# TB(2B) Ch. 10 Pyth. Thm & Irrational Numbers

## Pythagoras' Theorem

## Conventional Questions

**1. [13-14 St. Test #3]**

In **Figure 2**, $BCD$ is a straight line. $BC = \sqrt{3}$ cm , $AB = 3$ cm and $AC = 2\sqrt{3}$ cm.

**(a)** Show that $\Delta ABC$ is a right-angled triangle. **(2 marks)**

**(b)** If $AD = \sqrt{21}$ cm, find $CD$. **(3 marks)**

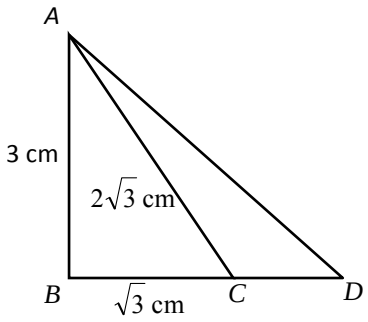



**Figure 2**

**2. [13-14 Final Exam #10]**

In **Figure 3**, $D$ is a point lying on $AC$ such that $\angle ACB = \angle ABD$ .

**(a)** Prove that $\Delta ABC \sim \Delta ADB$ . **(2 marks)**

**(b)** Suppose $AC = 25$ cm, $AB = 20$ cm and $BD = 12$ cm. Prove that $\Delta ABD$ is a right-angled triangle. **(3 marks)**

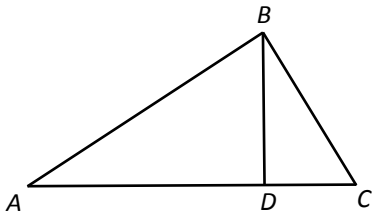



**Figure 3**

**3. [14-15 St. Test #2]**

In **Figure 1**, $AC = CB$ , $\angle ADC = 90°$ , $CD = 7$ cm and $AD = 24$ cm . Find the length of $AB$.

**(3 marks)**

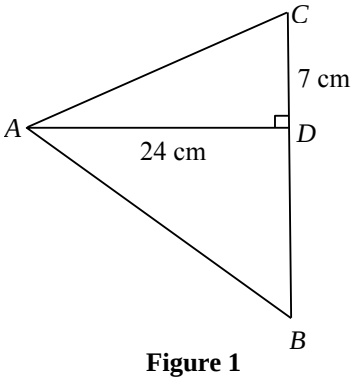



**Figure 1**

**4. [14-15 St. Test #5]**

In $\Delta ABC$ , $AB = 2\sqrt{x}$ cm , $BC = \sqrt{x^2 + 4}$ cm and $AC = (x + 2)$ cm , where $x > 0$ . Is $\Delta ABC$ a right-angled triangle? Explain your answer. **(3 marks)**

**5. [14-15 S.6 Mock Exam #7]**

In **Figure 1**, $ABCD$ is a rectangle. $E$ is a point on $AB$ such that $DE = CD$. $CF$ is the altitude of $\Delta CDE$.

**(a)** Prove that $\Delta CEF \cong \Delta CEB$.

**(b)** If $CD = 10$ cm and $BE = 2$ cm, find the area of $\Delta CDE$. **(6 marks)**

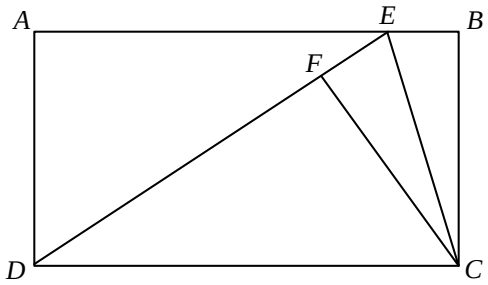



**Figure 1**

**6. [14-15 S.6 Mock Exam #8]**

In a polar coordinate system, $O$ is the pole. The polar coordinates of the points $P$ and $Q$ are $(8, 80°)$ and $(k, 350°)$ respectively, where $k > 0$. It is given that $OP : PQ = 4 : 5$.

**(a)** Is $\Delta OPQ$ a right-angled triangle? Explain your answer.

**(b)** Find the perimeter of $\Delta OPQ$.

**(4 marks)**

**7. [14-15 Final #11]**

In **Figure 3**, $BC : AB = 2 : 1$, $AC = 10$ and $BC = x$.

**(a)** Find $x$. **(2 marks)**

**(b)** Find $BD$. **(2 marks)**

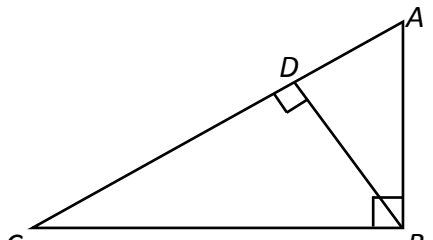



**Figure 3**

**8. [15-16 Final #10]**

In **Figure 3**, $\angle ACB = \angle AED = 90°$, $AC = 3$ cm, $BC = 4$ cm and $AE = 1.5$ cm.

**(a)** Prove that $\Delta ABC \sim \Delta ADE$. **(2 marks)**

**(b)** Hence, find the area of $\Delta ABD$. **(3 marks)**

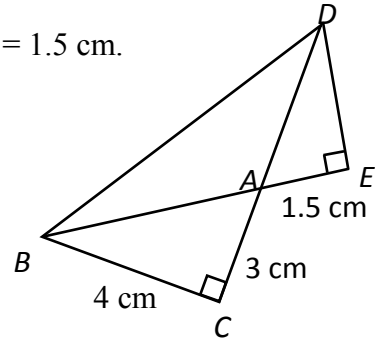



**Figure 3**

**9. [15-16 Final #14]**

In **Figure 6**, $\Delta ABC$ is a right-angled triangle. Prove that $\sin^2 x + \cos^2 x = 1$. **(2 marks)**

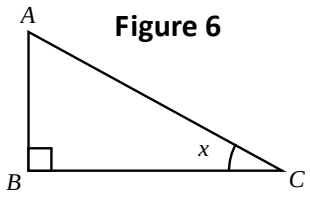



**Figure 6**

**10. [15-16 St. Test #4]**

A ship leaves a pier and sails east for 2 hours, then it sails south to a lighthouse for 3 hours. It is given that the speed of the ship is 50 km/h throughout the journey. Find the shortest distance between the pier and the lighthouse. **(2 marks)**

**11. [15-16 St. Test #8]**

In **Figure 2**, It is given that $AEDBC$ is a trapezium. $AB = 8$, $AC = 10$, $BC = 6$ and $\angle EDC = 90°$.

**(a)** Prove $\Delta ABC$ is a right angled triangle. **(2 marks)**

**(b)** If area of trapezium $AEDBC$ : area of $\Delta AEC = 8 : 3$, find $EC$. **(2 marks)**

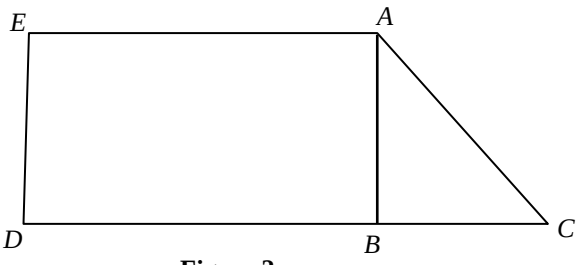



**Figure 2**

**12. [16-17 St. Test #2]**

**Figure 1** shows $\Delta ABC$. Prove that $\Delta ABC$ is a right-angled triangle. **(2 marks)**

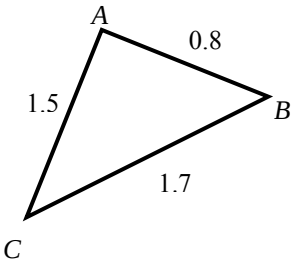



**Figure 1**

**13. [16-17 St. Test #9]**

In **Figure 4**, $BDC$ is a straight line. $AC = 26$ cm, $AB = 4\sqrt{37}$ cm, $CD : BD = 5 : 2$ and $AD \perp BC$. Find the length of $AD$. **(3 marks)**

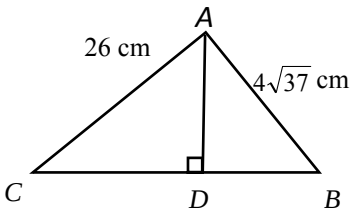



**Figure 4**

**14. [16-17 Final #11]**

In **Figure 3**, $D$ is a point lying on $AC$ such that $BD$ is perpendicular to $AC$. It is given that $AC = 39$ cm, $BD = 24$ cm and the area of $\Delta ABD$ is less than the area of $\Delta BCD$ by 300 $cm^2$.

**(a)** Find $AD$ and $CD$. **(2 marks)**

**(b)** Find the perimeter of $\Delta ABC$. **(2 marks)**

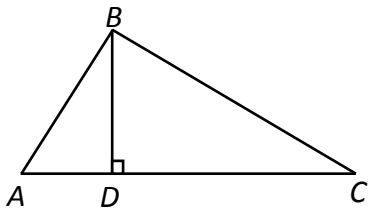
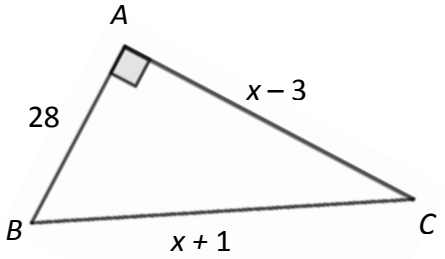



**Figure 3**

**15. [17-18 St. Test 2 #3]**

In **Figure 1**, it is given that $AB = 28$, $AC = x - 3$ and $BC = x + 1$. Find the value of $x$. **(3 marks)**




**Figure**

**16. [17-18 St. Test 2 #5]**

In **Figure 3**, $ABCD$ and $EFGH$ are two vertical buildings on the same horizontal level. It is given the area of $CDEF$ is 9300 $m^2$ , the height of the two buildings are 70 m and 85 m respectively.

(a) Find $DE$. **(2 marks)**

(b) Emma claims that $\Delta CEF$ is a right-angled triangle. Do you agree? Explain your answer.

**(3 marks)**

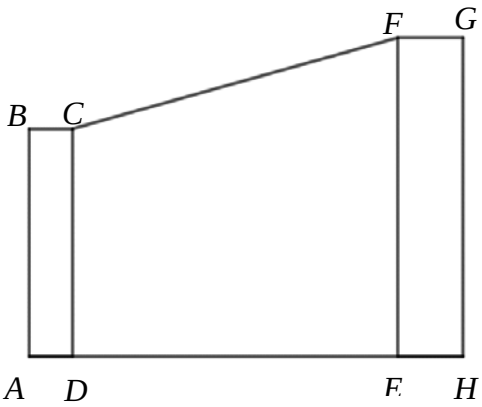



**Figure 3**

**17. [17-18 Final Exam #13]**

**Figure 5a** shows a logo *ABCDEF* for the Walkathon designed by Mary. The frame of her logo consists of two identical semi-circles *ABC* and *CDE* and an isosceles triangle $\Delta AEF$ with $AF = EF$. It is given that *ACE* is a straight line, and the areas of each semi-circle and the triangle are $12.5\pi$ sq. units and 100 sq. units respectively.

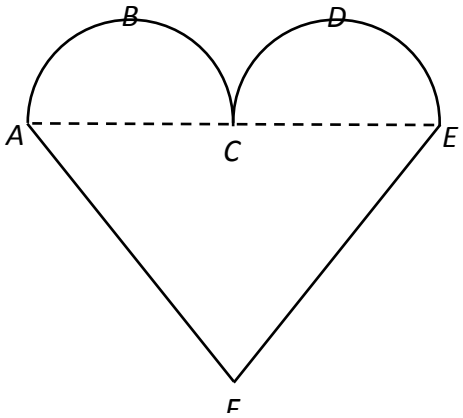



**Figure 5a**

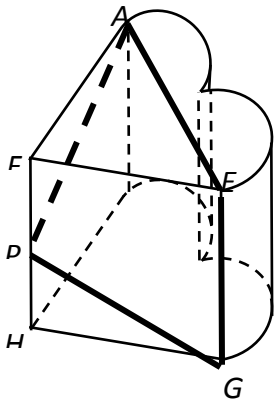



**Figure 5b**

**(a)** Find the radius of a semi-circle. **(2 marks)**

**(b) (i)** Find *CF*.

**(ii)** Rose claims that $\Delta AEF$ is a right-angled triangle. Do you agree? Explain your answer.

**(4 marks)**

**(c)** Mary's logo is being selected to make a souvenir for promoting the walkathon as shown in **Figure 5b**. Her logo is printed on a wooden prism with the base same as her logo frame. Let *G* and *H* be the points on the bottom base vertically below *E* and *F* respectively. Two **identical** thin ribbons are used to decorate the souvenir by connecting *G* and *A*. One ribbon passes through the vertex *E*, while the other ribbon passes through a point *P* on *FH* making *GPA* the shortest. Find the height of the souvenir. **(2 marks)**

**~ End ~**