

SHARP

Worksheet 7- Trigonometry

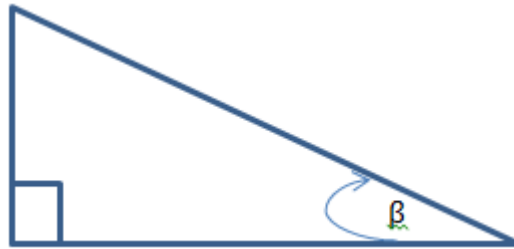
Grade 10 Mathematics

1. Label the following diagram with the following labels:

a) opposite

b) adjacent

c) hypotenuse

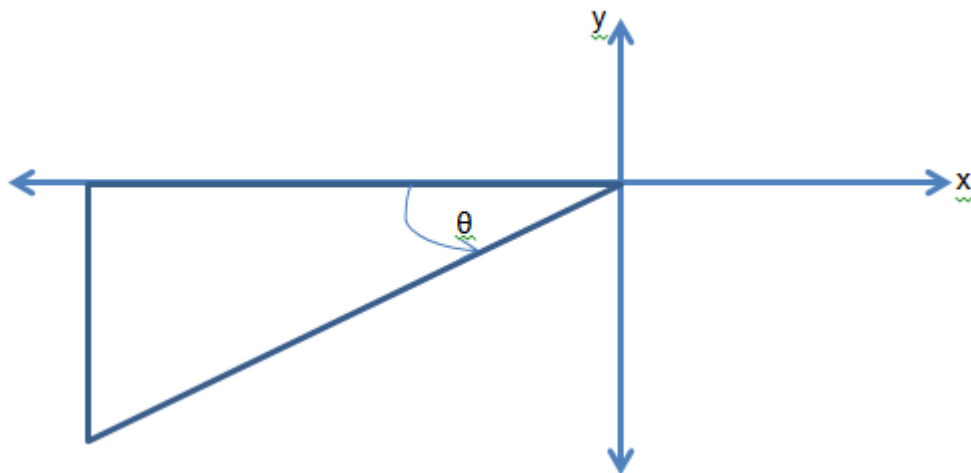


2. Label the following diagram with the following labels:

a) x

b) y

c) r



3. Use the following triangle to give the ratios for the questions below:



a) $\sin \theta$

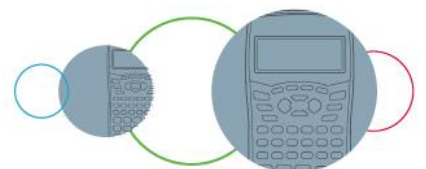
b) $\sin \alpha$

c) $\cos \theta$

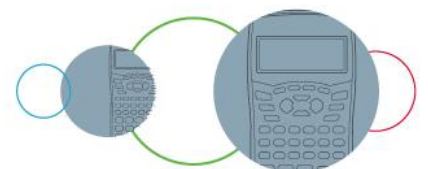
d) $\cos \alpha$

e) $\tan \theta$

f) $\tan \alpha$



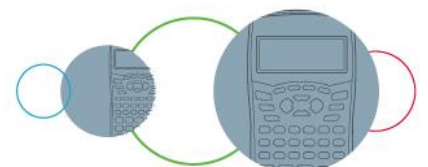
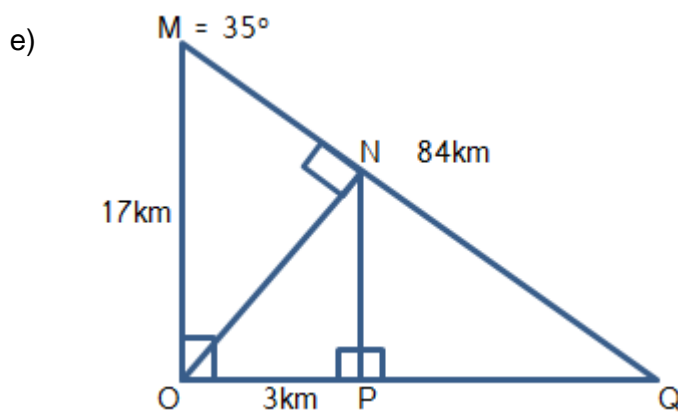
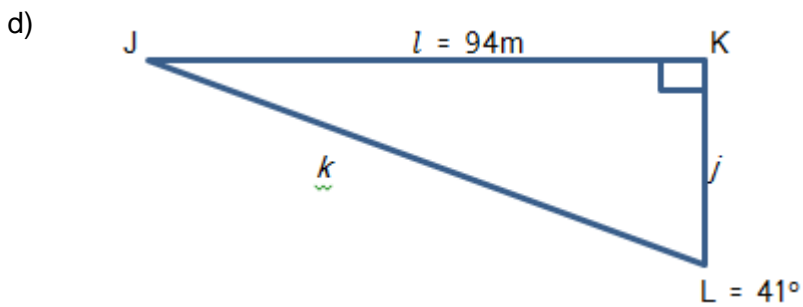
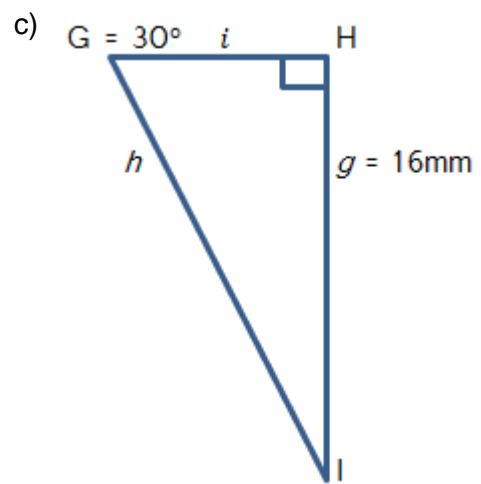
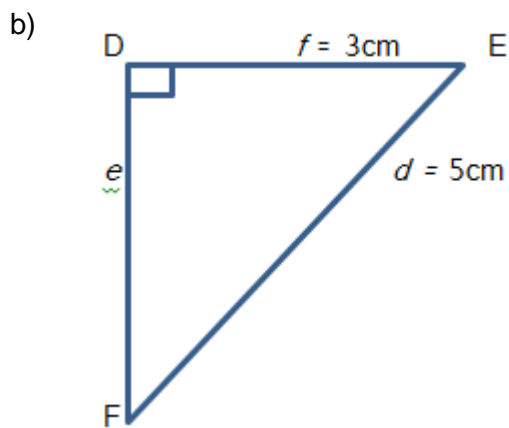
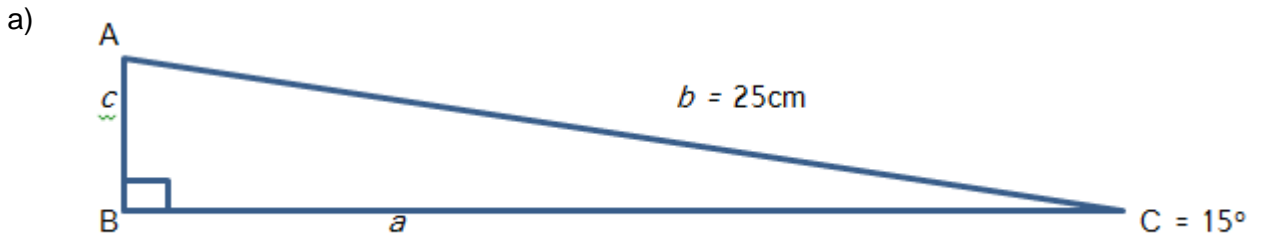
4. Determine the ratios of the following (leave your answers as surds) if possible:
- | | | |
|--------------------|--------------------|--------------------|
| a) $\sin 15^\circ$ | b) $\cos 15^\circ$ | c) $\tan 15^\circ$ |
| d) $\sin 30^\circ$ | e) $\cos 30^\circ$ | f) $\tan 30^\circ$ |
| g) $\sin 45^\circ$ | h) $\cos 45^\circ$ | i) $\tan 45^\circ$ |
| j) $\sin 60^\circ$ | k) $\cos 60^\circ$ | l) $\tan 60^\circ$ |
| m) $\sin 75^\circ$ | n) $\cos 75^\circ$ | o) $\tan 75^\circ$ |
| p) $\sin 90^\circ$ | q) $\cos 90^\circ$ | r) $\tan 90^\circ$ |
5. Determine the ratios of the following (round your answers to two decimal places):
- | | | |
|--------------------|--------------------|--------------------|
| a) $\sin 50^\circ$ | b) $\cos 40^\circ$ | c) $\tan 50^\circ$ |
| d) $\sin 40^\circ$ | e) $\cos 50^\circ$ | f) $\tan 40^\circ$ |
| g) $\sin 88^\circ$ | h) $\cos 88^\circ$ | i) $\tan 88^\circ$ |
| j) $\sin 5^\circ$ | k) $\cos 5^\circ$ | l) $\tan 5^\circ$ |
| m) $\sin 23^\circ$ | n) $\cos 23^\circ$ | o) $\tan 23^\circ$ |
6. Determine the ratios of the following given that $\alpha = 62^\circ$ and $\beta = 28^\circ$ (round off your answers to two decimal places where necessary):
- | | | |
|-------------------------------|--|------------------------------------|
| a) $\sin \alpha$ | b) $\sin \beta$ | c) $\sin(\alpha + \beta)$ |
| d) $\sin(\alpha - \beta)$ | e) $\sin 2\alpha$ | f) $\sin \frac{\alpha}{2}$ |
| g) $\cos \alpha + \sin \beta$ | h) $(\cos \alpha) \times (\sin \beta)$ | i) $\cos \frac{\beta}{2}$ |
| j) $\tan 3(\alpha + \beta)$ | k) $\tan(\alpha - \beta)$ | l) $\frac{\sin \beta}{\cos \beta}$ |
| m) $\tan \beta$ | n) $\sin \beta - \tan \alpha$ | o) $\sin^2 \alpha + \cos^2 \alpha$ |
7. Determine the value of θ (round off to whole numbers):
- | | | |
|---|--|--|
| a) $\sin \theta = 0.574$ | b) $\cos \theta = 0.857$ | c) $\tan \theta = 0.213$ |
| d) $2 \sin \theta = 1.2$ | e) $3 \cos \theta = 1.5$ | f) $-2 \tan \theta = 3.467$ |
| g) $2 \sin \theta - 0.4 = 0$ | h) $2 - 5 \cos \theta = 0$ | i) $9 \tan \theta - 10 = 4$ |
| j) $\sin(\theta - 30) = 0.242$ | k) $\cos 3(\theta - 10) = 0$ | l) $\tan(2\theta + 15) = 3$ |
| m) $\sin \frac{\theta}{2} = \frac{\sqrt{2}}{2}$ | n) $2 \cos \left(\frac{\theta}{3} - 10\right) = 0$ | o) $\frac{\tan(\theta + 20)}{4} = 0.1$ |
8. Give the reciprocals of each of the following:
- | | | |
|------------------|------------------|------------------|
| a) $\sin \delta$ | b) $\cos \delta$ | c) $\tan \delta$ |
|------------------|------------------|------------------|



9. Calculate the following (round off to two decimal places if necessary):

- | | | |
|---|------------------------------------|--|
| a) $\cot 34^\circ$ | b) $\sec 80^\circ$ | c) $\operatorname{cosec} 53^\circ$ |
| d) $\cot 15^\circ \times \frac{1}{\tan 15^\circ}$ | e) $2 \sec 60^\circ$ | f) $\frac{1}{\operatorname{cosec} 30^\circ}$ |
| g) $\sec 45^\circ \times \operatorname{cosec} 45^\circ$ | h) $\cot 15^\circ + \sec 30^\circ$ | i) $\operatorname{cosec} 25^\circ - 3$ |

10. Solve each of the following triangles for each of the unknowns:



11. P is the point (3; -4) on the Cartesian plane and makes an angle θ with the y-axis from the origin.
- Draw a representation of the above information.
 - Find the value of r , the hypotenuse.
 - Determine the values of:

i) $\sin \theta$	ii) $\cos \theta$
iii) $\tan \theta$	iv) $\sin^2 \theta + \cos^2 \theta$
v) $2 \sin \theta$	vi) $\sin \theta + \cos \theta$
vii) $\tan \theta \times \cos \theta$	viii) $\cos \theta - \sin \theta$
ix) $3 \sin \theta + 2 \tan \theta$	x) $\cos \theta + \sin \theta + \tan \theta$
12. Q is the point $(\sqrt{2}; 2)$ on the Cartesian plane and makes an angle α with the y-axis from the origin, O.
- Draw a representation of the above data.
 - Find the length of OQ.
 - Determine the value of α .
 - Determine the values of (leave in surd form if necessary):

i) $\sin \alpha$	ii) $\operatorname{cosec} \alpha$
iii) $\cos \alpha + \tan \alpha$	iv) $2 \sin \alpha$
v) $\frac{1}{\sin \alpha}$	vi) $\cos^2 \alpha - \sin^2 \alpha$
vii) $\cos^2 \alpha + \sin^2 \alpha$	viii) $\frac{\cos \alpha}{\sin \alpha}$
ix) $\cot \alpha$	x) $\tan \alpha \times \sin \alpha$
13. Name the special angles.
14. Calculate the following without using a calculator:
- | | |
|--|--|
| a) $\sin 30^\circ + \cos 60^\circ$ | b) $\sin 45^\circ + \cos 45^\circ$ |
| c) $\sin 45^\circ \times \cos 45^\circ$ | d) $\tan 30^\circ - \sin 30^\circ$ |
| e) $\tan 30^\circ \times \sin 60^\circ$ | f) $\cos 90^\circ + \sin 90^\circ$ |
| g) $\cos 30^\circ \cdot \sin 60^\circ + \sin 30^\circ \cdot \cos 60^\circ$ | h) $\sin 45^\circ \cdot \sin 45^\circ - \cos 45^\circ \cdot \cos 45^\circ$ |
| i) $\sin^2 30^\circ + \cos^2 30^\circ$ | j) $2 \cos^2 45^\circ - 1$ |

