

**Grade 9**

**WEEK 10**

**Lesson # 2**

**Topic:** Algebra

**Sub-Topic:** Laws of Indices

**Objective:**

Students will:

- ✓ Apply laws of indices into practical questions

**Content:**

**Remember:**

Law of Indices

- 1)  $a^0 = 1$
- 2)  $a^m \times a^n = a^{m+n}$
- 3)  $a^m \div a^n = a^{m-n}$
- 4)  $a^{-m} = \frac{1}{a^m}$
- 5)  $a^{\frac{m}{n}} = \sqrt[n]{a^m}$
- 6)  $a^{\frac{1}{2}} = \sqrt{a}$
- 7)  $a^{\frac{1}{3}} = \sqrt[3]{a}$
- 8)  $(a^m)^n = a^{m \times n}$

### == Exercise 6t ==

Simplify each of the following expressions:

1.  $2x^2 \times 3x^3$
2.  $3x^3 \times 4x^5$
3.  $4x^5 \times 3x^2$
4.  $5x^4 \times 2x^3$
5.  $3x^4 \times 5x^5$
6.  $2x^3 \times 3xy^2$
7.  $3x^2 \times 4x^2y$
8.  $5x^4 \times 3xy^3$
9.  $4x^3 \times 3x^2y^4$
10.  $7x \times 4x^4y^3$
11.  $2r^5 \times 3r^2 \times 4r^3$
12.  $3a^4 \times a \times 5a^3$
13.  $3x^2y \times 2xy^3 \times 4xy$
14.  $2x^3y \times 4x^2y \times xy^2$

15.  $5x^2y \times 3xy \times 4x^2y$

17.  $\frac{3a^5 \times 4a^2}{2a^3}$

19.  $5a^4 \div (a^2 \times 3a)$

21.  $(5x^2y)^3$

23.  $(4x^2y^3)^3$

25.  $\left(\frac{3x^3y^2}{5z}\right)^3$

27.  $\sqrt{16y^6}$

29.  $\sqrt[4]{81x^8y^4}$

16.  $5x^7 \div 2x^3$

18.  $\frac{6a^5 \times 5a^3}{3a^6}$

20.  $\frac{14a^5}{2a^3 \times 7a^4}$

22.  $(3x^3y^2)^4$

24.  $\left(\frac{4a^2b^3}{3c}\right)^2$

26.  $\sqrt{9x^4}$

28.  $\sqrt[3]{125x^3y^6}$

30.  $\sqrt[5]{32x^5y^{15}}$

Simplify each of the following expressions:

31.  $(x^{\frac{1}{2}})^7 \times \sqrt{x^9}$

33.  $(x^{\frac{1}{4}})^9 \times \sqrt[4]{x^7}$

35.  $(x^{\frac{1}{6}})^9 \times \sqrt[6]{x^9}$

37.  $5x^{-3}y^{\frac{3}{5}} \times 3x^5y^{\frac{2}{5}}$

39.  $4x^{\frac{1}{3}}y^{-3} \times 2x^{-\frac{4}{3}}y^5$

41.  $(3p^4)^{-3}$

43.  $(125x^6)^{-\frac{1}{3}}$

45.  $(27x^{12})^{-\frac{1}{3}}$

47.  $7a^{-2}(a^2 + \frac{a}{2})$

49.  $8a^{-\frac{1}{2}}(a^{\frac{9}{2}} - a^{\frac{5}{2}})$

32.  $(x^{\frac{1}{3}})^5 \times \sqrt[3]{x^4}$

34.  $(x^{\frac{1}{5}})^9 \times \sqrt[5]{x^6}$

36.  $3x^{-4}y^{\frac{2}{3}} \times 5x^5y^{\frac{1}{3}}$

38.  $4x^3y^{\frac{3}{4}} \times 3x^{-2}y^{\frac{1}{4}}$

40.  $7x^{\frac{2}{5}}y^{-5} \times 3x^{-\frac{7}{5}}y^3$

42.  $(4x^5)^{-2}$

44.  $(16x^4)^{-\frac{1}{2}}$

46.  $5a(a^{-1} - a)$

48.  $5a^{-\frac{1}{2}}(a^{\frac{9}{2}} - a^{-\frac{5}{2}})$

50.  $7a^{-\frac{1}{3}}(a^{\frac{4}{3}} - a^{-\frac{5}{3}})$

Determine the value of each of the following expressions:

51.  $2^5 \times 2^{-3}$

53.  $2^3 \times 2^{-5} \times 2^4$

55.  $8^5 \times 8^{-6} \times 8^3$

57.  $\frac{5^4 \times 5^3}{5^6}$

59.  $\frac{8^3 \times 8^2 \times 8^5}{8^7 \times 8^4}$

61.  $81^{\frac{1}{2}} \times 27^{\frac{1}{3}}$

63.  $16^{\frac{1}{4}} \times 25^{\frac{1}{2}} \times 27^{\frac{1}{3}}$

52.  $3^4 \times 3^{-5}$

54.  $5^4 \times 5^{-7} \times 5$

56.  $\frac{2^3 \times 2^4}{2^2}$

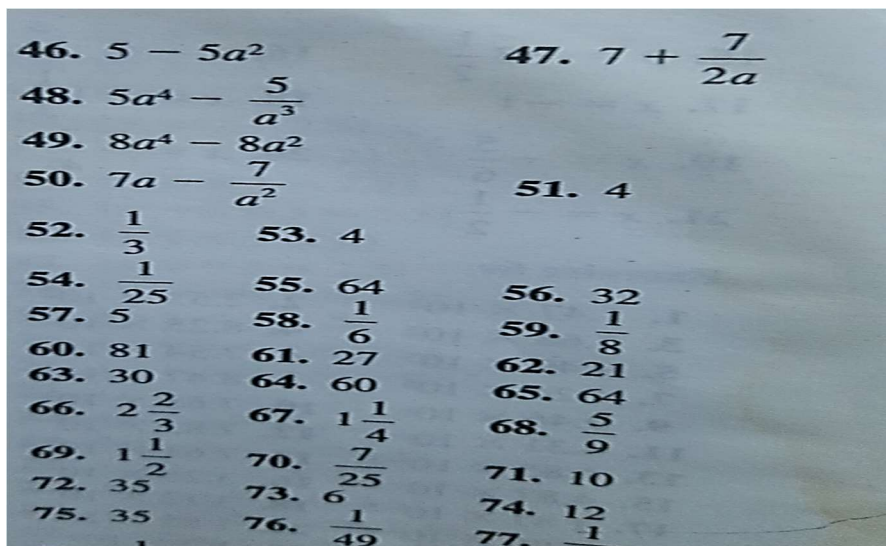
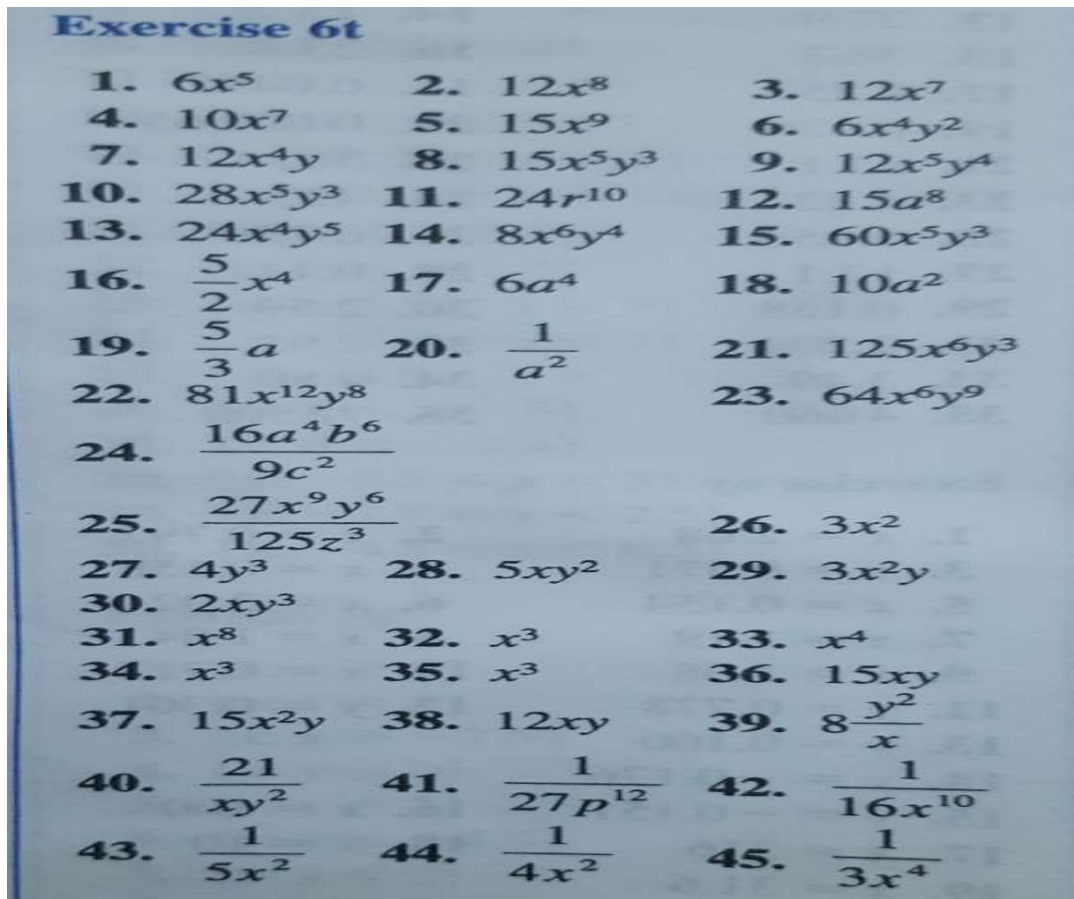
58.  $\frac{6^5 \times 6^3 \times 6^2}{6^7 \times 6^4}$

60.  $\frac{9^4 \times 9^5}{9^2 \times 9 \times 9^4}$

62.  $81^{\frac{1}{4}} \times 49^{\frac{1}{2}}$

64.  $125^{\frac{1}{3}} \times 16^{\frac{1}{2}} \times 81^{\frac{1}{4}}$

Solution:



Reference:

[www.toppr.com/guides/business-mathematics-and-statistics/business-mathematics](http://www.toppr.com/guides/business-mathematics-and-statistics/business-mathematics)