**Pre-calculus 10**

**Chapter 8**

**Trigonometry**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Mr. Formaran**

**8.1 Sine, Cosine, and Tangent for Right Triangles**

Naming the Sides of a Right Triangle

* A right triangle has one \_\_\_\_\_\_\_ angle ( )
* The side opposite the right angle is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_

(the longest side)

* \_\_\_ one of the acute angles is ,

you must be able to identify the side opposite ,

and the side adjacent to

Identify the sides of each right triangle

















Name the sides of each right triangle

A

B

C

c

b

a

D

X

Y

e

z



F



f

d

y

x

E

Z

Opposite: \_\_\_\_\_\_\_ Opposite: \_\_\_\_\_\_\_ Opposite: \_\_\_\_\_\_\_

Adjacent: \_\_\_\_\_\_\_ Adjacent: \_\_\_\_\_\_\_ Adjacent: \_\_\_\_\_\_\_

Hypotenuse:\_\_\_\_\_\_\_ Hypotenuse:\_\_\_\_\_\_\_ Hypotenuse:\_\_\_\_\_\_\_

D

X

Y

e

z

A

F



b

f

d

y

c

x



E

a

C

B



Z

Opposite: \_\_\_\_\_\_\_ Opposite: \_\_\_\_\_\_\_ Opposite: \_\_\_\_\_\_\_

Adjacent: \_\_\_\_\_\_\_ Adjacent: \_\_\_\_\_\_\_ Adjacent: \_\_\_\_\_\_\_

Hypotenuse:\_\_\_\_\_\_\_ Hypotenuse:\_\_\_\_\_\_\_ Hypotenuse:\_\_\_\_\_\_\_

Trigonometric Ratios for Right Triangles

*opposite*

*adjacent*

*adjacent*

*hypotenuse*

*opposite*

*hypotenuse*

 sin = cos = tan =

 Where: \_\_\_\_\_\_\_\_\_\_\_\_\_ is the length of the side opposite

 \_\_\_\_\_\_\_\_\_\_\_\_\_ is the length of the side adjacent to

 \_\_\_\_\_\_\_\_\_\_\_\_\_ is the length of the hypotenuse of the right triangle

D

X

Y

e

z

A



F



b

f

d

y

c

x



E

a

C

B

Z

sin : \_\_\_\_\_\_\_ sin : \_\_\_\_\_\_\_ sin : \_\_\_\_\_\_\_

cos : \_\_\_\_\_\_\_ cos : \_\_\_\_\_\_\_ cos : \_\_\_\_\_\_\_

tan : \_\_\_\_\_\_\_ tan : \_\_\_\_\_\_\_ tan : \_\_\_\_\_\_\_

D

X

Y

e

z

A

F



b

f

d

y

c

x



E

a

C

B



Z

sin : \_\_\_\_\_\_\_ sin : \_\_\_\_\_\_\_ sin : \_\_\_\_\_\_\_

cos : \_\_\_\_\_\_\_ cos : \_\_\_\_\_\_\_ cos : \_\_\_\_\_\_\_

tan : \_\_\_\_\_\_\_ tan : \_\_\_\_\_\_\_ tan : \_\_\_\_\_\_\_

Use Calculator to find:

1. sin

2. sin

3. sin

4. sin

5. sin

1. cos

2. cos

3. cos

4. cos

5. cos

1. tan

2. tan

3. tan

4. tan

5. tan

Given the decimal value for the trigonometric ratio, solve for to one decimal place.

(sin )

1.

2.

3.

4.

5.

(cos )

1.

2.

3.

4.

5.

(tan )

1.

2.

3.

4.

5.

Solve the right triangle.

Solve the right triangle.

Solve the right triangle.

Solve the right triangle.

**8.2 Relationships Between Sine, Cosine, and Tangent**

Sine and Cosine

A

C

B

b

c

a

 A + B = 900

 A = 900 - B or

 B = 900 - A

*b*

*c*

*a*

*c*

 sin A = = cos B cos A = = sin B

Therefore: sin = cos (900 - ) and cos = sin (900 - )

Example: sin 300 = cos 600 and cos 300 = sin 600

 sin \_\_\_ = cos \_\_\_ and cos \_\_\_ = sin \_\_\_

 sin \_\_\_ = cos \_\_\_ and cos \_\_\_ = sin \_\_\_

Tangent

*a*

*c*

*b*

*c*

*b*

*a*

 tan B = sin B = cos B =

*b*

*c*

*a*

*c*

*b*

*c*

sin B

cos B

 = --------- = x = tan B

*a*

*c*



sin

cos

 Therefore: tan =

Sine2 and Cosine2

**8.3 Special Angles**

The 450 – 450 – 900 Triangle

Pythagorean Theorem:

450

c2 = a2 + b2

1

450

1

Therefore: sin 450 = cos 450 = tan 450 =

The 300 – 600 – 900 Triangle



Pythagorean Theorem:

c2 = a2 + b2

300

2

2

600

1

1

Therefore: sin 450 = cos 450 = tan 450 =

Trigonometric Ratios of Special Angles

|  |  |  |  |
| --- | --- | --- | --- |
| Shape  Description automatically generated with low confidence | Shape  Description automatically generated with low confidence sin | Shape  Description automatically generated with low confidence cos | Shape  Description automatically generated with low confidence tan |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**8.4 Applications of Trigonometry**

Angle of Elevation

Object

Line of sight

Angle of elevation



Horizontal

Angle of Depression

Horizontal



Angle of depression

Line of sight

Object

Pitch

Pitch

Rise

Run

Rise

Run

 Pitch =

Example 1a

 A pilot is required to approach Vancouver airport at an 80 angle of descent. If the plane is travelling at an altitude of 10 000 ft, at what horizontal distance from the airport should the descent begin?

Given:



82

10 000 ft

Airport

 X

 Solution:



 =

 opp =

 adj =

Example 1b

 A pilot is required to approach Vancouver airport at an \_\_0 angle of descent. If the plane is travelling at an altitude of \_\_\_\_\_\_\_\_ ft, at what horizontal distance from the airport should the descent begin?

Given:

\_\_2

\_\_\_\_\_ ft

Airport

 X

 Solution:



 =

 opp =

 adj =

Example 2a

 A carpenter says that the pitch needed for rain to run properly off a roof is at least 4 to 12.

Find the angle the roof makes with the horizontal.

Given:

4



12

Solution:



 =

 opp =

 adj =

Example 2b

 A carpenter says that the pitch needed for rain to run properly off a roof is

at least \_\_\_ to \_\_\_. Find the angle the roof makes with the horizontal.

Given:

\_\_\_



\_\_\_

Solution:

 =

 opp =

 adj =

Example 3a

 The equal sides of an isosceles triangle are 30 cm, and the third side is 36 cm. Determine the measure of the interior angles of the triangle.

 Given:



30

30

18

8.4 Quiz

 The equal sides of an isosceles triangle are 150 cm, and the third side is 140 cm. Determine the measure of the interior angles of the triangle.

 Given:

\_\_\_

\_\_\_

\_\_\_