Barker College

Student Name: _____

Teacher Initials: _____

BHC
HYB
LZM*
ALY
JZT
ARM

Tuesday, 31th August 2021
Period 1 or 2
40 minutes

Year 9
5.3 MATHEMATICS
Formative Task 3
Checkpoint

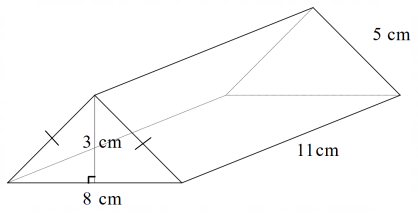
General Instructions

- Write your name in the spaces provided
- Complete on OneNote using your stylus
- Answer in the spaces provided
- NESA approved calculators may be used
- Show ALL necessary working
- Diagrams are NOT to scale
- Marks may not be awarded for careless or poorly arranged working
- A formula sheet has been provided at the end of the paper
- This is an open book task, you may use your exercise book and any notes you have made

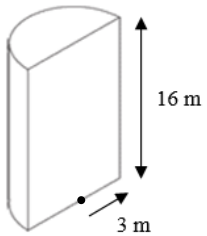
Section	Marks
1. Surface Area and Volume	/ 15
2. Equations and Inequalities	/ 20
3. Coordinate Geometry	/ 14
Total Marks:	**/ 49**

Part 1: Surface Area and Volume (15 marks)

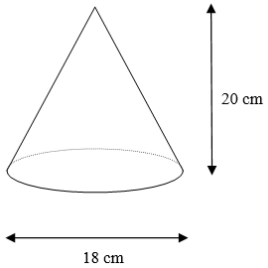
1. Find the surface area of the isosceles triangular prism. **3**



2. Calculate the surface area of this closed half cylinder correct to 2 decimal places. **3**



3. Calculate the volume of this cone to the nearest cm^3. **2**



4. A tennis ball has a radius of 3.5cm.

i. What is the volume of one tennis ball correct to 3 significant figures? **3**

ii. If 4 tennis balls fit inside a cylindrical can as shown, what is the radius and height of the can? **2**

iii. What is the volume of the can, correct to 2 decimal places, that IS NOT being taken up by the 4 tennis balls? **2**

Part 2: Equations and Inequalities (20 marks)

5. Solve the following equations.

a. $4x-3=21$ **2**

b. $4-\frac{3m}{2}=12$ **2**

c. $\frac{2x-3}{4}-\frac{x-2}{5}=1$ **3**

6. Consider the equation: $S=\frac{n}{2}(2a+(n-1)d)$.

i. If $a=2$, $d=3$ and $n=5$, find S. **1**

ii. Make d the subject of the formula. **3**

7. Solve the following inequality and plot your solution on the number line below. **3**

$$2(5-b) > -22$$

8. In a rectangle with a perimeter of 22cm, the longer sides are 3cm longer than the shorter sides. What are the dimensions of the rectangle? **3**

9. Solve: **3**

$$2\left(\frac{3}{x}-5\right)=7-\frac{2}{x}$$

Part 3: Coordinate Geometry (14 marks)

10. What is the equation of the vertical line that passes through the point (5, 3)? **1**

11. Find the exact distance between the points (-2, -5) and (4, -6). **2**

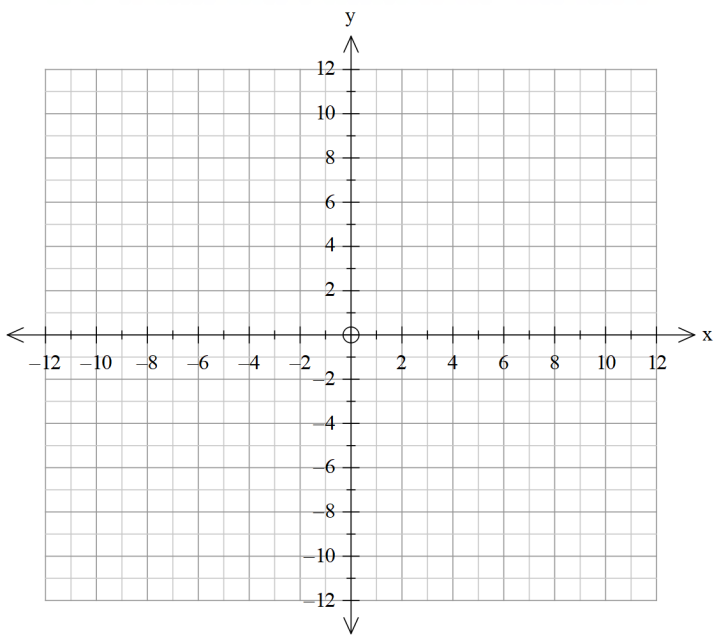
12. Find the midpoint of the interval joining (1, 5) and (3, 9). **1**

13. Find the gradient of the line that passes through the points (4, -5) and (-3, 5). **2**

14. What is the gradient and the y-intercept of the line $3x-2y-5=0$ **2**

15. Sketch the line $y = \frac{2x}{3} - 4$ on the coordinate plane below. **3**

(Hint: Make sure to label both intercepts.)



16. The point C (x,8) lies 13 units from the midpoint of interval AB where A is (-1, 2) and B is (5,4). By first drawing a diagram find all possible exact values of x. **3**

End of Assessment

Formula Sheet

Coordinate Geometry

Gradient of a line

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Distance between two points

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Midpoint of an interval joining two points

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Area

Circle

$$A = \pi r^2$$

Sector

$$A = \frac{\theta}{360} \pi r^2$$

Annulus

$$A = \pi \left(R^2 - r^2 \right)$$

Trapezium

$$A = \frac{h}{2}(a + b)$$

Surface Area

Sphere

$$A = 4\pi r^2$$

Closed cylinder

$$A = 2\pi r^2 + 2\pi rh$$

Cone

$$A = \pi r^2 + \pi rl$$

Volume

Prism or cylinder

$$V = Ah$$

Pyramid or cone

$$V = \frac{1}{3} Ah$$

Sphere

$$V = \frac{4}{3} \pi r^3$$

Volume and Capacity

Unit conversion: 1 m^3 = 1000 L

Yr 9 5.3 Formative Task

1. $SA = 2\left(\frac{1}{2} \times 8 \times 3\right) + 2 \times (5 \times 11) + 11 \times 8$
$= 222 cm^2$

2. $SA = 2\left(\frac{1}{2} \times \pi \times 3^2\right) + 2\pi(3)(16) + (16 \times 3)$
$= 275.07 m^2$

3. $V = \frac{1}{3} \times \pi \times 9^2 \times 20$
$= 1696 cm^3$

4. i) $V = \frac{4}{3} \pi (3.5)^3$
$= 180 cm^3$

ii) $r = 3.5$
$h = 28$

iii) $V = \pi(3.5)^2 \times 28 - 4(180)$ (from i)
$= 357.57 cm^3$

5. a) $4x - 3 = 21$
$4x = 24$
$x = 6$

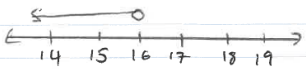
b) $4 - \frac{3m}{2} = 12$
$-\frac{3m}{2} = 8$
$-3m = 16$
$m = \frac{-16}{3}$

c) $\frac{2x-3}{4} - \frac{x-2}{5} = 1$
$10x - 15 - 4x + 8 = 20$
$6x = 27$
$x = \frac{27}{6}$

6. i) 40

ii) $S = \frac{n}{2}(2a + (n-1)d)$
$\frac{2S}{n} - 2a = d(n-1)$
$d = \frac{\frac{2S}{n} - 2a}{n-1}$

7. $2(5-b) > -22$
$5 - b > -11$
$-b > -16$
$b < 16$



8. $2x + 2y = 22$ ... ①
$x + 3 = y$ ... ②
② into ①
$2x + 2(x+3) = 22$
$4x + 6 = 22$
$4x = 16$
$x = 4$
$y = 7$

9. $2\left(\frac{3}{x} - 5\right) = 7 - \frac{2}{x}$
$6 - 10x = 7x - 2$
$-17x = -8$
$x = \frac{8}{17}$

Yr 9 5.3 Formative Task

10 $x = 5$

11 $d = \sqrt{(4--2)^2 + (-6--5)^2}$
$= \sqrt{37}$

12 $(2, 7)$

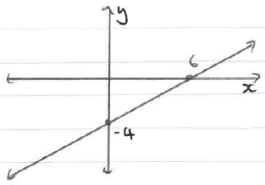
13 $m = \frac{-10}{7}$

14 $3x - 2y - 5 = 0$
$-2y = -3x + 5$
$x = \frac{3}{2}x - \frac{5}{2}$

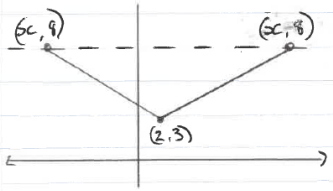
$\therefore m = \frac{3}{2}$

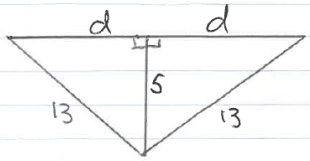
15 $y = \frac{2x}{3} - 4$

y int $= -4$ x int $= 6$



16 Midpoint AB $= 2, 3$





$d^2 = 13^2 - 5^2$
$d = 12$

$\therefore$ 2 possible points
$(14, 8)$ $(-10, 8)$