

## Trigonometry

1. Convert the following angles into degree or radian measure

a)  $90^\circ$

e)  $\pi$

b)  $60^\circ$

f)  $\frac{\pi}{4}$

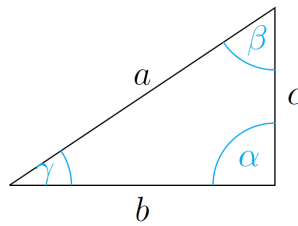
c)  $1^\circ$

g)  $\frac{2\pi}{3}$

d)  $120^\circ$

h)  $5\pi$

2. The following triangle is given:



a) Complete the following table (noting that  $\alpha$  is not necessarily a right angle, contrary to what the sketch suggests).

$a$	$b$	$c$	$\alpha$	$\beta$	$\gamma$
	5, 2cm		$30^\circ$	$60^\circ$	
1, 9cm	18, 1cm			$90^\circ$	
		10, 2cm	$90^\circ$		$38^\circ$
12, 3cm				$90^\circ$	$63^\circ$

b) Calculate the missing side lengths under each of the given assumptions.

i.  $a = 8mm$ ;  $b = 8,4mm$ ;  $\beta = 90^\circ$

ii.  $b = 3,5m$ ;  $c = 6,75m$ ;  $\gamma = 90^\circ$

iii.  $a = 3,4m$ ;  $\beta = 0,18\pi$ ;  $\alpha = \frac{\pi}{2}$

iv.  $\alpha = 27,4^\circ$ ;  $\beta = 45,9^\circ$ ;  $c = 8,3cm$

v.  $a = 6,7mm$ ;  $\alpha = 0,4241$ ;  $\beta = 0,8325$

vi.  $a = 7,2cm$ ;  $b = 5,1cm$ ;  $\gamma = 37^\circ$

3. Use the trigonometric identities known from the lecture to simplify the following expressions:

a)  $\frac{\sin(2\alpha)}{1 + \cos(2\alpha)}$

b)  $(1 + \cos(2\alpha))(1 - \sqrt{1 - \sin^2(2\alpha)})$

4. Express  $\sin(x + y + z)$  using  $\sin(x)$ ,  $\sin(y)$ ,  $\sin(z)$ ,  $\cos(x)$ ,  $\cos(y)$ ,  $\cos(z)$ . (Hint:  $x + y + z = (x + y) + z$ .)