# YR 10 STAGE 5.3
# TERM 1 ASSESSMENT
# SOLUTIONS 2017

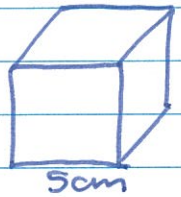
## SECTION 1

1. $SA = 2[(4\times3)+(2\times3)+(4\times2)] = 52m^2$ (A)

2. $0.015783 = 0.0158$ (C)

3. $A = \frac{1}{2}(4)(10+14) = 48m^2$ (D)

4. $5\times4 = 20 \therefore 5\times$ no replacement (B)

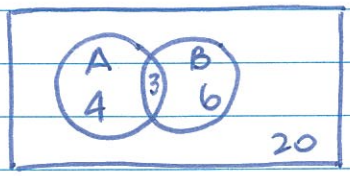
5. 


$V = 5^3 = 125cm^3$
$SA = 6(5)^2 = 150cm^3$

sides doubled $V = 10^3 = 1000cm^3$
sides halved $SA = 6(2.5)^2 = 37.5cm^2$ (C)

6. $V = \pi r^2 h + \frac{4}{3}\pi r^3 \div 2$
cylinder hemisphere

$= \pi 5^2(10) + \frac{4}{3}\pi(5)^3 \div 2 = 1047cm^3$ (D)

7. 

(B)

8. $\sqrt{16p^{36}} = \sqrt{16}\sqrt{p^{36}} = 4p^{18}$ (C)

9. $5x^{-\frac{1}{2}} = \frac{5}{\sqrt{x}}$ (B)

10. $1.11\times10^{-4} = 0.000111$ (A)

## SECTION II

1. (i) $3a^{-2} = \frac{3}{a^2}$

(ii) $\left(\frac{a}{b^{-3}}\right)^{-5} = \frac{a^{-5}}{b^{15}} = \frac{1}{a^5 b^{15}}$

2. $0.\dot{3}\dot{2} = \frac{32}{99}$

3. $\left(\frac{9}{16}\right)^x = \frac{3}{4}$ then $\left[\left(\frac{3}{4}\right)^2\right]^x = \frac{3}{4}$

$\therefore 2x = 1$

$x = \frac{1}{2}$

4. $25^y \times 5^{y+1} = 5^{2y} \times 5^{y+1}$

$= 5^{3y+1}$

5. $\frac{2}{\sqrt{3}+1} \times \frac{\sqrt{3}-1}{\sqrt{3}-1} = \frac{2\sqrt{3}-2}{3-1}$

$= \frac{2(\sqrt{3}-1)}{2}$

$= \sqrt{3}-1$

6. (i) $\frac{a^{n+2}}{a^{n-1}} = a^{(n+2)-(n-1)}$

$= a^3$

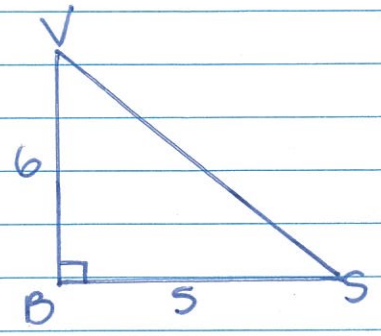
(ii) $(ac^4h^2)^{-4} \times (a^{-3}c^4h)^{-5} \div (a^{-8}c^{-2}h^7)^3$

$a^{-4}c^{-16}h^{-8} \times a^{15}c^{-20}h^{-5} \div a^{-24}c^{-6}h^{21}$

$\frac{a^{11}c^{-36}h^{-13}}{a^{-24}c^{-6}h^{21}}$

$\frac{a^{35}}{c^{30}h^{34}}$

7.




i) $(VS)^2 = 6^2 + 5^2$

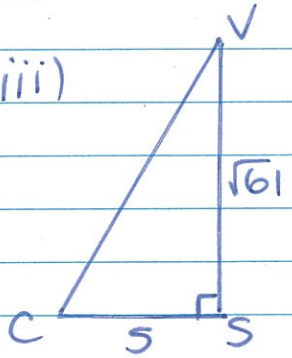
$= 36 + 25$

$VS = \sqrt{61}$ cm

ii) $SA = 10^2 + 4\left(\frac{1}{2} 10 \times \sqrt{61}\right)$

$= 100 + 20\sqrt{61}$ cm$^2$

iii)




$(VC)^2 = (\sqrt{61})^2 + 5^2$

$= 61 + 25$

$= 86$

$VC = \sqrt{86}$ cm

## SECTION III

1. $3^{x-1} = \frac{3}{\sqrt{27}}$

NB: $27 = 3^3$

$\sqrt{27} = (3^3)^{\frac{1}{2}} = 3^{\frac{3}{2}}$

$3^{x-1} = \frac{3}{3^{\frac{3}{2}}}$

$3^{x-1} = 3^{-\frac{1}{2}}$

$\therefore x - 1 = -\frac{1}{2}$

$x = \frac{1}{2}$

2. $\frac{3}{x-y} + \frac{x}{x^2-y^2} = \frac{3}{(x-y)} + \frac{x}{(x-y)(x+y)}$

$= \frac{3(x+y) + x}{(x-y)(x+y)}$

$= \frac{3x + 3y + x}{(x-y)(x+y)}$

$= \frac{4x + 3y}{(x-y)(x+y)}$

3. $(2\sqrt{3} - 1)(3\sqrt{3} - 1) = a - \sqrt{b}$

$6\sqrt{9} - 2\sqrt{3} - 3\sqrt{3} + 1$

$18 - 5\sqrt{3} + 1$

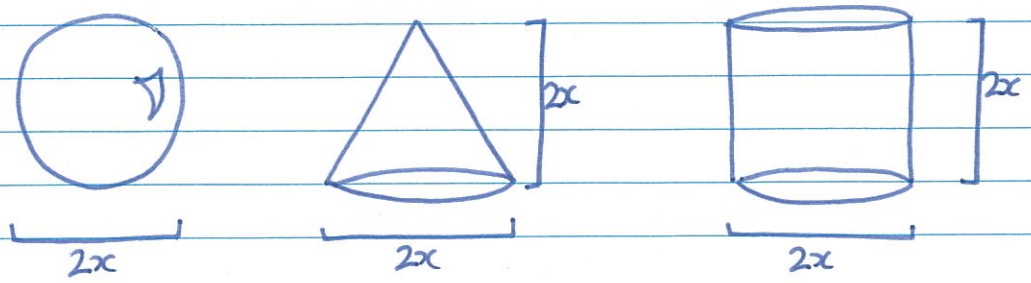
$19 - 5\sqrt{3} = a - \sqrt{b}$

$\therefore a = 19 \quad b = 75$

4. $3 \times 10^5 \times 60 \times 60 \times 24 \times 365{\cdot}25$

$9.46728 \times 10^{12}$

5.




$V_{sphere} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi x^3$

$V_{cone} = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi x^2 . 2x = \frac{2x^3\pi}{3}$

$V_{cylinder} = \pi r^2 h = \pi x^2 . 2x = 2x^3\pi$

$\therefore \frac{4}{3}\pi x^3 : \frac{2x^3\pi}{3} : 2x^3\pi$

$\frac{4}{3} : \frac{2}{3} : 2 \quad (\times 3)$

$4 : 2 : 6$

$\therefore$ 2 : 1 : 3

END OF ASSESSMENT