2. Approximation and errors

1	Error in length $= 0.015 \times 15 = 0.225$ Error in breadth $= 0.015 \times 12 = 0.18$ Error in perimeter $= 2(0.225 + 0.18)$ $= 0.81$	M_1 M_1 A_1	Finding error in both length and breadth
		3	

1. *Maximum perimeter = 2(12.05 + 8.05) = 40.2cm*
   Actual perimeter = 2(12.0 + 18.0)= 40.0cm
   Error = 40.2cm – 40.0cm = 0.2cm
   %error = $\frac{(0.2 \times 100)}{40}$
   = 0.5%

2. *A = ½ x 12 x 8 = 48*
   i) Absolute error
   = [½ x12.5 x 8.5 – ½ x 11.5 x 7.5]
   2
   = 5
   ii) % error = 5/24 X 100%
   = 10.4%

3. *A = L x W*
   A = x (14-x) = 14x – x^2

   $\frac{dA}{dx}$ = 14 – 2x = 0
   14 = 2x, x = 7

   Maximum area = 7(14 -7)
   = 7x 7 = 49cm^2

4. ***5.2*** → ***U.limit*** ~~***U.limit***~~ ***5.25m***
   U.limit ***5.15m***

   3.08 → ***U.limit*** ~~***U.limit***~~ ***3.085m***
   U.limit ***3.075m***

   Shortest possible length of 2nd piece
   = 5.15 – 3.085= 2.065m

5. *Absolute error 10 ± 0.05 and 15 ± 0.05*

   Max area = 10..5 x 15.05

   Min area = 9.95 x 14.95 = 148.7525

   a.e = $\frac{150.2525 - 15 + 150 - 148.7525}{2}$
   = 1.25

% error = $^{1.25}/_{150}$ x 100
= 0.8333%

6. *17.35 X 13.85 = 240.3*
17.35 X 13.75 = 237.2
∴17.3 X 13.8 = 238.7
Max err 240.3 – 238.7 = 1.5
Min err 238.7 – 237.2 = 1.6
Max err = $\frac{1.6 + 1.5}{2}$ = $\frac{3.1}{2}$ = 1.55
Product 238.7± 1.55
Last product 240
Max err = 1.55
Relative err = $\frac{1.55}{28.1\%}$
error = $\frac{1.55}{28.1}$ x 100 = 0.6%
Relative err = $\frac{1.55}{238.7}$

7. *14 Kg to the nearest $^{10}/_{1000}$ Kg*
A.E = 0.01
% E = $\frac{0.01}{14}$ x 100
=0.07

8.

X	*0°*	*3°*	*60°*	*90°*	*120°*	*150°*	*180°*	*210°*	*240°*	*270°*	*300°*	*330°*	*360°*
Cos x	*1*	*0.87*	*0.5*	*0*	*-0.5*	*0.87*	*-1.0*	*-0.87*	*0.5*	*0*	*0.5*	*0.87*	*1*
2 cos (x + 30)	*1.73*	*1*	*0*	*-1.0*	*-1.73*	*-2.0*	*-1.73*	*-1.0*	*0*	*1*	*1.73*	*2.00*	*1.73*

b) i) Amplitude of y = cos x is 1 unit
And Y = 2cos (x +30) 2 units

ii) period of y = 2 cos (x + 30°)
330°

c) Cos x = 2 cos (x + 30°)
x = 40° ± 1
x = 219° ±1

9. $\frac{y + x}{y - x} = \frac{12 + 6}{8 - 6}$ ***Correct substitution***
$= \frac{18}{2}$ ***Simplification***
$= 9$ ***CAO***