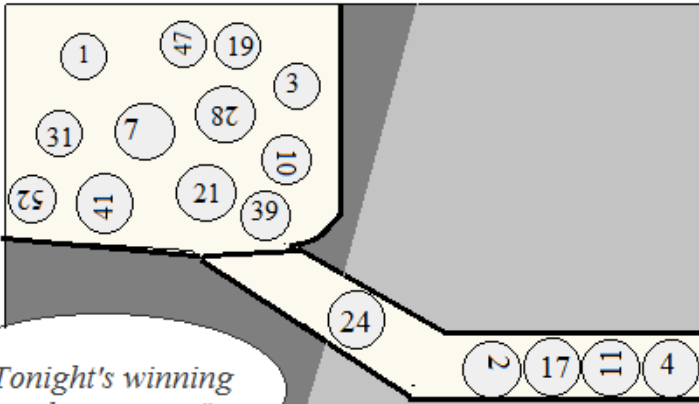    1  2  3  4  5  7  10  12  14  15  20  21  23  27  30  33  40  50  60  65

g) 37

    1  2  3  4  7  10  13  16  18  19  25  28  32  37

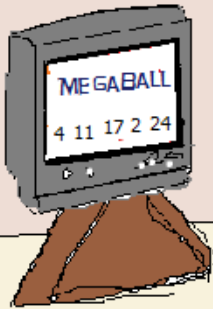h) 60

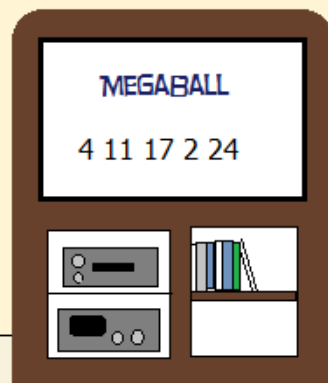    2  4  6  8  10  12  14  20  23  26  30  40  45  50  60

SOLUTIONS

## I. Proportions

$\dfrac{x}{5} = \dfrac{3}{15}$

"comparison"
15 'divided by 3' is 5
then,
3 'divided by 3' is 1

$x = 1$

$\dfrac{21}{x} = \dfrac{7}{11}$

"comparison"
7 to 21: multiply by 3
therefore,
11 to x: multiply by 3

$x = 33$

$\dfrac{6}{9} = \dfrac{x}{12}$

"cross multiply"
$9x = (6)(12)$
$9x = 72$

$x = 8$

$\dfrac{5}{8} = \dfrac{9}{x}$

cross multiply
$(5)(x) = (9)(8)$
$5x = 72$

$x = 72/5 \quad$ or $\quad 14.4$

$\dfrac{3}{90} = \dfrac{2}{x}$

reduce $\dfrac{1}{30} = \dfrac{2}{x}$

$x = 60$

$\dfrac{x}{48} = \dfrac{17}{34}$

reduce: $\dfrac{17}{34} = \dfrac{1}{2}$

$\dfrac{x}{48} = \dfrac{1}{2}$

comparison: 2 to 48: multiply by 24

then, 1 to x: multiply by 24

$x = 24$

$\dfrac{2}{5} = \dfrac{x}{55}$

comparison:
5 to 55 (multiply by 11)
then,
2 to x (multiply by 11)

$x = 22$

$\dfrac{8}{x} = \dfrac{24}{9}$

reduce: $\dfrac{24}{9} = \dfrac{8}{3}$

$x = 3$

## II. Fractions

$\dfrac{1}{3} + \dfrac{8}{16} =$

reduce fraction $\dfrac{1}{3} + \dfrac{1}{2} =$

find common denominator $\dfrac{2}{6} + \dfrac{3}{6} =$

solve $\dfrac{5}{6}$

$\dfrac{7}{6} - \dfrac{5}{18} =$

find common denominator $\dfrac{21}{18} - \dfrac{5}{18} =$

solve $\dfrac{16}{18}$

simplify $\dfrac{8}{9}$

$\dfrac{2}{7} \text{ x } \dfrac{1}{5} =$

"multiply across" $\dfrac{2 \text{ x } 1}{7 \text{ x } 5} =$

$\dfrac{2}{35}$

$\dfrac{3}{8} - \dfrac{2}{5} =$

find common denominator $\dfrac{15}{40} - \dfrac{16}{40}$

solve $\dfrac{-1}{40}$

$\dfrac{120}{130} \text{ x } \dfrac{26}{52} =$

reduce first!
then multiply across

$\dfrac{\overset{6}{\cancel{12}}}{13} \text{ x } \dfrac{1}{\underset{1}{\cancel{2}}} =$

$\dfrac{6}{13} \text{ x } \dfrac{1}{1} = \dfrac{6}{13}$

$\dfrac{-11}{13} + \dfrac{40}{39} =$

$\dfrac{-33}{39} + \dfrac{40}{39} = \dfrac{7}{39}$

$3\dfrac{1}{2} \text{ x } 2\dfrac{5}{6} =$

change to improper fractions
then, solve

$\dfrac{7}{2} \text{ x } \dfrac{17}{6} = \dfrac{119}{12}$

$9\dfrac{11}{12}$

$3\dfrac{5}{7} \div 1\dfrac{2}{3} =$

change to improper fractions

$\dfrac{26}{7} \div \dfrac{5}{3} =$

"invert and multiply"

$\dfrac{26}{7} \text{ x } \dfrac{3}{5} = \dfrac{78}{35}$

$\dfrac{7}{24} \text{ x } \dfrac{12}{35} =$

"reduce diagonally" first!

$\dfrac{\overset{1}{\cancel{7}}}{\underset{2}{\cancel{24}}} \text{ x } \dfrac{\overset{1}{\cancel{12}}}{\underset{5}{\cancel{35}}}$

then, multiply across:

$\dfrac{1}{2} \text{ x } \dfrac{1}{5} = \dfrac{1}{10}$

3 x .456 =

multiply
$$\begin{array}{r} \overset{11}{456} \\ \times\ \ 3 \\ \hline 1368 \end{array}$$

count decimals -- 3

1.368

.002 x .214 =

multiply
$$\begin{array}{r} 214 \\ \times\ \ 2 \\ \hline 428 \end{array}$$

count decimals -- 3 + 3 = 6

.000428

3.45 x 23.11 =

multiply
$$\begin{array}{r} 2311 \\ \times\ \ 345 \\ \hline 11555 \\ 92440 \\ +\ 693300 \\ \hline 797295 \end{array}$$

count decimals:
2 places each
4

79.7295

1.11 x 11.11 =

multiply
$$\begin{array}{r} 1111 \\ \times\ \ 111 \\ \hline 1111 \\ 1111 \\ 11110 \\ +\ 111100 \\ \hline 123321 \end{array}$$

(4 decimal places)

12.3321

---

38 ÷ .02 =

move decimal 2 places in BOTH terms:

3800 ÷ 2 = 1900

convert 3/11 into decimals.

$$\begin{array}{r} .272 \\ 11\overline{)3.0000} \\ -\ 2.2 \\ \hline .80 \\ -.77 \\ \hline .030 \\ .022 \\ \hline .0080 \end{array}$$

repeating

.2727 ...

.27$\overline{27}$

convert .32 into a simplified fraction

.32 = x

(100) · (.32) = (100)x

32 = 100x

$x = \dfrac{32}{100} = \dfrac{8}{25}$

---

convert 7/5 into decimals.

$7/5 = 1\dfrac{2}{5}$

1.40

.005 x .005 =

5 x 5 = 25

(3 decimal places in each term)

.000025

convert 11.43 into a mixed fraction

$11.43 = 11\dfrac{43}{100}$

$11\dfrac{43}{100}$

---

IV. Absolute Value

|-7| = 7

|3 − 8| = |-5| =

5

|4 + 11| + |4 − 11| = |15| + |-7| =

15 + 7 = 22

---

16 + |-5| =

16 + 5 = 21

3|4 − 7| =

3 x |-3| =

3 x 3 = 9

4|11 − 7| + 3|6 − 9| = 4 x |4| + 3 x |-3| =

4 x 4 + 3 x 3 =

16 + 9 = 25

---

| y | = 14

since it's an absolute value, y can be either 14 or -14

y = -14, 14

| x + 5 | = 10

(x + 5) can equal 10 OR -10

x + 5 = 10

x + 5 = -10

x = 5, -15

| z − 11 | = 17

(z - 11) can equal 17 OR -17

z - 11 = 17

z - 11 = -17

z = 28, -6

## V. Variables and "like terms"

$5a^2 + 3a^2 =$

five "$a^2$" and three "$a^2$"

add up to    $8a^2$

$3b + 11b =$

three "b's" and eleven "b's"
add up to

$14b$

$2x + 4y - (x + 3y) =$

$2x - x = 1x$

$4y - 3y = 1y$    $x + y$

$$\frac{3x^2}{x^5} = \frac{3 \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{x}}}{\underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{x}} \cdot x \cdot x \cdot x}$$

$$\frac{3}{x^3}$$

$$\frac{9s^4}{3s} = \frac{\overset{3}{\cancel{9}} \cdot \overset{1}{\cancel{s}} \cdot s \cdot s \cdot s}{\underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{s}}}$$

$$3s^3$$

$5cd + 2c + 3cd + 4c =$

combine "like terms"

five "cd" and three "cd"

equals eight "cd"

two "c" and four "c" equals six "c"

$8cd + 6c$

$4x^2 + 5x^3 + 3x^2 =$

collect "like terms"

four $x^2$
five $x^3$   $\Big)$   $7x^2 + 5x^3$
three $x^2$

$b^4 \times b^2 =$

multiplying 4 b's
and, multiplying 2 b's..

Total multiplying 6 b's

$b^6$

$(x^2)^3 =$

$(x^2)(x^2)(x^2)$

$x \cdot x \cdot x \cdot x \cdot x \cdot x = x^6$

## VI. Supplementary, Complementary, and Vertical Angles

$x + 50 = 180$ (supplementary angles)
$x = 130$

$50^\circ$  $x^\circ$
$y^\circ$
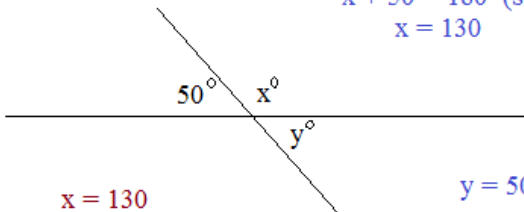
$x = 130$
$y = 50$

$y = 50$ (vertical angles)

or, $x + y = 180$
$130 + y = 180$
$y = 50$
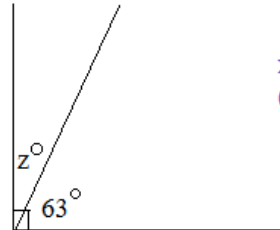
$x + 63 = 90$
(complementary angles)

$x = 27$

$z^\circ$
$63^\circ$
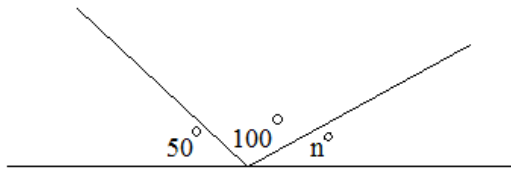
$50^\circ$  $100^\circ$  $n^\circ$

$50 + 100 + n = 180$    $n = 30$
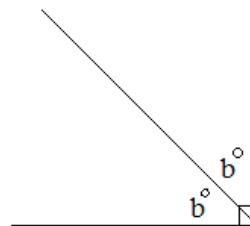
right angle is bisected
(2 congruent angles)

$b + b = 90$

$b^\circ$
$b^\circ$    $b = 45$

VII. Linear Equations              SOLUTIONS            If a point is on a line, then it fits in the equation!

Which point is <u>not</u> on the line $2x + 4y = 12$ ?     a) (4, 1)     $2(4) + 4(1) = 12$   yes
                                                          b) (-2, 4)    $2(-2) + 4(4) = 12$  yes
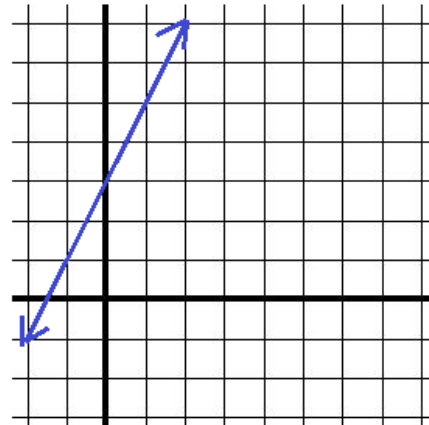                                                          c) (0, 3)     $2(0) + 4(3) = 12$   yes          (3, 1) is NOT
                                                          d) (6, 0)     $2(6) + 4(0) = 12$   yes          on the line
                                                          e) (3, 1)     $2(3) + 4(1) \neq 12$  no

Which equation represents the graph?

one method is          a)  $y = 3x + 2$
to plug in points --
Since (0, 3)           b)  $y = 2x + 3$        y-intercept is (0, 3)
is on the line, it                             and
eliminates  a) and d)  c)  $2x + y = 3$        slope is 2

Then, (1, 5) is on     d)  $2x - y = 3$
the line and it
eliminates  c)

b)  $y = 2x + 3$
includes (0, 3) and (1, 5)
and other points on the line



slope is -1/2          a)  $y = -2x + 4$
eliminates a) and c)                           y-intercept is (0, 4)
then, testing (0, 4),  b)  $2x + 4y = 4$       and
you find that the point                        slope is -1/2
is not on line b)      c)  $y = \frac{1}{2}x + 4$
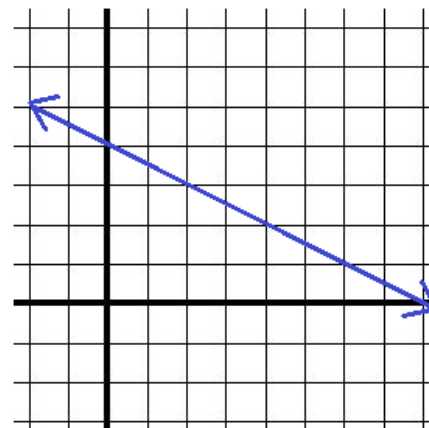
d)  $x + 2y = 8$       d)  $x + 2y = 8$
contains all points
on the line in the graph



For the line  $y = 3x + 5$,

(2, ? )          $y = 3(2) + 5$   $y = 11$          (2, 11)

(-1, ?)          $y = 3(-1) + 5$   $y = 2$          (-1, 2)

y-intercept?     y-intercept is where line crosses     (0, 5)
                 the y-axis... i.e. where $x = 0$

x-intercept?     x-intercept is where line crosses     (-5/3, 0)
                 the x-axis... i.e. where $y = 0$

VIII. Comparison Exercise

Write each group of numbers *from largest to smallest*.

try to rewrite in common terms...

Group 1:

$3.7$  $3\frac{3}{4}$  $\frac{26}{8}$  $\frac{9}{2}$  $3.07$

3rd   2nd   4th   largest 1st   smallest 5th

$3\frac{3}{4} = \frac{15}{4} = \frac{30}{8}$  or 3.75

$\frac{26}{8}$  or 3.25

$\frac{9}{2} = \frac{36}{8}$  or 4.5

Group 2:

$-.55$  $\frac{-4}{11}$  $-.5\overline{5}$  $-.5$  $-\frac{6}{9}$

3rd   largest 1st   4th   2nd   smallest 5th

(remember: 'smallest negative' is largest number!)

compare each term....

$-.55555 < -.55000 < -.50000$

$-.\overline{5}$     $-.55$     $-.5$

then, $-4/11 > -.5$   and, $-6/9$ is $-.667$

Group 3:

$6\frac{2}{3}$  $6\frac{11}{15}$  $\frac{19}{3}$  $\frac{37}{6}$  $6.6$

2nd   largest 1st   4th   smallest 5th  3rd

try changing to 'similar' formats:

$6\frac{2}{3}$  $6\frac{11}{15}$  $6\frac{1}{3}$  $6\frac{1}{6}$  $6\frac{6}{10}$

or  6.66  6.733  6.33  6.1667  6.6

Group 4:

$8.08$  $8.8$  $8.008$  $8.808$  $8.0\overline{8}$

4th   2nd   smallest 5th   largest 1st   3rd

extend the places:

8.08000  8.80000  8.008000  8.808000  8.08888

Group 5:

$.64$  $\frac{2}{3}$  $\frac{5}{8}$  $\frac{7}{13}$  $.641$

3rd   1st   4th   5th smallest   2nd

.64   .667   .625   .538   .641

Group 6:  Arrange the portions from *largest to smallest*.

$4\%$  $.8\%$  $\frac{1}{10}$  $\frac{2}{16}$  $.07$

4th   smallest   2nd   1st   3rd

.04   .008   .10   .125   .07

Bonus:  If these portions were added together, what is the total amount?

.343   or  34.3%

mathplane.com

IX.  Finding factors                                        <span style="color:red">Answers</span>

Circle the factors of each number:

*Example:*  20

(1)(2)  3  (4)(5)  6    8    12    15    19   (20)

a)  21

(1)  2  (3)  4  5  6  (7)  8  9  10

$$1 \qquad\qquad 21$$
$$3 \qquad 7$$

b)  12

(1)(2)(3)(4)  5  (6)  7  8  9  10  11  (12)

1 and the number itself are always factors
2 is factor of all even numbers

c)  90

(1)(2)(3)  4  (5)(6)  7  8  (9)(10)  11  12  (15)  16  17  (18)  20  25  (30)  35  40  (45)

d)  52

(2)  3  (4)  5  6  7  8  10  12  (13)  15  20  21  24  (26)  30

e)  210

(2)(3)  4  (5)(6)(7)  8  9  (10)  11  12  (14)(15)  20  (21)  24  27  29  (30)  40  50  60  (70)

5 and 10 are factors of anything ending in 0

f)  100

(1)(2)  3  (4)(5)  7  (10)  12  14  15  (20)  21  23  27  30  33  40  (50)  60  65

g)  37

(1)  2  3  4  7  10  13  16  18  19  25  28  32  (37)

prime numbers only have 2 factors (1 and itself)

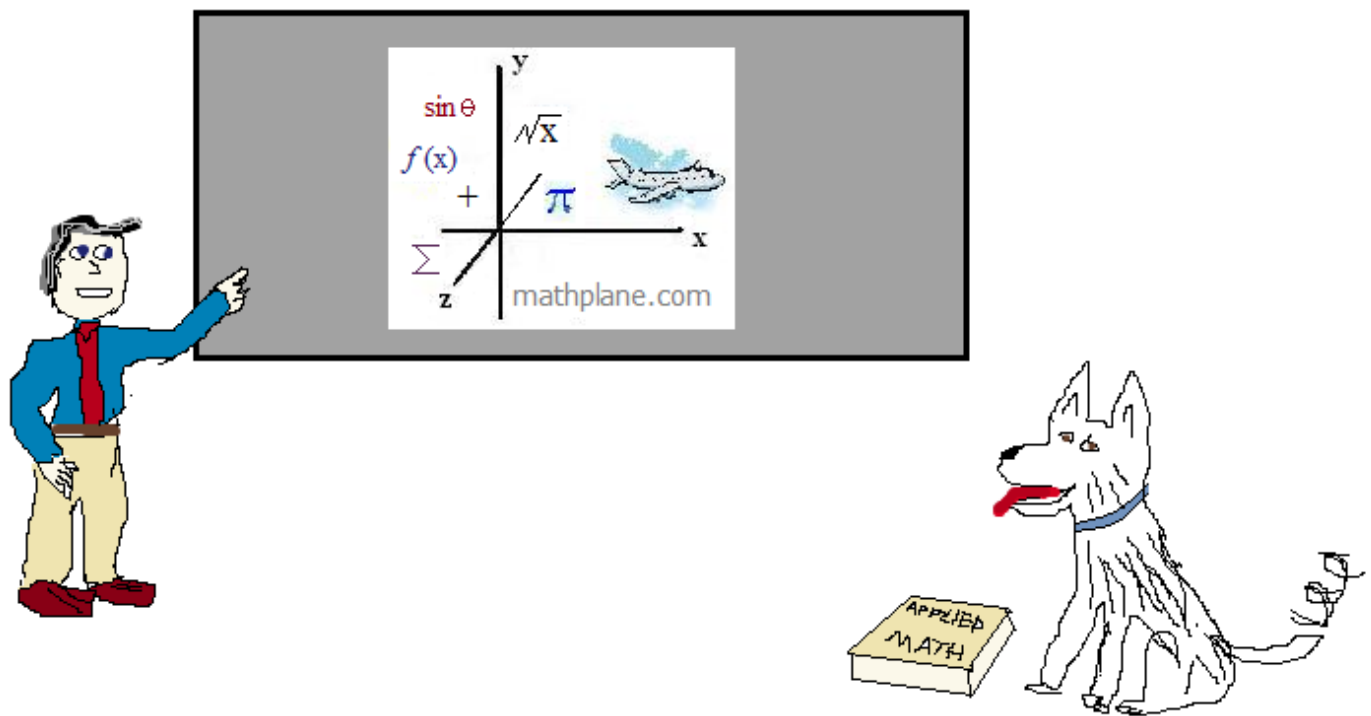h)  60

(2)(4)(6)  8  (10)(12)  14  (20)  23  26  (30)  40  45  50  (60)

the others are 1, 3, 5, 15

Thanks for visiting. (Hope it helps!)

If you have questions, suggestions, or requests, contact us.

Enjoy

Also, at Facebook, Google+, TeachersPayTeachers, and Pinterest…