TRIGONOMETRY WORKSHEET

Show all working in proper steps.

1. Without using a calculator, determine whether the following trigonometric ratios are positive or negative.
   (a) $\sin 230°$ (b) $\cos 140°$ (c) $\tan 215°$ (d) $\cos 350°$
   (e) $\tan 340°$ (f) $\sin 160°$ (g) $\cos(-60°)$ (h) $\tan(-155°)$

2. For each of the following conditions, determine the quadrant or possible quadrants in which θ must lie.
   (a) $\tan\theta > 0$
   (b) $\cos\theta > 0$ and $\sin\theta < 0$
   (c) $\cos\theta$ and $\tan\theta$ are of the same sign
   (d) $\sin\theta$ and $\tan\theta$ are of opposite signs

For questions 3 to 11, do not use a calculator.

3. Evaluate the following:
   (a) $\tan 300°$ (b) $\cos 330°$ (c) $\sin 150°$ (d) $\tan 315°$
   (e) $\sin 225°$ (f) $\cos 210°$ (g) $\tan(-120°)$ (h) $\sin 405°$

4. If θ is acute and $\cos\theta = \frac{4}{5}$, find the value of $\sin\theta$ and of $\tan\theta$.

5. Given that A is obtuse and that $\tan A = -\frac{1}{2}$, find the value of $\cos A$ and of $\sin A$.

6. Given that $\sin A = -\frac{5}{13}$ where $180° < A < 270°$, find the value of $\tan A$ and of $\cos(-A)$.

7. Given that $\sin A = \frac{2}{\sqrt{5}}$ and $90° < A < 180°$, find the value of $\cos A$ and of $\tan A$.

8. Given that $\cos A = \frac{1}{2}$ and that $\cos A$ and $\sin A$ have the same sign, find the value of $\sin(-A)$ and of $\tan A$.

9. Given that $\tan A = -\frac{5}{12}$ and that $\tan A$ and $\cos A$ have opposite signs, find the value of $\cos A$ and of $\cos(90° - A)$.

10. Given that $\cos A = \sqrt{\frac{2}{3}}$ where $180° < A < 360°$, find the value of
    (a) $\sin A$, (b) $\sin(90° - A)$, (c) $\tan(90° - A)$.

*11. Given that $\sin 20° = k$, express the following in terms of k.
    (a) $\sin 200°$ (b) $\cos 20°$ (c) $\tan(-20°)$ (d) $\sin 70°$

12. Find all the angles x where $0° < x < 360°$ such that
    (a) $\cos x = -0.71$, (b) $\tan x = 1.732$,
    (c) $\sin x = 0.866$, (d) $\tan x = -2$,
    (e) $10\cos x - 3 = 0$, (f) $4(\tan x - 1) = 3(5 - 2\tan x)$,
    (g) $2\sin(-x) = 0.3$, (h) $2\cos^2 x = 1$,
    (i) $3\sin x + 2 = \tan 75°$, (j) $\frac{8\cos x + 1}{2 - \cos x} = 3$.

13. Find all the angles between $-360°$ and $180°$ such that
    (a) $\sin x = -\frac{1}{2}$ (b) $\cos x = \frac{\sqrt{3}}{2}$
    (c) $\tan(-x) + 1 = 0$ (d) $\sqrt{2}\sin(90° - x) + 1 = 0$

14. Positive angles x and y are such that $x + 2y = 300°$ and $\tan y = 2\cos 160°$. Find their values.

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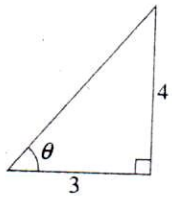
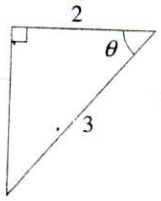
Show all working in proper steps.

1. For each of the following triangles, find the values of $\cos\theta$, $\sin\theta$ and $\tan\theta$.

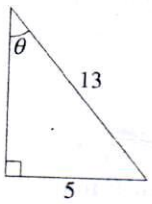
(a)



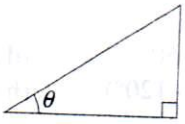
(b)



(c)



2. For the given right-angled triangle below, complete the table of trigonometric ratios on the right.



	$\cos\theta$	$\sin\theta$	$\tan\theta$
(a)	$\frac{8}{17}$		
(b)			$\frac{1}{2}$
(c)		$\frac{7}{25}$	
(d)			3

3. Given that $\sin\theta = \frac{1}{2}$, find the value of $\sin\theta\cos(90° - \theta)$.

4. Given that $\tan A = 2$, find the value of $2\tan A + \tan(90° - A)$.

5. Without using a calculator, evaluate

(a) $\dfrac{\sin 45°}{\cos 30° + \sin 60°}$, **(b)** $\tan 45° + \tan 30° \tan 60°$.

6. Without using a calculator, find the value of

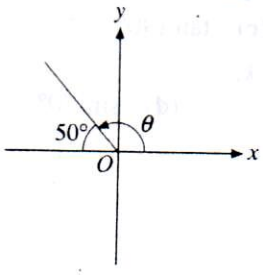
(a) $\dfrac{\sin 65°}{\cos 25°}$, **(b)** $\tan 75° \tan 15°$.

7. State the quadrant of the angle θ and find the value of the basic angle α if

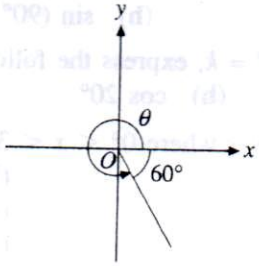
(a) $\theta = 250°$, **(b)** $\theta = 390°$, **(c)** $\theta = -60°$, **(d)** $\theta = -100°$.

8. For each of the following diagrams, find the value of the angle θ.

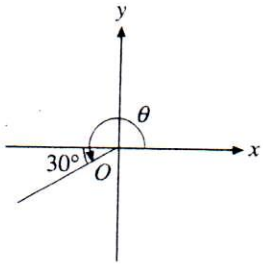
(a)



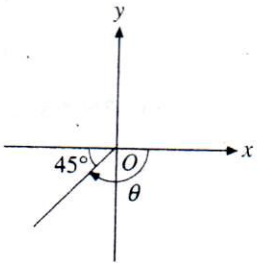
(b)



(c)



(d)



9. Find all the angles between 0° and 360° which make a basic angle of α with the x-axis if

(a) $\alpha = 20°$, **(b)** $\alpha = 70°$, **(c)** $\alpha = 35°$.

10. Find all the angles between −180° and 180° with basic angle $\alpha = 10°$.