DAYSPRING INTERNATIONAL ACADEMY

Mathletics for Upper Secondary

Read the questions *carefully*. Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

Student's Name: _____

Instructor's Name: Nana Baah Akuffu

Time Allowed: 10 minutes

1. If two angles form a linear pair and one is 52°, what is the other angle?

Solution:
If the angles are linear pair, then they add up to 180°. Hence let the x be the size of the other angle.

$$x + 52^\circ = 180^\circ \tag{1}$$
$$x = 180^\circ - 52^\circ \tag{2}$$
$$x = 122^\circ \tag{3}$$

2. What is the name of the triangle with no equal sides?

Solution:
Scalene Triangle

3. A regular polygon of 12 sides has an exterior angle of?

Solution:
Let e be the interior angle of the polygon. Then

$$e = \frac{360^\circ}{n} \tag{4}$$
$$e = \frac{360^\circ}{12^\circ} \tag{5}$$
$$e = 30^\circ \tag{6}$$

4. What is the supplement of 60°?

Solution:
Supplementary angles add up to 180°. Let x be the angle, then

$$x + 60^\circ = 180^\circ \tag{7}$$
$$x = 180^\circ - 60^\circ \tag{8}$$
$$x = 120^\circ \tag{9}$$

5. In a right–angled triangle, the acute angles are congruent. What is the measure of each angle?

Solution:
45°

6. Find the the number of sides of a regular polygon if the sum of interior angles is 540°?

Solution:
Let n be the number of sides. Then

$$(n-2)180 = 540 \tag{10}$$
$$180n - 360 = 540 \tag{11}$$
$$180n = 540 + 360 \tag{12}$$
$$180n = 900 \tag{13}$$
$$n = \frac{900}{180} \tag{14}$$
$$n = 5 \tag{15}$$

7. When a line cuts two parallel lines, it produces some pairs of congruent angles. Names these angles.

Solution:

1. Z angles or alternating angles
2. Vertically opposite angles
3. Corresponding angles

8. Find the perimeter in cm of a rectangle whose length is $176mm$ and width $184mm$.

Solution:
Let l be the length and b be the breadth. Now $176mm$ is the same as $17.6cm$ and $184mm$ will be $18.4cm$. Hence, the perimeter, P of the rectangle will be

$$P = 2(l + b) \tag{16}$$
$$P = 2(17.6 + 18.4) \tag{17}$$
$$P = 2(36.0) = 72cm \tag{18}$$

9. If two angles form a linear pair and one is 52°, what is the other angle?

Solution:
If the angles form a linear pair, then they add up to 180°. Let x be the angle, then,

$$x + 52^\circ = 180^\circ \tag{19}$$
$$x = 180^\circ - 52^\circ \tag{20}$$
$$x = 128^\circ \tag{21}$$

10. An angle is 8 more than its complement. Find the angle.

Solution:
Let x be the angle and y the other complement. From the question $x = y + 8$ and since complementary angles add up to 90° we can have

$$x + y = 90^\circ \tag{22}$$
$$y + 8 + y = 90^\circ \tag{23}$$
$$2y = 82^\circ \tag{24}$$
$$y = 41^\circ \tag{25}$$

Hence $x = y + 8 = 49^\circ$

11. Each side of a marble tile is $16cm$ long. How many tiles are needed to cover an area of $5120cm^2$?

Solution:
The area of one marble tile will be $256cm^2$. Hence if the area of the total space is $5120cm^2$, then we will need $\frac{5120}{256} = 20$ marble tiles.

12. Find the halfway point between the points $A(1, -2)$ and $B(-3, -5)$.

Solution:
The midpoint if AB is given by

$$\text{Midpoint} = (\frac{1-3}{2}, \frac{-5-3}{2}) \tag{26}$$
$$= (\frac{-2}{2}, \frac{-7}{2}) \tag{27}$$
$$= (-1, \frac{-7}{2}) \tag{28}$$

13. Name any 3 quadrilaterals which has at least one congruent sides.

Solution:
Any 3 of these;

1. Kite
2. Parallelogram
3. Square
4. Rhombus
5. Rectangle

14. A three sided regular polygon is?

Solution:
An Equilateral Triangle

15. Describe a Right–angled triangle.

Solution:
This is a triangle which has one of its angles to be 90°.

16. Find the distance between the origin and the points $(4, 5)$.

Solution:
Let d be the distance, then

$$d = \sqrt{(4-0)^2 + (5-0)^2} \tag{29}$$
$$d = \sqrt{16+25} \tag{30}$$
$$d = \sqrt{41}. \tag{31}$$

17. A line l_1 is defined by the equation $2x + y = 1$. If l_2 is parallel to l_1, find the equation of the line l_2 if it passes through the origin.

Solution:
Since l_2 is parallel to l_1, then the gradient of l_2 is -2. Hence if l_2 passes through the origin, then

$$\frac{y-0}{x-0} = -2 \tag{32}$$
$$y = -2x. \tag{33}$$

18. What is the difference between a prism and a pyramid?

Solution:
A pyramid has a vertex whilst a prism does not.

19. What do we call a parallelogram with 4 equal sides and 4 right angles?

Solution:
A **square**

20. *Challenge Problem.* Two sides of a triangle have lengths $6cm$ and $8cm$. Find an interval for the third side.