المدرسة
الوطنية الأرثوذكسية
الشميساني

The National
Orthodox School
Shmaisani

Worksheet 5 |

Lower Secondary
Stage (6-8)

1ᵗʰ Semester | 2023-2024

Subject: Math
Objectives:

Chapter: 3

- To write large and small numbers using standard form
- To calculate using standard form

Q1: a) Write the number 230 000 in standard form.
  b) Write 6.3×10^{-3} as an ordinary number.

a) 2.3×10^{5}

b) 0.0063

Q2: a) Write the number 0.000 47 in standard form.
  b) Write 3.7×10^6 as an ordinary number.
  c) Work out the value of $\dfrac{5 \times 10^3}{8 \times 10^{-5}}$
  Give your answer in standard form.

a) 4.7×10^{4}

b) 3700000

c) $0.625 \times 10^{8} = 6.25 \times 10^{7}$

Q3: Work out the value of $(6 \times 10^5) \times (8 \times 10^{-4})$.
  Give your answer in standard form.

$48 \times 10 = 4.8 \times 10^{2}$

Q4: The distance between Mercury and the Sun is 58 000 000 km.
a) Write the number 58 000 000 in standard form.

Uranus is 50 times as far from the Sun as Mercury.
b) Calculate the distance between Uranus and the Sun.
Give your answer in standard form.

a) 5.8×10^7 km

b) $50 \times 5.8 \times 10^7$

$290 \times 10^7 = 2.9 \times 10^9$ km

Q5: Work out the value of $(7.2 \times 10^4) + (4.7 \times 10^3)$.
Give your answer in standard form.

$7.2 \times 10^4 + 4.7 \times 10^3$ or $7.2 \times 10^4 + 0.47 \times 10^4$

$72 \times 10^3 + 4.7 \times 10^3$ 7.67×10^4

76.7×10^3

7.67×10^4

Q6: The age of the Universe is approximately 15 000 million years.
a) Write the number 15 000 million in standard form.

1 gigayear = 10^9 years.
b) Express the age of the Universe in gigayears.

Million = 10^6

a) 15 000 million = $15000 \times 10^6 = 1.5 \times 10^{10}$

b) $(1.5 \times 10^{10}) \div 10^9 = 1.5 \times 10 = 15$ giga years .

Q7: $x = 2 \times 10^m$ and $y = 3 \times 10^n$ where m and n are integers.
Find an expression, in standard form, for xy.

$xy = (2 \times 10^m) \times (3 \times 10^n)$

$xy = 6 \times 10^{m+n}$

Q8: $P = 2a + 5b$

$a = 3.5 \times 10^6$ and $b = 2.7 \times 10^7$

Work out the value of P.

Give your answer in standard form.

$P = 2a + 5b$

$P = 2 \times 3.5 \times 10^6 + 5 \times 2.7 \times 10^7$

$P = 7 \times 10^6 + 13.5 \times 10^7$

$P = 0.7 \times 10^7 + 13.5 \times 10^7$

$P = 14.2 \times 10^7 = 1.42 \times 10^8$

Q9: $y = \dfrac{a+b}{ab}$

$a = 2 \times 10^4$ and $b = 8 \times 10^5$

Work out the value of y.

Give your answer in standard form correct to 3 significant figures.

$y = \dfrac{2 \times 10^4 + 8 \times 10^5}{(2 \times 10^4) \times (8 \times 10^5)}$

$y = \dfrac{2 \times 10^4 + 80 \times 10^4}{16 \times 10^9} = \dfrac{82 \times 10^4}{16 \times 10^9} = 5.125 \times 10^{-5} \approx 5.13 \times 10^{-5} \ (3.S.F)$

Q10: $F = 3p - 4q$

$p = 2 \times 10^{-5}$ and $q = 8 \times 10^{-6}$

Work out the value of F.

Give your answer in standard form.

$F = 3 \times 2 \times 10^{-5} - 4 \times 8 \times 10^{-6}$

$F = 6 \times 10^{-5} - 32 \times 10^{-6}$

$F = 6 \times 10^{-5} - 3.2 \times 10^{-5}$

$F = 2.8 \times 10^{-5}$

Q11: $3.2 \times 10^8 + a \times 10^7 = 3.8 \times 10^8$

Find the value of a.

$$3.2 \times 10^8 + a \times 10^7 = 3.8 \times 10^8$$
$$-3.2 \times 10^8 \qquad\qquad -3.2 \times 10^8$$

$$\frac{a \times 10^7}{10^7} = \frac{0.6 \times 10^8}{10^7}$$

$$a = 0.6 \times 10$$
$$a = 6$$

Q12: $x = 7 \times 10^n$ where n is an integer.

Find an expression, in standard form, for x^2

Give your expression as simply as possible.

$$x = 7 \times 10^n$$
$$x^2 = (7 \times 10^n)^2$$
$$x^2 = 7^2 \times 10^{2n}$$
$$x^2 = 49 \times 10^{2n}$$
$$x^2 = 4.9 \times 10^{2n+1} \quad \Leftarrow \text{Standard form.}$$