

Year 9 Term 3 Homework

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

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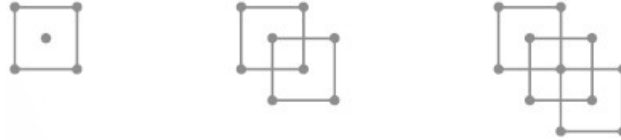
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10 Year 9 Term 3 Week 10 Homework

10.1 The Linear Function

Exercise 10.1.1



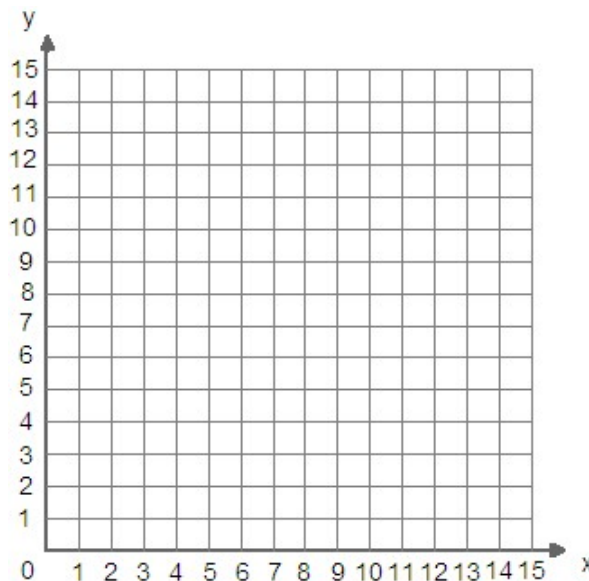
1. Complete the table below:

Number of squares (x)	1	2	3	4	5
Number of dots (y)					

2. How many dots are being added in each step?

3. Write down an equation in the form $y = mx + b$ that shows the relationship between the number of dots and the number of squares in each step.

4. Plot the values from the table on a number grid.



10.2 Trigonometry

10.2.1 Trigonometric ratios using a calculator

Exercise 10.2.1 Evaluate, correct to the nearest hundredth:

- $\frac{12 \sin 58^\circ}{5 \sin 26^\circ}$ _____
- $\frac{23 \tan 82^\circ}{15 \cos 72^\circ}$ _____
- $\frac{\tan 35^\circ - \sin 28^\circ}{\sin 36^\circ + \tan 74^\circ}$ _____
- $\frac{\sin 45^\circ + \cos 72^\circ}{\cos 29^\circ \tan 54^\circ}$ _____
- $\frac{\cos 40^\circ \sin 16^\circ}{\cos 40^\circ + \sin 16^\circ}$ _____

Exercise 10.2.2 Further applications

- If $\sin \theta = 0.7431$, find $\cos \theta$, $\tan \theta$, correct to 4 decimal places.

- If $\cos \theta = 0.9135$, find $\sin \theta$, $\tan \theta$, correct to 4 decimal places.

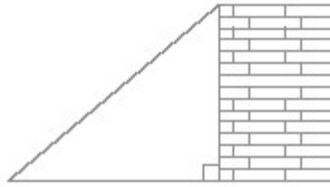
- If $\tan \theta = 3.078$, find $\sin \theta$, $\cos \theta$, correct to 4 decimal places.

Exercise 10.2.3 If $\alpha = 60^\circ$, find, correct to 2 decimal places:

- $\sin 2\alpha$ _____
- $2 \sin \alpha$ _____
- $\sin \frac{\alpha}{2}$ _____
- $5 \sin (2\alpha - 75^\circ)$ _____

10.2.2 Problems involving finding sides

Exercise 10.2.4 Answer the following questions, correct to 2 decimal places.



1. A ladder leans against a wall, making an angle of 62° with the ground. The foot of the ladder is 3 m from the base of the wall. How far up the wall will the ladder reach?

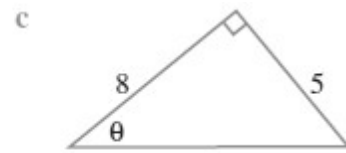
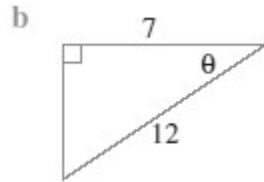
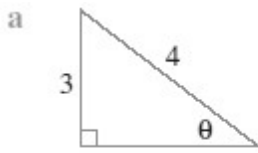
2. A second ladder of length 6 m leans against the wall and makes an angle of 22° with the wall. How far is the foot of the ladder from the base of the wall?

3. A third ladder leans against the wall and makes an angle of 71° with the ground. Find the length of the ladder if it reaches 8 m up the wall.

Exercise 10.2.5 The angle between the vertical and the slant edge of a cone is 24° and the perpendicular height of the cone is 9 cm. Find the length of the diameter, correct to the nearest centimetre.

10.2.3 Problems involving finding angles

Exercise 10.2.6 Find the size of the angles marked θ , correct to the nearest degree.

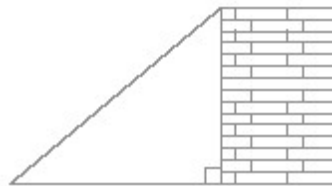


a. $\theta =$ _____

b. $\theta =$ _____

c. $\theta =$ _____

Exercise 10.2.7 In each of the following questions, give all angles correct to the nearest degree.



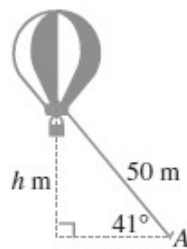
1. A ladder length 5 m leans against a wall. The foot of the ladder is 1.5 m from the base of the wall. Find the angle formed between the ladder and the ground.

2. The foot of a ladder is 2.8 m from the base of the wall and the ladder reaches 7.6 m up the wall. Find the angle made by the ladder with the wall.

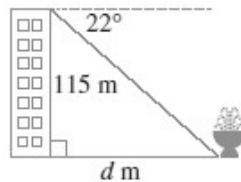
10.2.4 Angles of elevation and depression

- The angle of elevation is the angle between the horizontal and the line of sight when the observer is looking upward.
- The angle of depression is the angle between the horizontal and the line of sight when the observer is looking downward.

Exercise 10.2.8 A hot-air balloon hovering above an airfield remains tethered to the ground at A by a 50 m long rope. A man standing on ground at A observes the angle of elevation of the balloon to be 41° . Find the height of the balloon, correct to the nearest metre.



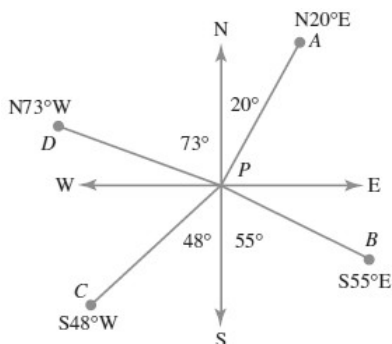
Exercise 10.2.9 From the top of 115 m high tower, the angle of depression of a fountain is 22° . Find the distance between the fountain and the base of the tower, correct to nearest metre.



10.2.5 Compass bearings

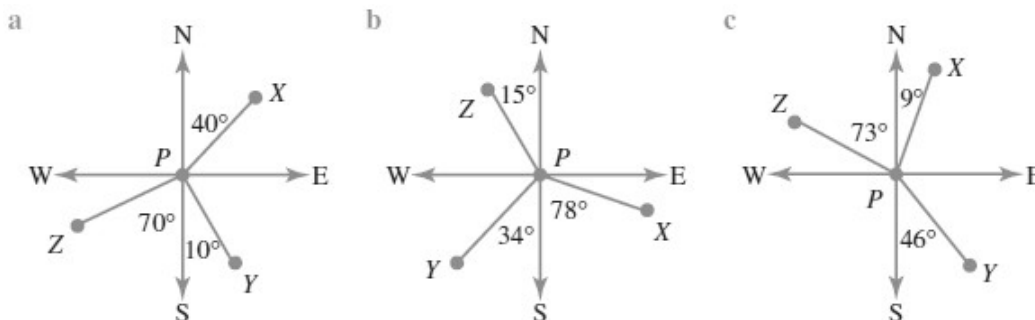
- A compass bearing is a deviation involving the four cardinal directions north, south, east and west.
- Compass bearings are always measured from the north or south and towards the east or west.
- A bearing such as NE means $N45^\circ W$. SE means $S45^\circ E$, etc..

Example 10.2.1



1. The bearing of A from P is $N20^\circ E$
2. The bearing of B from P is $S55^\circ E$
3. The bearing of C from P is $S48^\circ W$
4. The bearing of D from P is $N73^\circ W$

Exercise 10.2.10 Find the compass bearings from P of the points X, Y and Z

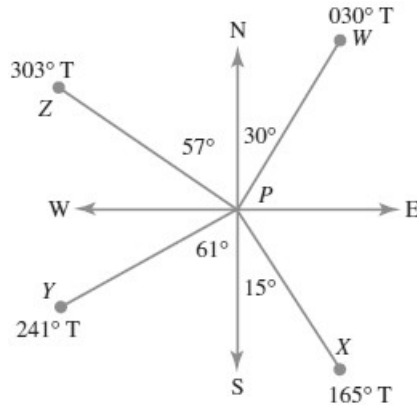


- a** Point X _____ , Point Y _____ , Point Z _____
- b** Point X _____ , Point Y _____ , Point Z _____
- c** Point X _____ , Point Y _____ , Point Z _____

10.2.6 True bearings

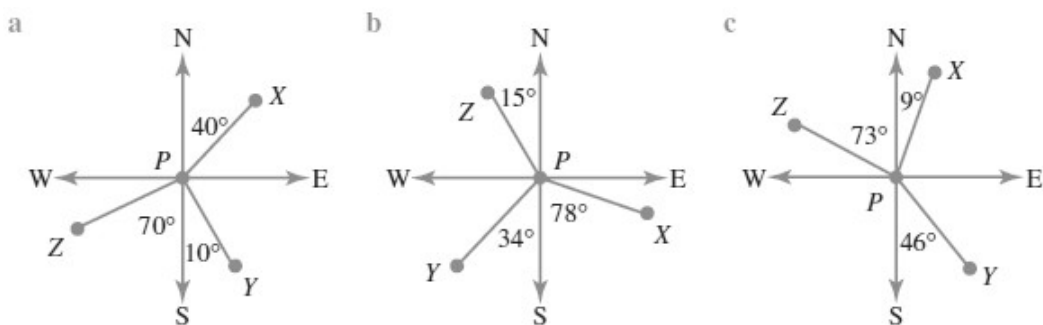
- A true bearing is a deviation from north, measured in a clockwise direction.
- By convention, a true bearing is written using 3 digits.

Example 10.2.2



1. Point W is $030^\circ T$
2. Point X is $165^\circ T$
3. Point Y is $241^\circ T$
4. Point Z is $303^\circ T$

Exercise 10.2.11 Find the true bearings from P of the points X, Y and Z

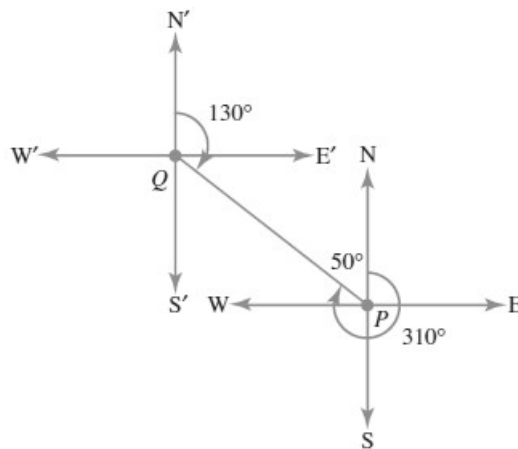


- a** Point X _____ , Point Y _____ , Point Z _____
- b** Point X _____ , Point Y _____ , Point Z _____
- c** Point X _____ , Point Y _____ , Point Z _____

10.2.7 Opposite bearings

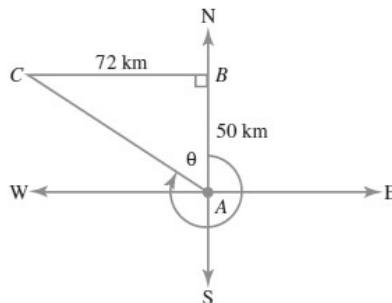
- The opposite bearing of B from A is the bearing of A from B.
- To find the bearing of A from B given the bearing of B from A:
 - draw a compass at B and mark on this compass the angle from north around to the ray BA
 - on the compass with centre A, find the acute angle between BA and the north-south axis
 - use parallel line properties to find the required bearing on the compass with centre B.
- Opposite bearing always differ by 180°

Example 10.2.3 The bearing of Q from P is 310° . Find the bearing of P from Q.



Solution: $\angle NPQ = 360^\circ - 310^\circ = 50^\circ$
 $\angle N'QP = 180^\circ - 50^\circ = 130^\circ$ (*co-interior \angle s, and $N;Q \parallel NP$*)
 \therefore The bearing of P from Q is 130° .

Exercise 10.2.12 Ken drove due north from A to B for 50 km. He then turned and drove due west to C, which is 72 km from B. Find the bearing of C from A correct to nearest degree.



Exercise 10.2.13 Use a pair of alternate angles to find the true bearing of P from Q, given that the bearing of Q from P is:

1. 125° _____

2. 329° _____

3. 143° _____

Exercise 10.2.14 For each of the following, draw a neat diagram, then find the required distance, correct to 2 decimal places.

1. Linda drove for 72 km on a bearing of 051° . How far did she drive north?

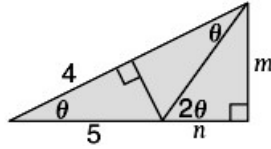
2. Luke walked for 13 km on a bearing of 122° . How far did he walk east?

3. Mike sailed for 115 km on a bearing of 343° . How far did he sail west?

10.3 Maths Challenge

Exercise 10.3.1

1. For the figure shown below, Find:



(a) $\sin \theta$ _____

(b) $\cos \theta$ _____

(c) m and n _____

(d) $\sin 2\theta$ _____

(e) Hence prove that $\sin 2\theta = 2 \times \sin \theta \times \cos \theta$

2. If $\frac{x}{10} = \cos 60^\circ$, find the value of x .

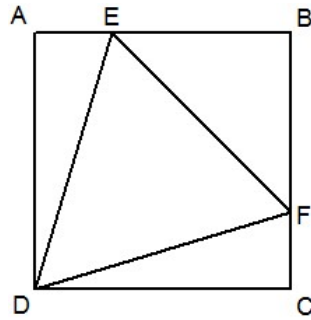
3. If $a = 3 \sin 40^\circ + 4 \cos 30^\circ$, find the value of a correct to 3 decimal places.

4. What is the area of a hexagon of side P units?

10.4 Miscellaneous Exercise

Exercise 10.4.1

1. An equilateral triangle is inscribed in a square as shown below in the diagram. If the triangle has sides of length 1 cm, Find the area of the square.



2. A right-angle isosceles triangle has area 4 cm^2 . Find the perimeter of the triangle.

3. The sum of all but one of the internal angles of a pentagon is 380° . Find the number of degrees in the remaining angle.

4. A right-angled triangle PQR has its hypotenuse PR trisected at points S and T .
If $QS^2 + QT^2 = kPR^2$, find the value of k .
