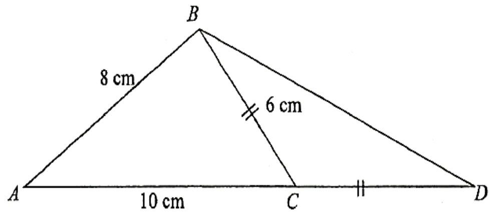
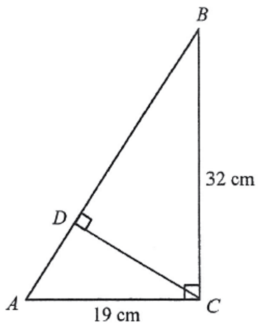
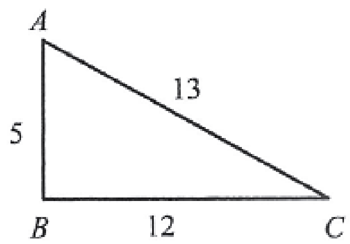
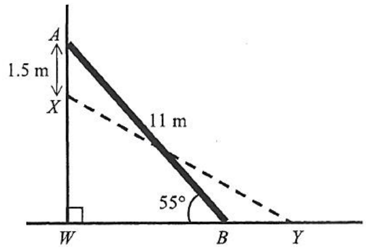
7 MUST KNOW QUESTIONS TO ***<u>CONQUER</u>***

TRIGONOMETRIC FUNCTIONS

1	In the diagram, $AB = 8$ cm, $AC = 10$ cm, $BC = 6$ cm, $BC = CD$ and ACD is a straight line.  (a) Explain why $\angle ABC$ is a right angle. (b) Without finding any angle, find the arca of ΔBCD. (c) Write down exact value of cos $\angle BCD$.	 [1] [2] [1]
2	In the diagram, ABC is a right-angled triangle and ADB is a straight line. It is given that $BC = 32$ cm, $AC = 19$ cm and $\angle BDC = 90°$.  Find (a) $\angle DBC$, (b) DC.	 [1] [1]
3	A triangle *ABC* has sides $AB = 5$ cm, $BC = 12$ cm and $AC = 13$ cm.  (a) Prove that triangle *ABC* is a right-angled triangle. (b) Hence, find (i) sin $\angle BAC$, (ii) angle *ACB*.	 [2] [1] [1]

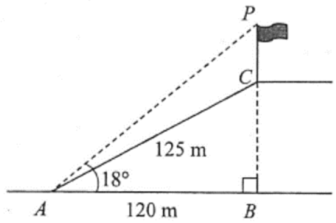
4 A ladder, AB, 11 m long, is placed against a wall. The angle between the ladder and the floor is $55°$.



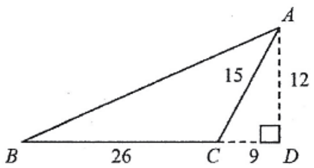
(a) Find WB. [1]

(b) The ladder slides down the wall by 1.5 m to a new position XY.
Find the new angle between the ladder and the floor. [3]

5 The diagram below shows a vertical flagpole PC placed at the top of the hill.
B is vertically below C and angle $ABC = 90°$, angle $PAB = 18°, AB = 120$ m and $AC = 125$ m. Find the height of the flagpole. [3]



6 It is given that $AC = 15$ cm, $AD = 12$ cm, $BC = 26$ cm and $CD = 9$ cm.



(a) Expressing as a fraction in its lowest form, find

(i) tan $\measuredangle ACD$, [1]

(ii) sin $\measuredangle BAD$. [2]

(b) Find the shortest distance from C to AB. [2]

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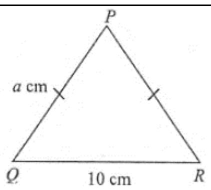

In the diagram above, triangle PQR is an isosceles triangle with $PQ = PR = a$ cm and $QR = 10$ cm

(a) Express in terms of a,

(i) the value of cos $\angle PQR$, [1]

(ii) the shortest distance from P to QR. [1]

(b) Given that $a = 13$, find the value of sin $\angle PRQ$.
Leave your answer as a fraction [2]

Answer Key

1	Solution: (b) Area = 14.4 Area = $\frac{1}{2}(6)(6)\frac{4}{5}$ = 14.4 Ans: (a) Since $6^2 + 8^2 = 10^2$, by converse of Pythagoras Theorem, *ABC* is a right-angle triangle, angle ABC is a right angle. (b) 14.4 (c) cos $\angle BCD$ = $-\frac{3}{5}$	
2	Solutions: (a) $\tan \angle DBC = \frac{19}{32}$ $\angle DBC = 30.7°$ (b) $\sin 30.70 = \frac{DC}{32}$ $DC = 16.3$ cm Ans: (a) 30.7° (b) 16.3 cm	
3	Solution: (a) $AC^2 = 13^2 = 169$ $AB^2 + BC^2 = 5^2 + 12^2 = 169$ Since $AB^2 + BC^2 = AC^2$, by converse of Pythagoras theorem, triangle *ABC* is a right-angled triangle, $\angle ABC = 90°$ Ans: (b)(i) $\sin \angle BAC = \frac{12}{13}$ (ii) $\angle ACB = 22.6°$	
4	Solutions: (a) $\cos 55° = \frac{WB}{11}$ $WB = 6.3093 = 6.31m$ (b) $\sin 55° = \frac{AW}{11}$ $AW = 11 \sin 55° = 9.0107$ $XW = .107 - 1.5 = 7.5107$ $\sin \angle XYW = \frac{7.5107}{11}$ $\angle XYW = 43.0619 = 43.1°$ Ans: (a) $6.31m$ (b) 43.1°	
5	Solution: $\tan 18° = \frac{PB}{120}$ PB = 120 x tan 18° = 38.990 (5 s.f.) By the Pythagoras Theorem, $125^2 = 120^2 + BC^2$ $BC^2 = 125^2 - 120^2$ $BC = \sqrt{125^2 - 120^2}$ = 35 Height of a flagpole = 38.990 – 35= 3.990 =3.99 m (3 s.f.) Ans: 3.99 m (3s.f.)	

6	Solutions: (a)(ii) $AB = \sqrt{35^2 + 12^2} = 37$ sin $\measuredangle BAD = \frac{35}{37}$ (b) Area of ABC = $\frac{1}{2}(26)(12)$ = 156 ----- M1 (area of ABC) Let h be the shortest distance between C to AB $\frac{1}{2}(37)h = 156$ $h = 8\frac{16}{37}$ Ans: (a)(i) tan $\measuredangle ACD = \frac{4}{3}$ (ii) sin $\measuredangle BAD = \frac{35}{37}$ (b) $h = 8\frac{16}{37}$	
7	Solutions: (a) (i) $cos\ \angle PQR = \frac{10 \div 2}{a}$ $= \frac{5}{a}$ (ii) shortest distance = $\sqrt{a^2 - 5^2}$ $= \sqrt{a^2 - 25}$ (b) $sin\ \angle PRQ = \frac{\sqrt{a^2-25}}{a}$ $= \frac{\sqrt{13^2-25}}{13}$ $= \frac{12}{13}$ Ans: (a)(i) $\frac{5}{a}$ (ii) $\sqrt{a^2 - 25}$ (b) $\frac{12}{13}$	