

SELF-EXERCISE 12

1(a) $4^2 \times 4^{-3}$

$4^{2+(-3)}$

4^{-1}

$= \frac{1}{4}$

4

(b) $x^2 \cdot x^5$

$= x^{2+5}$

$= x^7$

(c) $(4ab^2)^2$

$4^2 a^2 (b^2)^2$

$= 16a^2 b^4$

(d) $(-3)^3$

-3^3

$= -27$

(e) $x^2 z^{-3} \times (x^2 z)^2$

$= x^2 z^{-3} \times x^4 z^2$

$= x^{2+4} z^{-3+2}$

$= x^6 z^{-1}$

$= \frac{x^6}{z}$

(f) $\frac{(-a^4 b)^3}{-a^4 b^3}$

$= \frac{-a^{12} b^3}{-a^4 b^3}$

$= -a^{12-4} b^{3-3}$

$= -a^8 b^0$

$= -a^8$

(g) $2^3 \times 2^{3/5}$

2^3

$= 2 \times 2 \times 2$

$= 8$

(h) $(3a)^{-1} \times 3a^{-1}$

$\frac{1}{(3a)^{-1}}$

$\div \frac{1}{3a}$

$= 3a$

$3a \times \frac{1}{3a}$

3×3

$= 9$

$(3a)^{-1} = \frac{1}{3a}$

$\frac{1}{3a} \times \frac{3}{a} = \frac{3}{3a^2} = \frac{1}{a^2}$

$3a^{-1} = \frac{3}{a}$

$$2(a) \quad 3^{3x} = 81$$

$$3^{3x} = 3^4$$

$$3x = 4$$

$$3x = 4$$

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

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

$$3$$

*

$$(d) \quad 8x^3 = 27$$

$$8x^3 = 3^3$$

$$8x = 3$$

$$8x = 3$$

$$x = \frac{3}{8}$$

$$x = \frac{3}{8}$$

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$$(b) \quad 2^x \cdot 4^{x+1} = 64$$

$$2^x \times (2^2)^{x+1} = 2^6$$

$$2^x \times 2^{2x+2} = 2^6$$

$$2^{x+2x+1} = 2^6$$

$$2^{3x+1} = 2^6$$

$$3x+1 = 6$$

$$3x+1-1 = 6-1$$

$$3x = 5$$

$$3x = 5$$

$$x = \frac{5}{3}$$

$$x = \frac{5}{3}$$

$$3$$

*

$$(e) \quad 8^x = \frac{1}{4}$$

$$4$$

$$(2^3)^x = 1$$

$$2^{3x} = 1$$

$$2^{3x} = 1$$

$$2^{3x} = 2^{-2}$$

$$3x = -2$$

$$3x = -2$$

$$3x = -2$$

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

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

$$3$$

*

$$(c) \quad 8^{x^2} - 16^{x+1} = 0$$

$$(2^3)^{x^2} - (2^4)^{x+1} = 0$$

$$(2)^{x^2 \cdot 3} - (2)^{4x+1} = 0$$

$$2x^6 - 2x^4 = 0$$

$$2x^{6-4} = 0, \quad 2x^2 = 0$$

$$\frac{2x^2}{2} = \frac{0}{2}$$

$$x = \frac{0}{2}$$

$$2$$

*

$$(f) \quad 5^{3x} \div 25^{x+1} = 1$$

$$125$$

$$5^{3x} \div (5^2)^{x+1} = 5^3$$

$$5^{3x-2(x+1)} = 1$$

$$5^{3x-2x-2} = 1$$

$$5^{x-2} = 1$$

$$5^{x-2} = 5^0$$

$$x-2 = 0$$

$$x-2 = 0$$

$$x-2 = 0$$

$$x = 2$$

$$3x-2(x+1) = -3$$

$$3x-2x-2 = -3$$

$$x-2 = -3$$

$$x = -3+2$$

$$x = -1$$

$$x = -1$$

$$x = -1$$

$$3 \cdot 4x = 4 \cdot 6x + 6$$

$$(2^5)^{4x} = (2^{\frac{3}{4}})^{8x+6}$$

$$2^{20x} = 2^{16x+12}$$

$$20x = 16x + 12$$

$$20x - 16x = 16x + 12 - 16x$$

$$4x = 12$$

$$\frac{4x}{4} = \frac{12}{4}$$

$$x = 3$$

$$x = 3$$

$$x = 3$$

$$x = 3$$

$$(h) \quad 3^{2x} = \frac{1}{243}$$

$$3^{2x} = \frac{1}{3^5}$$

$$3^{2x} = 3^{-5}$$

$$2x = -5$$

$$\frac{2x}{2} = \frac{-5}{2}$$

$$x = -\frac{5}{2}$$

$$(c) \quad 8^{2x} - 16^{x+1} = 0$$

$$(2^3)^{2x} - (2^4)^{x+1} = 0$$

$$2^{6x} - 2^{4x+4} = 0$$

$$2^{6x} = 2^{4x+4}$$

$$6x = 4x + 4$$

$$2x = 4$$

$$x = 2$$

Checked.
31/1/2018