

Year 10 Term 2 Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

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1 Year 10 Term 2 Week 1 Homework

1.1 Deductive Geometry

1.1.1 Pythagoras' Theorem

In any right-angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides. That is, $c^2 = a^2 + b^2$.

Exercise 1.1.1 Which of the following could be the sides of a right-angled triangle? All lengths are in cm.

1. 3, 4, 5 _____

2. 9, 12, 15 _____

3. 8, 10, 14 _____

Exercise 1.1.2

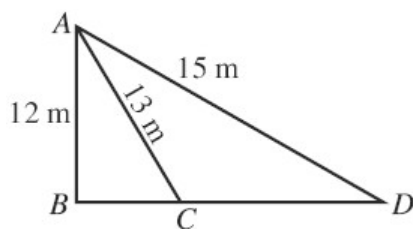
1. An isosceles triangle has a base of 40 cm and congruent sides of 29 cm. Find the altitude of the triangle.

2. In a right-angled triangle, the hypotenuse is 8 cm longer than the shortest and 4 cm longer than the third side. Find the length of the sides.

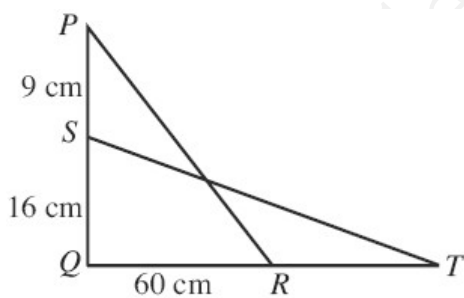
3. The diagonals of a rhombus are 32 cm and 60 cm. Find the perimeter of the rhombus.

Exercise 1.1.3

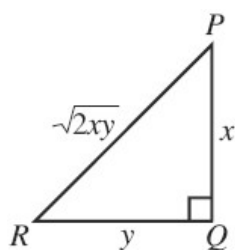
1. Find the length of CD in the following figure:



2. In the diagram, $PQ \perp QT$, $PR = ST$, $PS = 9$ cm, $SQ = 16$ cm and $QR = 60$ cm. Find the length of RT .

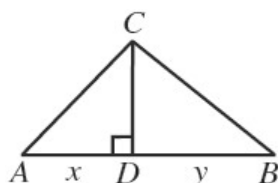


3. Show that $\triangle PQR$ is isosceles.



Exercise 1.1.4

1. In triangle ABC , CD is an altitude and $\frac{AD}{CD} = \frac{CD}{DB}$. Let $AD = x$ and $DB = y$.

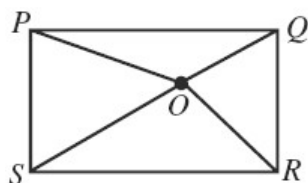


(a) Show that $CD = \sqrt{xy}$.

(b) Find expressions for AC^2 and BC^2 in terms of x and y .

(c) Hence, show that $\triangle ABC$ is right-angled.

2. $PQRS$ is a rectangle and O is any point in the interior. Prove that $OP^2 + OR^2 = OQ^2 + OS^2$.



1.2 Miscellaneous exercises**Exercise 1.2.1**

1. If $x = \frac{1}{2}$, $y = \frac{2}{3}$ and $z = \frac{3}{4}$, evaluate:

(a) $\sqrt{\frac{xy}{z}}$

(b) $\frac{x^2}{z} \times \frac{2}{y}$

2. Expand and simplify the following:

(a) $\frac{1}{2}(x + 3) + \frac{1}{3}(x + 2)$

(b) $\frac{(x-3)^2}{(2x-1)^2} - \frac{(x+2)^2}{(2x-1)^2}$

(c) $x^{-1} \times 2x^{\frac{1}{2}}$

(d) $9^{\frac{x}{2}} \times 27^{\frac{x}{3}}$

Exercise 1.2.2

1. Change subject of the equations shown in brackets [].

(a) $A = 4\pi r^2$ [r]

(b) $A = \frac{1}{2}(x + y)h$ [x]

2. Simplify the following expressions:

(a) $5x\sqrt{x} - \sqrt{x^3}$

(b) $\frac{5\sqrt{2}}{3\sqrt{6}-4\sqrt{2}}$

(c) $\frac{3}{\sqrt{6}-2} + \frac{3}{\sqrt{6}+2}$

3. Factorise the following expressions:

(a) $a^2 - 5a - 24$

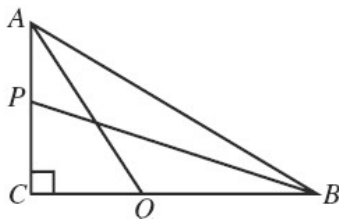
(b) $6ab + bc + 3b^2 + 2ac$

(c) $16x^2 + 16x - 5$

1.3 Maths challenge

Exercise 1.3.1

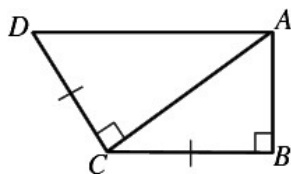
1. In $\triangle ABC$, $AC \perp BC$. P is any point on AC and Q is any point on CB .



(a) Prove that $AQ^2 + BP^2 = AB^2 + PQ^2$.

(b) If P and Q are the midpoints of AC and BC respectively, prove that $AQ^2 + BP^2 = 5PQ^2$.
 [Hint: Let $AC = 2x$ and $BC = 2y$.]

2. $AB \perp BC$, $DC \perp CA$ and $BC = CD = 2AB$. Prove that $AD = 3AB$.



Exercise 1.3.2 Solve the following quadratic equations:

1. $x^2 - 7x + 12 = 0.$

2. $6x^2 - 7x + 5 = 0.$

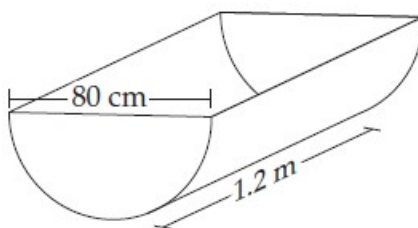
3. $2x^2 - 4x - 7 = 0.$

4. $3x^2 - 2x + 5 = 0.$

5. *Solve by completing square* $4x^2 - 4x - 2 = 0.$

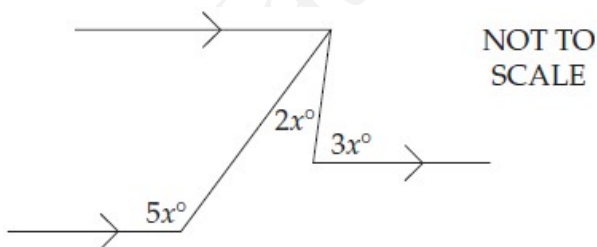
Exercise 1.3.3

1. A bath is in the shape of half a cylinder. Find the surface area and the volume of the bath.



2. How many sides are there on the polygon with a angle sum of 1080° .

3. Find the value of x .



4. George won \$2500 and decides to invest it for 5 years. He has two options: Option A 6% per annum compounded monthly. Option B 7% per annum simple interest. Show by calculation, which option gives him more interest and by how much.
