Five Algebra Questions

(and, the answers...)

Topics include distributive property, square roots, absolute value, exponents, fractions, and more.
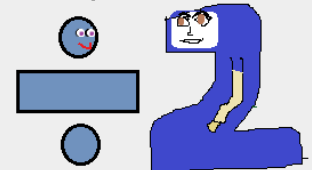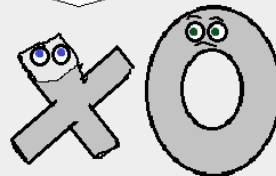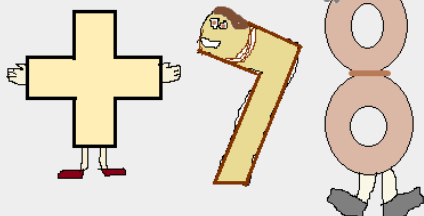
Five Algebra Questions I

1) $3.06 + t = 8.7$ Find t:

2) $\dfrac{-x}{4} = 16$ Find x:

3) $4(x + 2) + 3 = 11$ Find x:

4) $2(x + 5) - 3(y + 6)$ Simplify:

5) $2(w + 7) = 5w - 7$ Find w:

Five Algebra Questions II

1) $\dfrac{1}{8} + x = \dfrac{1}{16}$ Find x:

2) $-3(x + 5) - 2(x - 5)$ Simplify:

3) $\dfrac{3}{5} + \dfrac{w}{10} = \dfrac{7}{20}$ Find w:

4) $.4(y + .3) = y + .6$ Find y:

5) $8(x + 7) + 11 = -13$ Find x:

Five Algebra Questions III

1) $4(x + 9) + 8(3 - x)$ Simplify:

2) $\dfrac{w}{.3} + .7 = .9$ Find w:

3) $\dfrac{3}{8} - x = -\dfrac{1}{4}$ Find x:

4) $11(d + 2) = 6d - 3$ Find d:

5) $-(y + 8) + 1 = 15$ Find y:

1) If the perimeter of the pentagon is 254, then x =

80   50

X

40

2x

2) Angles A and B are supplementary (add up to 180 degrees)

Find y:

A

$130°$ $\frac{y}{3}°$ B
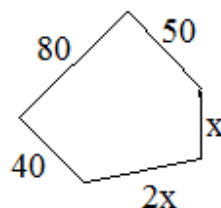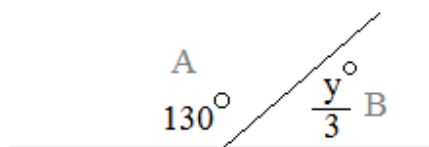
3) $.345 + v = .21$ Find v:

4) $7(m + 6) - (9m + 12) = 8$ Find m:

F

5) $\angle FGL \cong \angle HGL$

(the angle measures are equal)

Find z:

$2z + 13$ L

$\frac{1}{4}z$

G   H
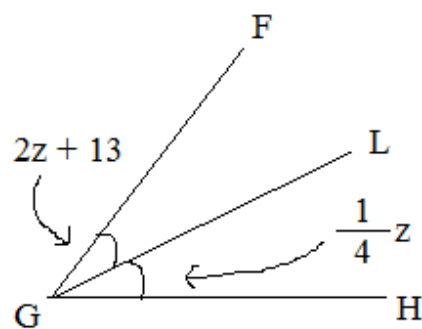
Five Algebra Questions V

1) $3x^2 + 4 = 31$

2) $|2x + 1| - 5 = 12$

3) $2 + \sqrt{x + 1} = 11$

4) $3(x - 5) + 4 = 2x + 7$

5) $\sqrt{2x + 1} + 5 = 3$

Five Algebra Questions VI

1) $\dfrac{2x^2}{3} = \dfrac{8}{3}$

2) $4\sqrt{3x-1} = 16$

3) $2(x-3)+6 = x+12$

4) $-2+|5x+3| = 10$

5) $7+\dfrac{|x+5|}{2} = 5$

1) $2|x + 5| = 10$

2) $\dfrac{3}{4}\sqrt{x + 3} = 6$

3) $3 + 3x^2 = 12$

4) $-|x - 5| = 5 - 11$

5) $\sqrt{2x - 5} = 11$

1) $4(x - 3) = 2 + 3(x + 5)$

2) $3x^2 + 8 = 14$

3) $4 + |x - 3| = 17$

4) $\sqrt[N]{x + 3} - 6 = -4$

5) $|x + 5| + 6 = 5$

Five Algebra Questions IX

1) $4 + \dfrac{x^2}{6} = 7$

2) $\dfrac{|2x + 1|}{4} = 3$

3) $\dfrac{\sqrt{x + 5}}{3} = 2(5 - 2)$

4) $3x^2 = \dfrac{4}{3}$

5) $14 - |x - 5| = 2$

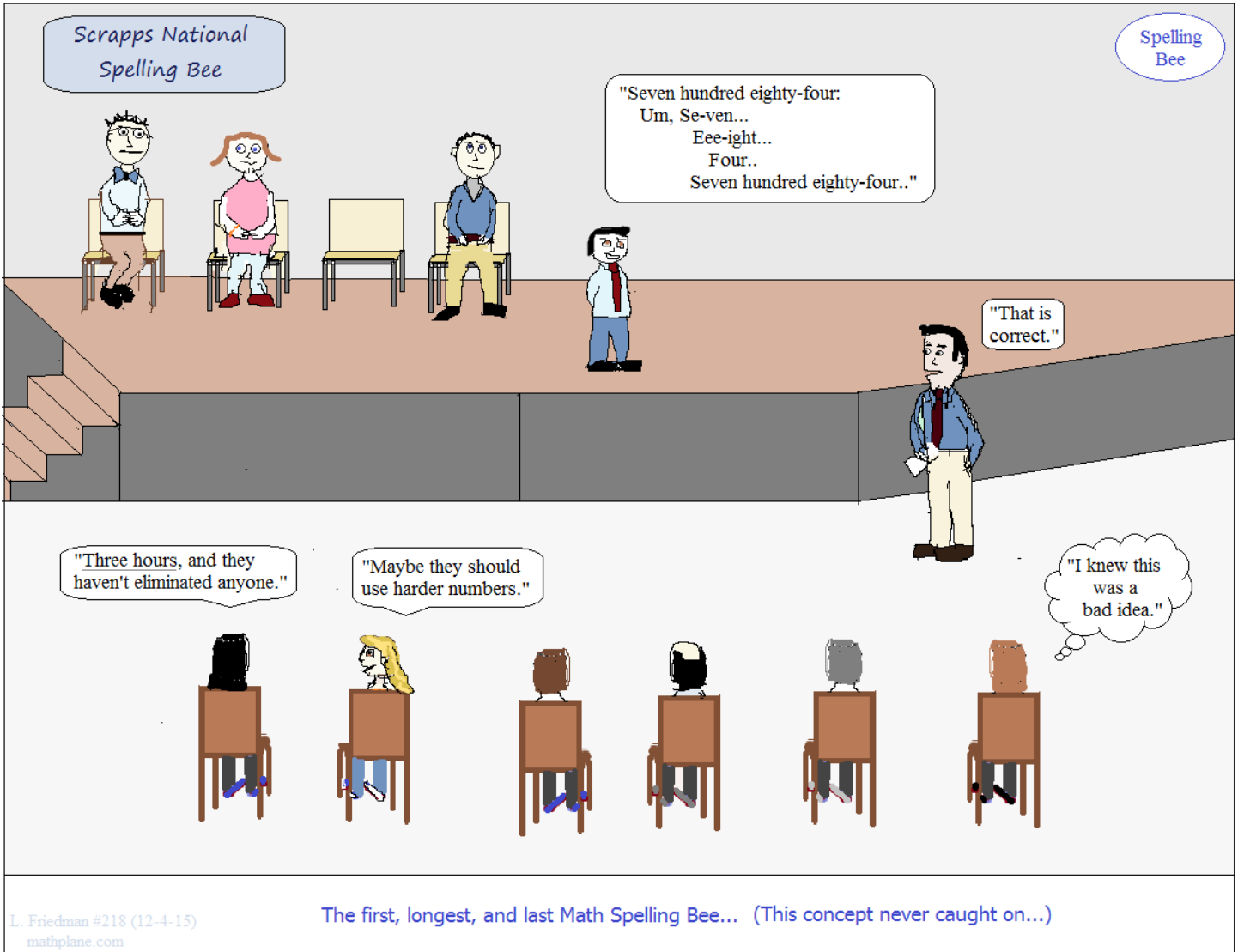The first, longest, and last Math Spelling Bee... (This concept never caught on...)

The Answers-→

ANSWERS

1) $3.06 + t = 8.7$ Find t:

$$3.06 + t = 8.70$$
$$\underline{-3.06 \qquad\quad -3.06}$$
$$0 + t = \boxed{5.64}$$

2) $\dfrac{-x}{4} = 16$ Find x:

$$(-4) \cdot \dfrac{-1}{4} x = 16 \cdot (-4)$$
$$x = \boxed{-64}$$

3) $4(x + 2) + 3 = 11$ Find x:

$$4(x + 2) + 3 = 11$$
$$\underline{\qquad\quad -3 \qquad -3}$$
$$4(x + 2) = 8$$

divide each side by 4:
$$(x + 2) = 2$$
then, $x = \boxed{0}$

4) $2(x + 5) - 3(y + 6)$ Simplify:

(distribute): $2x + 10 - 3y - 18$

(collect 'like' terms): $\boxed{2x - 3y - 8}$

5) $2(w + 7) = 5w - 7$ Find w:

(distribute): $2w + 14 = 5w - 7$
$$ -2w \qquad\quad -2w$$

(collect 'like' terms): $14 = 3w - 7$
$$\underline{\qquad +7 \qquad\quad +7}$$
$$21 = 3w$$

$w = \boxed{7}$

(Note: to check your work
plug your answer into the
original equation!)

Five Algebra Questions II

ANSWERS

1) $\dfrac{1}{8} + x = \dfrac{1}{16}$ Find x:

$\dfrac{2}{16} + x = \dfrac{1}{16}$

$\dfrac{-2}{16} \qquad \dfrac{-2}{16}$

$x = \boxed{\dfrac{-1}{16}}$

2) $-3(x + 5) - 2(x - 5)$ Simplify:

-3x - 15 - 2x -(-10)

-5x - 15 + 10 $\boxed{-5x - 5}$

3) $\dfrac{3}{5} + \dfrac{w}{10} = \dfrac{7}{20}$ Find w:

$\dfrac{12}{20} + \dfrac{w}{10} = \dfrac{7}{20}$

$(10)\,\dfrac{w}{10} = \dfrac{-5}{20}\,(10)$ $w = \boxed{\dfrac{-5}{2}}$

4) $.4(y + .3) = y + .6$ Find y:

.4y + .12 = y + .6

-.4y   -.4y

.12 = .6y + .6 $y = \boxed{-.8}$

-.6   -.6

-.48 = .6y

5) $8(x + 7) + 11 = -13$ Find x:

8(x + 7) = -24

(x + 7) = -3

$x = \boxed{-10}$

| Five Algebra Questions III | ANSWERS | mathplane.com |

1) $4(x + 9) + 8(3 - x)$ Simplify: (distribute): $4x + 36 + 24 - 8x$

(collect 'like' terms): $\boxed{-4x + 60}$

2) $\dfrac{w}{.3} + .7 = .9$ Find w:

$\dfrac{w}{.3} = .2$ $\boxed{w = .06}$

$\quad\; -.7 \quad -.7$

multiply by .3

3) $\dfrac{3}{8} - x = \dfrac{-1}{4}$ Find x:

$-x = \dfrac{-5}{8}$ $\boxed{x = \dfrac{5}{8}}$

$\dfrac{-3}{8} \qquad\quad \dfrac{-3}{8}$

(divide/multiply by -1)

4) $11(d + 2) = 6d - 3$ Find d: (distribute left side):

$$11d + 22 = 6d - 3$$
$$\underline{-6d \qquad\quad -6d}$$
$$5d + 22 = -3$$ $\boxed{d = -5}$
$$\underline{\quad -22 \quad -22}$$
$$5d = -25$$

5) $-(y + 8) + 1 = 15$ Find y:

(Note: to check an answer, just substitute into the original equation!)

$-y - 8 + 1 = 15$

$-y \; - 7 = 15$ $\boxed{y = -22}$

$\underline{\quad +7 \qquad +7}$

$-y = 22$

ANSWERS

1) If the perimeter of the pentagon is 254, then x =

$x = 28$

$40 + 80 + 50 + x + 2x = 254$ perimeter
$170 + 3x = 254$ collect 'like' terms
$3x = 84$ divide by 3
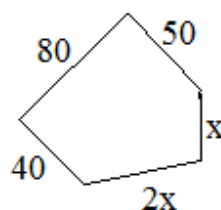
2) Angles A and B are supplementary (add up to 180 degrees)

Find y:

$130 + \frac{1}{3}y = 180$

$y = 150$

$\frac{1}{3}y = 50$
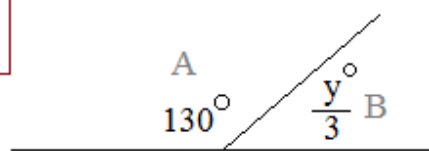
3) $.345 + v = .21$ Find v:

$v = .21 - .345$

$v = .210 - .345$

$v = -.135$

4) $7(m + 6) - (9m + 12) = 8$ Find m:

$7m + 42 - (9m + 12) = 8$

$7m + 42 - 9m - 12 = 8$

$-2m + 30 = 8$

$-2m = -22$

$m = 11$

5) $\angle FGL \cong \angle HGL$

(the angle measures are equal)

Find z: $2z + 13 = \frac{1}{4}z$

$z = \frac{-52}{7}$

$\frac{4}{7} \cdot \frac{7}{4}z = -13 \cdot \frac{4}{7}$

| Five Algebra Questions V | ANSWERS |

1) $3x^2 + 4 = 31$ Isolate the x^2 $3x^2 = 27$

$$x^2 = 9$$

$\boxed{x = 3, -3}$

$$\sqrt{x^2} = \sqrt{9}$$

"The *square root of a square* has a plus or minus solution"

2) $|2x + 1| - 5 = 12$ Isolate the absolute value
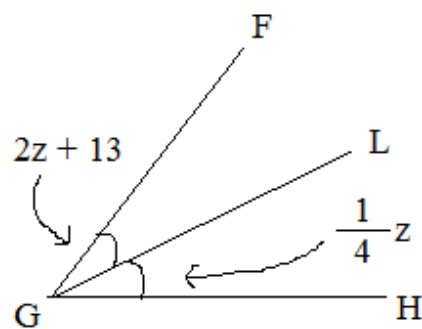
$$|2x + 1| = 17$$

$\boxed{x = 8, -9}$

Split the absolute value

$$2x + 1 = 17 \quad OR \quad 2x + 1 = -17$$

3) $2 + \sqrt{x + 1} = 11$

Isolate the radical

$$\sqrt{x + 1} = 9$$

$\boxed{x = 80}$

square both sides

$$x + 1 = 81$$

to check answers, just plug into original equation

$$2 + \sqrt{(80) + 1} = 11$$
$$2 + 9 = 11$$
$$11 = 11 \checkmark$$

4) $3(x - 5) + 4 = 2x + 7$

distribute

$$3x - 15 + 4 = 2x + 7$$

collect terms

$$3x - 11 = 2x + 7$$

$\boxed{x = 18}$

$$x = 18$$ solve

5) $\sqrt{2x + 1} + 5 = 3$

$$\sqrt{2x + 1} = -2$$ isolate radical

$$\sqrt{2(3/2) + 1} + 5 = 3$$

$$2x + 1 = 4$$ square both sides

$$\sqrt{4} + 5 = 3$$

$\boxed{\text{NO SOLUTION}}$

$$x = 3/2$$ check answer

$$7 \neq 3$$

Five Algebra Questions VI   ANSWERS

1) $\dfrac{2x^2}{3} = \dfrac{8}{3}$ multiply both sides by 3   square root both sides

$$2x^2 = 8$$

divide by 2 $\sqrt{x^2} = \sqrt{4}$

$$x^2 = 4$$

Square root of a square has a plus or minus solution

$\boxed{x = 2, \text{-}2}$

2) $4\sqrt{3x - 1} = 16$

divide by 4 $\sqrt{3x - 1} = 4$

square both sides $3x - 1 = 16$

$\boxed{x = \dfrac{17}{3}}$

3) $2(x - 3) + 6 = x + 12$

distribute (to remove parentheses) $2x - 6 + 6 = x + 12$

collect terms $2x = x + 12$

$\boxed{x = 12}$

4) $-2 + |5x + 3| = 10$

isolate absolute value term $|5x + 3| = 12$

split into $+$ and $-$ $5x + 3 = 12$ $5x + 3 = -12$

(to check, put answers into original equation)

$\boxed{x = \dfrac{9}{5} \text{ or -3}}$

5) $7 + \dfrac{|x + 5|}{2} = 5$

Isolate the absolute value terms $\dfrac{|x + 5|}{2} = -2$

$|x + 5| = -4$

since absolute value must be positive, there is $\boxed{\text{NO SOLUTION}}$

If you split into $+$ and $-$

$$x + 5 = -4 \qquad x + 5 = 4$$

$$x = -1 \text{ or } -9$$

But, when you check your answers...

$$7 + \dfrac{|(\text{-}1) + 5|}{2} \neq 5 \qquad 7 + \dfrac{|(\text{-}9) + 5|}{2} \neq 5$$

Five Algebra Questions VII   SOLUTIONS

1) $2|x + 5| = 10$ Isolate the absolute value term

$|x + 5| = 5$ then, split the term + and − $\boxed{x = 0, -10}$

$x + 5 = +5 \quad x + 5 = -5$

2) $\dfrac{3}{4}\sqrt{x + 3} = 6$

Isolate the radical

$\sqrt{x + 3} = \dfrac{4}{3}(6)$ then, square both sides $\boxed{x = 61}$

$\sqrt{x + 3} = 8$ $x + 3 = 64$

3) $3 + 3x^2 = 12$

$3x^2 = 9$ *square root of a square has*

$x^2 = 3$ *a positive and negative answer*

$\boxed{x = \sqrt{3} \text{ or } -\sqrt{3}}$

4) $-|x - 5| = 5 - 11$

$-1|x - 5| = -6$ $x - 5 = +6$ $\boxed{x = 11 \text{ or } -1}$

$|x - 5| = 6$ $x - 5 = -6$

5) $\sqrt{2x - 5} = 11$ square both sides

$2x - 5 = 121$

$2x = 126$

$\boxed{x = 63}$

SOLUTIONS

1) $4(x - 3) = 2 + 3(x + 5)$

   distribute to remove the $4x - 12 = 2 + 3x + 15$
   parentheses

   collect terms and solve $x = 29$

2) $3x^2 + 8 = 14$

   isolate the x term.. $3x^2 = 6$

                                   $x^2 = 2$

   then, square root both sides $x = +\sqrt{2}$ or $-\sqrt{2}$

To check: plug into original equation

$4(29 - 3) = 2 + 3(29 + 5)$

$104 = 2 + 102$

$104 = 104$ ✓

square root of a square
has a positive and negative

3) $4 + |x - 3| = 17$

   $|x - 3| = 13$

   $x - 3 = 13$ $x - 3 = -13$

   $x = 16$ or -10

4) $\sqrt{x + 3} - 6 = -4$

   Isolate the radical $\sqrt{x + 3} = 2$

   then, square both sides $x + 3 = 4$

   $x = 1$

5) $|x + 5| + 6 = 5$

   isolate the absolute value term

   $|x + 5| = -1$

   since an absolute value is always
   positive, there is   NO SOLUTION

NOTE: if you split and solve,

$x + 5 = -1$ $x + 5 = +1$

$x = -6$ $x = -4$

But, when you check these answers,
they don't work!

$|(-6) + 5| + 6 = 5$ $|(-4) + 5| + 6 = 5$

$1 + 6 \neq 5$ $1 + 6 \neq 5$

| Five Algebra Questions IX | SOLUTIONS |

1) $4 + \dfrac{x^2}{6} = 7$

isolate the square term... $\quad \dfrac{x^2}{6} = 3$

$\qquad\qquad$ then, square root...

$\qquad x^2 = 18$

$x = \sqrt{18}$ or $-\sqrt{18}$

$\boxed{3\sqrt{2} \text{ or } -3\sqrt{2}}$

2) $\dfrac{|\,2x+1\,|}{4} = 3$

$\qquad\qquad |\,2x+1\,| = 12$

split the absolute value

$\qquad 2x+1 = +12 \qquad 2x+1 = -12$

$\boxed{x = \dfrac{11}{2} \text{ or } \dfrac{-13}{2}}$

3) $\dfrac{\sqrt{x+5}}{3} = 2(5-2) \qquad \dfrac{\sqrt{x+5}}{3} = 6$

$\qquad\qquad\qquad \sqrt{x+5} = 18$

$x + 5 = 324 \qquad \boxed{x = 319}$

4) $3x^2 = \dfrac{4}{3} \qquad x^2 = \dfrac{4}{9}$

$\boxed{x = 2/3,\ -2/3}$

$x = +\sqrt{\dfrac{4}{9}}$ or $-\sqrt{\dfrac{4}{9}}$

5) $14 - |\,x-5\,| = 2$

$\qquad\qquad -|\,x-5\,| = -12$

$\qquad\qquad\qquad x - 5 = 12$

multiply by -1 $\quad |\,x-5\,| = 12$

$\boxed{x = -7,\ 17}$

$\qquad\qquad\qquad x - 5 = -12$
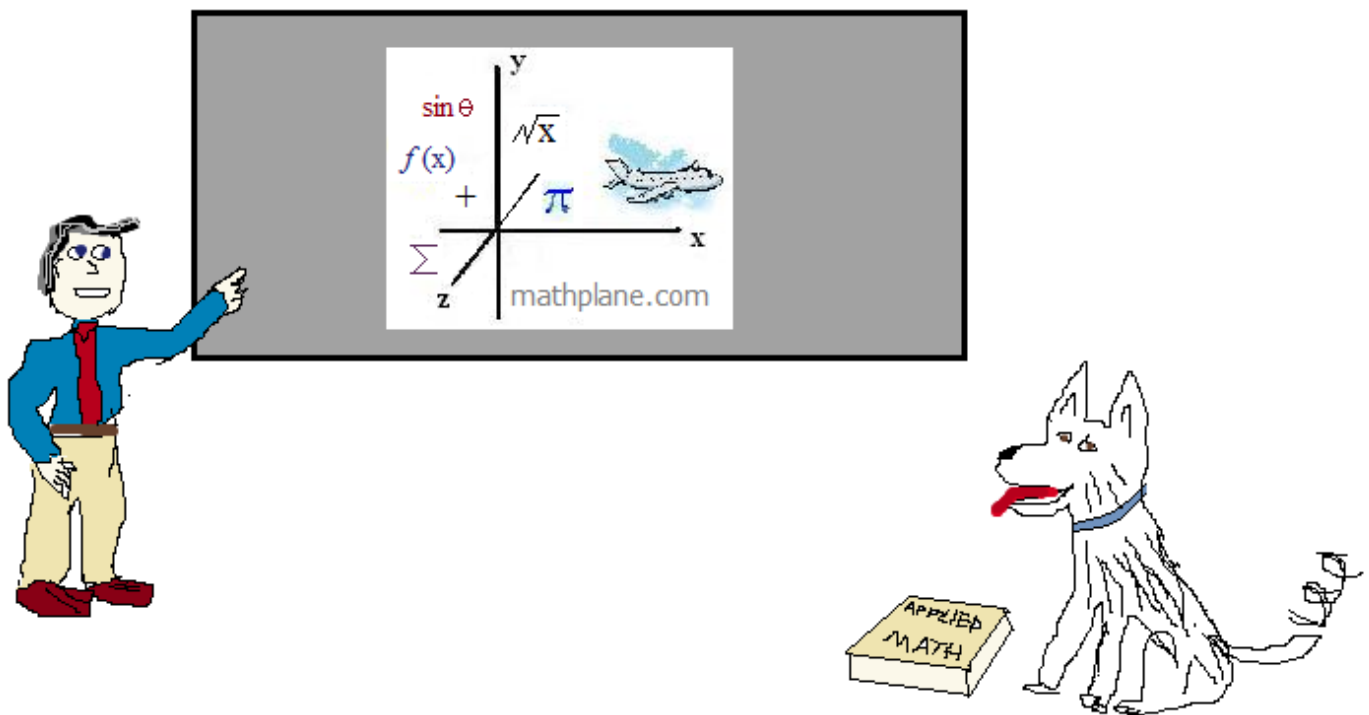
Thanks for visiting. (Hope it helped!)

If you have questions, suggestions, or requests, let us know.

Cheers

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