

Some Observations

Not Linear

Doubling an angles does NOT usually double the ratio. Compare $\sin 10^\circ$ with $\sin 20^\circ$, for example.

$$\text{generally, ...} \quad \sin(2x) \neq 2 \sin x$$

"sin" IS NOT a number

If x, y and z are real numbers, then certainly, $x(y + z) = xy + xz$ is true by the Distributive Law, but sin is not a real number, and the Distributive Law does not apply to it.

$$\text{generally, ...} \quad \sin(y + z) \neq \sin y + \sin z$$

"sin 23°" IS a number

By the very definition sin of some angle, θ , IS a ratio. Thus, its a real number, thus it follows all Real Number Axioms, such as DL, Associations Laws, Commutativity Laws, etc...

$$\text{generally, ...} \quad (y + z) \sin 23^\circ = y \sin 23^\circ + z \sin 23^\circ$$

Special Exponent Notation By convention, the following notation has been adopted for exponents.

$$[\sin x][\sin x] = [\sin x]^2 = \sin^2 x$$

Special Exponent Notation

By convention, the following notation has been adopted for exponents.

$$\sin x^2 = \sin (x^2) = \sin(x \cdot x)$$

Special Exponent Notation

By convention, the -1 exponent has been reserved for composition inverse, not multiplicative inverse of the functions. That is..

$$\frac{1}{\sin x} \neq \sin^{-1} x \quad \dots \text{ however,} \quad \frac{1}{\sin x} = [\sin x]^{-1}$$

sec, csc, or cot NOT on most Calculators

To calculate $\sec 23^\circ$ for example, you will most likely calculate $\cos 23^\circ$, then find the reciprocal. sec NOT on CALCULATOR, Do not confuse with \cos^{-1} button which IS on most scientific calculators.

Some Observations

1.

$$\frac{\cos 10^\circ}{\cos 30^\circ} = \frac{1}{3}$$

A. TRUE B. FALSE

2.

$$\frac{\tan 100^\circ}{\tan 50^\circ} = 2$$

A. TRUE B. FALSE

3.

$$\tan(100^\circ + 50^\circ) = \tan(100^\circ) + \tan(50^\circ)$$

A. TRUE B. FALSE

4. Generally,

$$\tan(xy) = \tan(x) \cdot \tan(y).$$

A. TRUE B. FALSE

5. Generally,

$$\tan(2y) = 2 \tan(y).$$

A. TRUE B. FALSE

6. Generally,

$$\sin(2y) = 2 \sin(y).$$

A. TRUE B. FALSE

7. Generally,

$$\cos(-5y) = -5 \cos(y).$$

A. TRUE B. FALSE

8. Generally,

$$\frac{\cos(10x)}{x} = \cos 10$$

A. TRUE B. FALSE

9. NOT LINEAR:

- (a) Calculate $\cos 10^\circ$
- (b) Calculate $\cos 20^\circ$
- (c) Does doubling an angle generally double the corresponding cosine ratio?
- (d) Does doubling an angle double the adjacent to hypotenuse ratio? Draw a for each of the ref. triangles.
- (e) Make your best guess (TRUE OR FALSE): generally...

$$\cos 2x = 2 \cos x$$

10. NOT LINEAR:

- (a) Calculate $\cos 20^\circ$
- (b) Calculate $\cos 60^\circ$
- (c) Does tripling an angle generally triple the corresponding cosine ratio?
- (d) Does tripling an angle generally triple the adjacent to hypotenuse ratio? Draw a for each of the ref. triangles.

- (e) Make your best guess (TRUE OR FALSE): generally...

$$\cos 3x = 3 \cos x$$

11. NOT LINEAR:

- (a) Calculate $\sin 30^\circ$
(b) Calculate $\sin 60^\circ$
(c) Does doubling an angle generally double the sine ratio?
(d) Does doubling an angle generally double the opp to hypotenuse ratio?
(e) Make your best guess (TRUE OR FALSE): generally...

$$\sin 2x = 2 \sin x$$

12. 'cos' is not a number :

- (a) Calculate $\cos 30^\circ$
(b) Calculate $\cos 15^\circ$
(c) Calculate $\cos 45^\circ$
(d) :

$$\cos 45^\circ = \cos(30^\circ + 15^\circ) = \cos 30^\circ + \cos 15^\circ$$

- (e) Make your best guess (TRUE OR FALSE): generally...

$$\cos(x + y) = \cos x + \cos y$$

13. 'sin' is not a number :

- (a) Calculate $\sin 100^\circ$
(b) Calculate $\sin 80^\circ$
(c) Calculate $\sin 180^\circ$
(d) (TRUE OR FALSE):

$$\sin 180^\circ = \sin(100^\circ + 80^\circ) = \sin 100^\circ + \sin 80^\circ$$

- (e) Make your best guess (TRUE OR FALSE): generally...

$$\sin(x + y) = \sin x + \sin y$$

14. 'sin' is not a number :

- (a) Calculate $\sin 180^\circ$
(b) Calculate $\sin 360^\circ$
(c) Calculate $\sin 540^\circ$
(d) (TRUE OR FALSE):

$$\sin 540^\circ = \sin(180^\circ + 360^\circ) = \sin 180^\circ + \sin 360^\circ$$

- (e) Make your best guess (TRUE OR FALSE): generally...

$$\sin(x + y) = \sin x + \sin y$$

15. 'sin' is not a number:

- (a) (TRUE OR FALSE explain your answer):

$$\frac{5c}{5w} = \frac{c}{w}$$

(b) (TRUE OR FALSE explain your answer):

$$\frac{5w}{3w} = \frac{5}{3}$$

(c) (TRUE OR FALSE explain your answer):

$$\frac{xyzc}{xyzw} = \frac{c}{w}$$

(d) (TRUE OR FALSE explain your answer):

$$\frac{\sin c}{\sin w} = \frac{c}{w}$$

(e) (TRUE OR FALSE explain your answer):

$$\frac{\sin 30^\circ}{\sin 60^\circ} = \frac{30^\circ}{60^\circ}$$

(f) (TRUE OR FALSE explain your answer):

$$(xy)z = x(yz)$$

(g) (TRUE OR FALSE explain your answer):

$$(\sin y)z = \sin(yz)$$

(h) (TRUE OR FALSE explain your answer):

$$xy = yx$$

(i) (TRUE OR FALSE explain your answer):

$$\sin y = y \sin$$

16. 'sin 23°' IS a number:

(a) (TRUE OR FALSE explain your answer):

$$\frac{5 \sin 23^\circ}{7 \sin 23^\circ} = \frac{5}{7}$$

(b) (TRUE OR FALSE explain your answer):

$$(\sqrt{5} + 3) \sin 23^\circ = \sqrt{5} \sin 23^\circ + 3 \sin 23^\circ$$

(c) (TRUE OR FALSE explain your answer):

$$(\sqrt{3}t)(\sin 23^\circ) = (\sqrt{3})(t \sin 23^\circ)$$

(d) (TRUE OR FALSE explain your answer):

$$5(\sin 23^\circ) = (\sin 23^\circ)5$$

(e) (TRUE OR FALSE explain your answer):

$$\text{if } x(\sin 23^\circ) = 7 \text{ then } x = \frac{7}{\sin 23^\circ}$$

17. 'sin' is not a number:

(a) (TRUE OR FALSE explain your answer):

$$5c = c5$$

(b) (TRUE OR FALSE explain your answer):

$$xyzw = wxyz$$

(c) (TRUE OR FALSE explain your answer):

$$\sin w = w \sin$$

18. 'sin' is not a number:

Trigonometry
Sec. 01 exercises

(a) (TRUE OR FALSE explain your answer):

$$\text{if } 5c = x \text{ then } c = \frac{x}{5}$$

(b) (TRUE OR FALSE explain your answer):

$$\text{if } yc = x \text{ then } c = \frac{x}{y}$$

(c) (TRUE OR FALSE explain your answer):

$$\text{if } \sin c = x \text{ then } c = \frac{x}{\sin}$$