

# Methods Preparation Course

## Course Work

### Indices

Evaluate the following.

1.  $7^{12} \times 7^3$

$$= 7^{15}$$

2.  $3^{197} \div 3^{195}$

$$= 3^2$$
$$= 9$$

3.  $2^7 \div 2^8$

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

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4.  $12^0$

$$= 1$$

5.  $(0.5)^0$

$$= 1$$

6.  $15^0 + 7^0 - 1$

$$= 1 + 1 - 1$$
$$= 1$$

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7.  $(7 + 3)^0$

$$= 1$$

8.  $\frac{2^5 \times 2^5}{2^8}$

$$= \frac{2^{10}}{2^8}$$
$$= 2^2 = 4$$

9.  $1^{12}$

$$= 1$$

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10.  $(-1)^{12}$

$$= 1$$

11.  $-1^{12}$

$$= -1$$

12.  $(-1)^{135}$

$$= -1$$

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13.  $64^{\frac{1}{2}}$

$$= 8$$

14.  $100^{\frac{1}{2}}$

$$= 10$$

15.  $10000^{\frac{1}{2}}$

$$= 100$$

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19.  $2^{-2}$

$$= \frac{1}{4}$$

20.  $2^{-5}$

$$= \frac{1}{32}$$

21.  $5^{-3}$

$$= \frac{1}{125}$$

22.  $\left(\frac{9}{16}\right)^{\frac{1}{2}}$

$$= \frac{3}{4}$$

23.  $\left(\frac{7}{5}\right)^{-1}$

$$= \frac{5}{7}$$

24.  $\left(\frac{100}{49}\right)^{-0.5}$

$$= \frac{7}{10}$$

25.  $\left(2\frac{1}{4}\right)^{\frac{1}{2}}$

$$= \frac{3}{2}$$

26.  $27^{\frac{2}{3}}$

$$= 9$$

27.  $(-27)^{\frac{2}{3}}$

$$= 9$$

Express the following in the form  $10^n$ 

28. 1000

$$= 10^3$$

29.  $(10^5)^3$

$$= 10^{15}$$

30.  $\sqrt[2]{10^3}$

$$= 10^{\frac{3}{2}}$$

28. 0.1

$$= 10^{-1}$$

29. 0.0001

$$= 10^{-4}$$

30.  $\frac{1}{1000}$

$$= 10^{-3}$$

Simplify the following

31.  $(-3x)^3 \times x^2$

$$= -27x^5$$

32.  $3x^{-2} \times 7x^3$

$$= 21x$$

33.  $\frac{(x^3 \times x^{-7})^{\frac{1}{2}}}{x}$

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

34.  $\left(\frac{x^5y}{xy^2}\right)^{-3}$

$$= \left(\frac{x^4}{y}\right)^{-3}$$

$$= \frac{y^3}{x^{12}}$$

35.  $\frac{(x^2y^3)^2}{x^2y^3}$

$$= \frac{x^4y^6}{x^2y^3}$$

$$= x^2y^3$$

36.  $\frac{(-3x^3y)^3}{3xy^2}$

$$= -9x^8y$$

37.  $\frac{2^{x+2} + 12}{3 \times 2^x + 9}$

$$= \frac{2^2 \cdot 2^x + 12}{3 \cdot 2^x + 9}$$

$$= \frac{4(\cancel{2^x} + 3)}{3(\cancel{2^x} + 3)}$$

$$= \frac{4}{3}$$

38.  $\frac{3^{3x+3} - (3^x)^3}{3^{3x}}$

$$= \frac{\cancel{3^{3x}}(27-1)}{\cancel{3^{3x}}}$$

$$= 26$$

39.  $\frac{5^{x+1} + 25}{5^{x-1} + 1}$

$$= \frac{5^2(\cancel{5^{x-1}} + 1)}{\cancel{5^{x-1}} + 1}$$

$$= 25$$