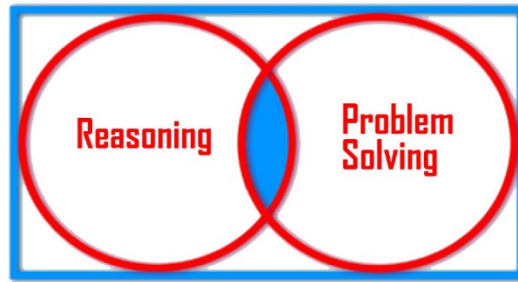


GCSE Foundation (5 – 1)



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Mathematical Reasoning Questions

(Indices) – Set 1

Solutions

The questions are repeated here for your convenience

| | |
|-----------------|--|
| <p>1</p> | <p>If $3x = 6$, what is the value of the expression $3^x + x^3$</p> <p>a) 12 b) 17 c) 9 d) $3^{2x} + 2x^3$</p> <p style="text-align: center;"><u>Solution</u></p> <p>If $3x = 6$, then $x = 2$ {divide both sides by 3} [1mark]</p> <p>Therefore, $3^x + x^3 = 3^2 + 2^3$ $= 9 + 8 = 17$ [1mark]</p> <p>Correct Answer: B</p> |
| <p>2</p> | <p>Circle all the expressions which are equivalent to $27a^3b^2$</p> <p style="text-align: center;"><u>Solution</u></p> <p>a) $9a \times 3b = 27ab$ b) $81a^3b^3 \div 3b = 27a^3b^2$ c) $3b \times 9a^3b = 27a^3b^2$ d) $30a^2b - 3ab^2 = 10a$</p> <p>Correct Answers: B and C [2marks]</p> |
| <p>3</p> | <p>Complete the following calculation by filling in the missing terms using an expression or a number</p> $3a^{\square}b \times 2a^{\square} = \square a^3b^2$ <p style="text-align: center;"><u>Solution</u></p> <p>To obtain a^3 we need to multiply $a^2 \times a$ By Multiplying 3 and 2 we will obtain 6 To obtain b^2 we need to multiply $b \times b$ Therefore, the correct solution will be</p> $3a^{\square 2}b \times 2a^{\square b} = \square 6 a^3b^2$ <p style="text-align: right;">[3marks]</p> |

| | |
|-----------------|---|
| <p>4</p> | <p>Which of the following is NOT equal to $18xy^2$?</p> <p>a) $9x^2 \times 2y^3$ b) $18xy^{-2} \times y^4$ c) $36xy^4 \div 2y^2$ d) $6x^2 \times 3y^6$</p> <p style="text-align: right;"><u>Solution</u></p> <p>a) $9x^2 \times 2y^3 = 18x^2y^3$ b) $18xy^{-2} \times y^4 = 18xy^2$ c) $36xy^4 \div 2y^2 = 18xy^2$ d) $6x^2 \times 3y^6 = 18x^2y^6$</p> <p>Correct Answers: A and D</p> <p style="text-align: right;">[2marks]</p> |
| <p>5</p> | <p>Choose the correct answer when the expression $5x^3 + 6x^2$ is simplified</p> <p>a) $11x^5$ b) $11x^6$ c) $11x^3 + x^2$ d) None of the Above</p> <p style="text-align: right;"><u>Solution</u></p> <p>None of the above {Because you cannot add expressions involving variables with different powers}</p> <p>Correct Answer: D [1mark]</p> |
| <p>6</p> | <p>If $a * b = b^3 - a$ then what is the value of $6 * 2$</p> <p style="text-align: right;"><u>Solution</u></p> <p>{Substitute $a = 6$ and $b = 2$}</p> <p>$6 * 2 = 2^3 - 6$ $= 8 - 6 = 2$</p> <p style="text-align: right;">[2marks]</p> |

7 Given that $2^x = 64$ and $x = 14y$, circle the correct value for y



- a) $\frac{7}{3}$
- b) 7
- c) 3
- d) $\frac{3}{7}$

Solution

If $2^x = 64$, Then $x = 6$

{Because $2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$ }

Therefore, $6 = 14y$ {Divide both sides by 14}

$$\frac{6}{14} = y \text{ {simplify}}$$

$$\frac{3}{7} = y$$

Correct Answer: D

[2marks]

8 Given that $50x^4y \div 10xy^8 = Ax^3y^b$, find the values of A and b

Solution

$$\frac{50x^4y}{10xy^8} = 5x^3 \text{ {Laws of indices } } a^x \div a^b = a^{x-b}$$

$$5x^3y^{-7} = Ax^3y^b \text{ Therefore, } A = 5 \text{ and } b = -7$$

[2marks]

9 You are told that $\frac{1}{x} = x^{-1}$

Answer **True** or **False** to the following statements

a) $2^{-1} = \frac{1}{2}$ **True**

b) $3^{-1} + 4^{-1} = \frac{7}{12}$ **True** $\{3^{-1} + 4^{-1} = \frac{1}{3} + \frac{1}{4} = \frac{7}{12}\}$

c) $3^{-1} + 4^{-1} = \frac{1}{7}$ **False**

d) $5^{-2} = \frac{1}{25}$ **True** $\{5^{-2} = \frac{1}{5^2} = \frac{1}{25}\}$

[4marks]

10

Simplify the expression $\frac{27x^{12} \times 3x^8}{x^{10} \div x^{-2}}$

Choose one answer

- a) $81x^{20}$
- b) $81x^8$
- c) $81x^{12}$
- d) $81x^{-4}$

Solution

$$\frac{27x^{12} \times 3x^8}{x^{10} \div x^{-2}} = \frac{81x^{20}}{x^{12}}$$

$$\frac{81x^{20}}{x^{12}} = 81x^8$$

Correct Answer: B

[3marks]