Name: _____
Teacher: _____

ROSEBANK COLLEGE

2012
YEAR 10
TERM 1 TEST

COMMON MATHEMATICS

Time Allowed: 1 Period
Topics: Surface Area and Volume; Ratio

Weight: 20%

Instructions to Students: Calculators permitted
Show any necessary working

Outcomes to be assessed:

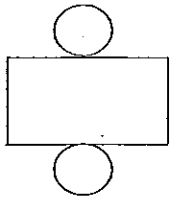
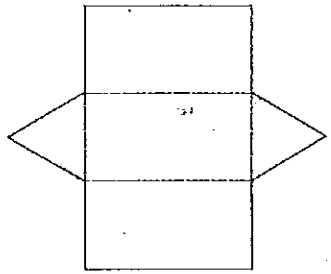
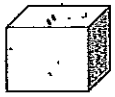
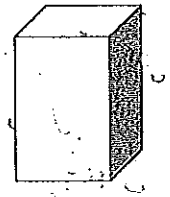
- MS4.2 Calculates surface area of rectangular and triangular prisms and volume of right prisms and cylinders
- MS5.2.2 Applies formulae to find the surface area of right cylinders and volume of right pyramids, cones and spheres, and calculates the surface area and volume of composite solids
- NS4.3 Operates with fractions, decimals, percentages and ratios

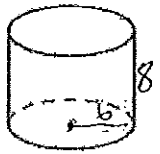
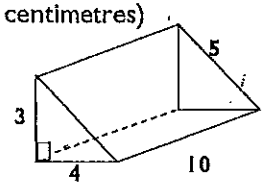
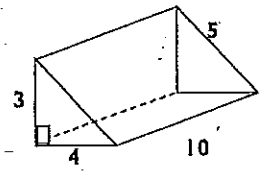
Name: _____
Teacher: _____

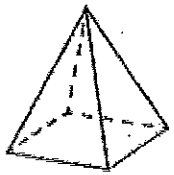
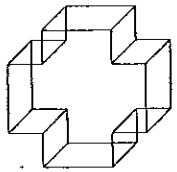
SECTION 1: SHORT ANSWER QUESTIONS

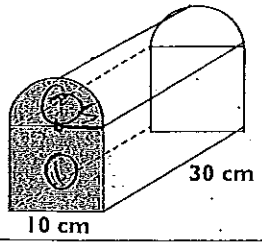
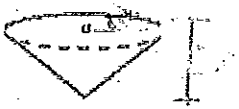
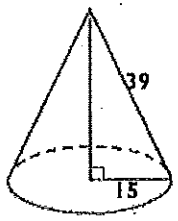
All linear units are in centimetres, unless otherwise stated.

SURFACE AREA AND VOLUME

Questions	Working	Answer	Marks
1. Name the solid formed by each net. a)  b) 		a) b)	1 1
2a. What is the total surface area of the **closed cube** below? Each side is 4 cm 		Surface Area	2
2b. What is the total surface area of this closed rectangular prism with base dimensions 5 cm and 6 cm; prism height = 8 cm 		Surface Area	3

Questions	Working	Answer	Marks
3. Find the surface area of this **cylinder** with **no lid** (to the **nearest cm²**). Base radius = **6 cm** height = **8 cm**  	Curved Surface Area = *(Use $C = 2\pi rh$)* Base Area (circle) =	Total Surface Area =	**3**
4. Complete the working steps shown to find the **surface area** of this triangular prism. (all units are in centimetres)  	2 Triangles = Back Rectangle = Front Rectangle = Base Rectangle =	Total surface area =	**3**
5. Find the **volume** of this triangular prism. (all centimetres)  	Use V = AH, where A is the area of base and H is height of the prism	Volume =	**3**

Questions	Working	Answer	Marks
6. Find the **volume** of this pyramid if its **base area** is **12·5** cm^2 and height is **5** *cm*.  Formula V = 1/3 A x h		Volume =	**2**
7. **a)** What is the capacity, in **millilitres**, of this solid, if its volume is **600 cm³**?  **b)** Convert this capacity to **Litres**.		**a)** **b)**	**1** **1**
8. Find the **volume** of the hemisphere below, to one decimal place, if the **diameter** is **12** cm. ***Note: The volume of a sphere is given by:*** $V = \frac{4}{3}\pi r^3$. 		Volume =	**2**

Questions	Working	Answer	Marks
9. This regular prism has an end which is a **semi-circle** joined to a **square**. Find the **shaded** end area and hence find the prism's **volume**, correct to (1) decimal place. Each side of the square is **10** cm. 	End Area =	a) End area =	2
	Volume =	b) Volume =	2
10. The cone shaped storage tank below is completely filled with grain. All units are in metres. Top **radius** is **5m** and **height** is **3m**  Find the volume of the tank to the nearest m^3. *Note: The volume of a cone is given by:* $V = \frac{1}{3}\pi r^2 h$		Volume of Cone =	2
11. Find the **height** of the cone (to the nearest cm) Slant height = 39 cm Base Radius = 15 cm 		Height =	2

Name:

Teacher:

SECTION 2: SHORT ANSWER QUESTIONS

RATIOS

Questions	Working	Answer	Marks
1. A jar has ~~red~~ and *blue* lollies. If there are **6** *red* for every **5** **blue** *lollies* in the jar: a) Find how many ~~**green**~~ *red* lollies if there are **65** **blue**. b) Find how many ~~red~~ lollies if the total number of red and ~~green~~ lollies in the jar is **132**.	a) b)	a) b)	1 1
2. a) If you mix **7½** cups of flour with **2½** cups of milk, what is the ratio of flour to milk in its simplest form? b) If you mix **25** **grams** of salt with every **kilogram** of meat; what is the simplified ratio of salt to meat?	a) b)	a) b)	2 ½ 2
3. A rectangle has a length of **10** **cm** and a breadth of **5** **cm.** Find the simplified ratio of the **length** to the **perimeter.**			2
4. The lengths of the sides of a triangle are in the ratio **2:3:4.** If the **perimeter** of the triangle is **45** cm, find the length of the **shortest side.**			2
5. Express **20** minutes to **4** hours as a ratio in its **simplest** form.			2

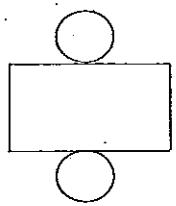
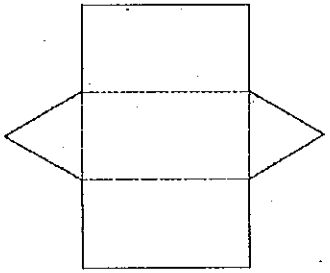
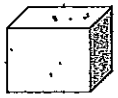
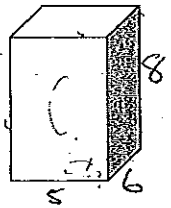
Name: ANSWERS

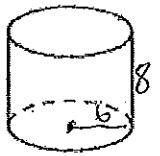
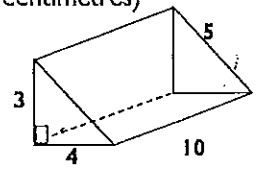
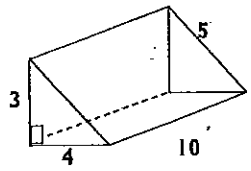
Teacher: _____

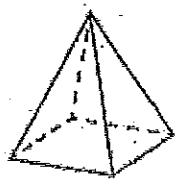
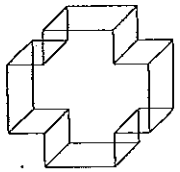
SECTION 1: SHORT ANSWER QUESTIONS

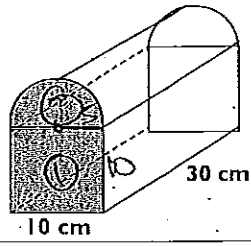
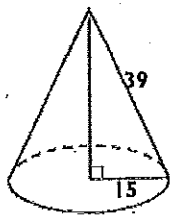
All linear units are in centimetres, unless otherwise stated.

SURFACE AREA AND VOLUME

Questions	Working	Answer	Marks
1. Name the solid formed by each net. **a)**  **b)** 		a) Cylinder ✓ b) ~~Rectangular~~ triangular prism ✓	1 1
2a. What is the total surface area of the **closed cube** below? Each side is 4 cm 	$4\times4=16\times6$ $=96$	Surface Area ✓ $\therefore SA=96cm^2$	2
2b. What is the total surface area of this closed rectangular prism with base dimensions 5 cm and 6 cm; prism height = 8 cm 	$(6\times8)\times2=96$ $(6\times5)\times2=60$ $(8\times5)\times2=80$	Surface Area ✓ $\therefore SA=236cm^2$	3

Questions	Working	Answer	Marks
3. Find the surface area of this **cylinder** with **no lid** (to the **nearest** cm^2). Base radius = 6 cm height = 8 cm 	Curved Surface Area = *(Use $C=2\pi rh$.)* $2\times\pi\times6\times8$ $=301.6$ Base Area (circle) = $\pi\times6^2$ $=113.1$ $301.6+113.1=$ $\therefore SA=414.7cm^2$	Total Surface Area = ✓	3
4. Complete the working steps shown to find the **surface area** of this triangular prism. (all units are in centimetres) 	2 Triangles = $\frac{1}{2}bxh$ $=(\frac{1}{2}\times4\times3)\times2$ $=12$ + Back Rectangle = $3\times10=30$ $\therefore SA=132cm^2$ ✓ Front Rectangle = $5\times10=50$ Base Rectangle = $4\times10=40$	Total surface area = $12+30+50+40$	3
5. Find the **volume** of this triangular prism. (all centimetres) 	Use V = AH, where A is the area of base and H is height of the prism $V=\frac{1}{2}\times3\times4\times10$ $=60cm^3$	Volume = ✓ $\therefore V=60cm^3$	3

Questions	Working	Answer Marks
6. Find the **volume** of this pyramid if its **base area** is **12·5** cm^2 and height is **5** *cm*.  Formula V = 1/3 A x h	$\frac{1}{3} \times 12.5 \times 5$ $= 20.83 cm^3$	Volume = $\therefore V = 20.83 cm^3$ 2
7. **a)** What is the capacity, in **millilitres**, of this solid, if its volume is **600 cm³**?  **b)** Convert this capacity to **Litres**.	A) = 600 ml B = 0.6L	a) 600ml b) 0.6L 1 1
8. Find the **volume** of the hemisphere below, to one decimal place, if the **diameter** is **12** cm. ***Note: The volume of a sphere is given by:*** $V = \frac{4}{3}\pi r^3$. 	$\frac{4}{3} \times \pi \times 6^3 \div 2$ $= 452.39 cm^3$	Volume = $\therefore V = 452.39 cm^3$ 2

Questions	Working	Answer Marks
9. This regular prism has an end which is a **semi-circle** joined to a **square**. Find the **shaded** end area and hence find the prism's **volume**, correct to (1) decimal place. Each side of the square is **10** cm.  	End Area = ① = 10 x 10 = 100 $= \pi r^2 \div 2$ $= 39.27$ $= 139.27 cm^2$ Volume = A x h $= 139.27 \times 30$ $= 4178.1 cm^3$	a) End area = 2 b) Volume = $\therefore V = 4178.1 cm^3$ 2
10. The cone shaped storage tank below is completely filled with grain. All units are in metres. Top **radius** is **5m** and **height** is **3m** Find the volume of the tank to the nearest m^3. *Note: The volume of a cone is given by:* $V = \frac{1}{3}\pi r^2 h$	$\frac{1}{3} \times \pi \times 5^2 \times 3$ $= 78.54 cm^3$	Volume of Cone = $\therefore V = 78.54 cm^3$ 2
11. Find the **height** of the cone (to the nearest cm) Slant height = 39 cm Base Radius = 15 cm  	Pythagoras Theorem $a^2 + b^2 = c^2$	Height = $39^2 - 15^2$ $\sqrt{\text{ANS}}$ $h = 36 cm$ 2

Name:
Teacher:

SECTION 2: SHORT ANSWER QUESTIONS

RATIOS

Questions	Working	Answer	Marks
1. A jar has ~~red~~ and ~~green~~ lollies. If there are **6 ~~green~~** for every **5 blue** ~~marbles~~ in the jar: **a)** Find how many **green** lollies if there are **65 blue**. **b)** ~~Find how many red lollies if the total number of red and green lollies in the jar is 132.~~	a) 6:5 ratio $6 \div 5 = 1.2 \times 65$ $= 78$ ✓ b)	a) b)	1 1
2. **a)** If you mix **7½** cups of flour with **2½** cups of milk, what is the ratio of flour to milk in its simplest form? **b)** If you mix **25 grams** of salt with every **kilogram** of meat; what is the simplified ratio of salt to meat?	a) $7.5:2.5$ $= 7.5 \div 2.5 = 3:1$ ✓ b) $0.25:1$ ✗ $= \frac{1}{4}$ m or $1:40$ ✓	a) b) $25g : 1000g$ $1:40$	2 1/2
3. A rectangle has a length of **10 cm** and a breadth of **5 cm**. Find the simplified ratio of the **length** to the **perimeter**.	5, 10 $= 1:2$ or $= \frac{1}{2}$	length : perimeter $10 : 30$ ✗ $1:3$	2
4. The lengths of the sides of a triangle are in the ratio **2:3:4**. If the **perimeter** of the triangle is **45** cm, find the length of the **shortest side**.	$2:3:4$ △ $45 \div 3$ $= 45 \div 9 = 5$ $2=10, 3=15, 4=20$	∴ Shortest side $= 10$cm. ✓	2
5. Express **20** minutes to **4** hours as a ratio in its **simplest** form.	$= 1:12$ ✓ or $\frac{1}{12}$		2

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