

West Spring Secondary School
Sec 3 E. Mathematics
Topic: Indices & Standard Form
2011 Term 1 Test 2
Duration : 40 minutes

Name: _____ ()

Class : _____ Date : _____

Mark : _____ / 20

Parent's Signature : _____

Instructions:

Write all your solutions and answers on the space provided. Omission of essential workings will result in deduction of marks. Please show your workings clearly and neatly. Calculator is allowed.

1) Write the following numbers in standard form: [2m]

a) $28\,400 = \frac{2.84 \times 10^4}{\text{-----}}$ - A1

b) $0.00743 = \frac{7.43 \times 10^{-3}}{\text{-----}}$ - A1

2) Write the following numbers in ordinary form: [2m]

a) $7.65 \times 10^0 = \frac{7.65}{\text{-----}}$ - A1

b) $4.192 \times 10^{-2} = \frac{0.04192}{\text{-----}}$ - A1

3) Express the following in standard form, correct to 3 significant figures. [2m]

a) $325\,610 = \frac{3.26 \times 10^5}{\text{-----}}$ - A1
(correct to 3 sig. fig.)

b) $0.08999 = \frac{8.999 \times 10^{-2}}{\text{-----}}$
 $= \frac{9.00 \times 10^{-2}}{\text{-----}}$ - A1
(correct to 3 sig. fig.)

4) The mass of the earth is 5.9763×10^{27} grams.

Expressing your answers in standard form, correct to 3 significant figures, write this mass in kilograms.

[1m]

$$\begin{aligned} \text{Mass} &= \frac{5.9763 \times 10^{27}}{1000} \\ &= 5.9763 \times 10^{24} \\ &= 5.98 \times 10^{24} \text{ kg} \quad \text{- A1} \\ &\text{(correct to 3 sig. fig.)} \end{aligned}$$

- 5) The length of a rectangle is 5.1×10^2 metres and its breadth is 2.0×10^3 metres. Calculate, in standard form,

[2m]

- a) its perimeter.

$$\begin{aligned} \text{Perimeter} &= 2 [5.1 \times 10^2 + 2.0 \times 10^3] \\ &= 5.02 \times 10^3 \text{ m} \quad \text{--- AI} \end{aligned}$$

- b) its area.

$$\begin{aligned} \text{Area} &= (5.1 \times 10^2) \times (2.0 \times 10^3) \\ &= 1.02 \times 10^6 \text{ m}^2 \quad \text{--- AI} \end{aligned}$$

- 6) Evaluate the following and express your answers in standard form:

[5m]

a) $7.2 \times 10^3 + 9 \times 10^4$

$$\begin{aligned} &7.2 \times 10^3 + 9 \times 10^4 \\ &= 7.2 \times 10^3 + 90 \times 10^3 \\ &= 97.2 \times 10^3 \\ &= 9.72 \times 10^4 \quad \text{--- AI} \end{aligned}$$

b) $5.9 \times 10^{-1} - 5.5 \times 10^{-1}$

$$\begin{aligned} &5.9 \times 10^{-1} - 5.5 \times 10^{-1} \\ &= 0.4 \times 10^{-1} \\ &= 4 \times 10^{-2} \quad \text{--- AI} \end{aligned}$$

$$\begin{aligned}
 \text{c) } & (3.6 \times 10^4) \div (1.2 \times 10^3) \\
 & (3.6 \times 10^4) \div (1.2 \times 10^3) \\
 & = 3 \times 10^1 \quad \text{--- A1}
 \end{aligned}$$

$$\begin{aligned}
 \text{d) } & (5.5 \times 10^{-6}) \times (4.8 \times 10^3) \\
 & (5.5 \times 10^{-6}) \times (4.8 \times 10^3) = 2.64 \times 10^{-2} \quad \text{--- A1}
 \end{aligned}$$

$$\begin{aligned}
 \text{e) } & \frac{4}{8 \times 10^6} \\
 & = 0.5 \times 10^{-6} \\
 & = 5 \times 10^{-7} \quad \text{--- A1}
 \end{aligned}$$

7) Given that $p = 8 \times 10^9$ and $q = 4 \times 10^7$, find the values of each of the following, expressing your answers in standard form. [3m]

a) $p \times q$

$$\begin{aligned}
 & p \times q \\
 & = 8 \times 10^9 \times 4 \times 10^7 \\
 & = 3.2 \times 10^{17} \quad \text{--- A1}
 \end{aligned}$$

b) $q \div p$

$$\begin{aligned} q \div p &= (4 \times 10^7) \div (8 \times 10^9) \\ &= 5 \times 10^{-3} \end{aligned} \quad \text{--- A1}$$

c) $p+q$

$$\begin{aligned} &(8 \times 10^9) + (4 \times 10^7) \\ &= (8 \times 10^9) + (0.04 \times 10^9) \\ &= 8.04 \times 10^9 \end{aligned} \quad \text{--- A1}$$

8) The distance from the earth to the sun is 1.5×10^8 km. the distance from Pluto to the sun is 6.0×10^9 km.

a) Find the ratio of the shorter distance to the longer distance.
Give your answer in its simplest form.

[1m]

$$\begin{aligned} \frac{\text{shorter Distance}}{\text{Longer Distance}} &= \frac{1.5 \times 10^8}{6 \times 10^9} \\ &= 2.5 \times 10^{-2} \\ &= 0.025 \\ &= \frac{1}{40} \\ \therefore \text{Ratio} &= 1:40 \end{aligned} \quad \text{--- A1}$$

b) How much further is Pluto from the sun than the Earth from the sun? Give your answer in standard form.

[2m]

$$\begin{aligned} \text{Distance} &= (6.0 \times 10^9) - (1.5 \times 10^8) \quad \text{--- M1} \\ &= 5.85 \times 10^9 \quad \text{m} \quad \text{--- A1} \end{aligned}$$