

Revision

Basic Algebra

Questions

- 1) Three times a certain number x plus five is equal to five times the number plus two. The correct algebraic expression for this is:

a. $3x + 5 = 5 + x + 2$

$$3 \times x + 5 = 5 \times x + 2$$

b. $3 + x + 5 = 5x + 2$

$$3x + 5 = 5x + 2$$

☒ c. $3x + 5 = 5x + 2$

- 2) $(3x + 5) - (x + 3)$ is equal to: $3x + 5 - x - 3 = 2x + 2$

☐ a. $2x + 2$

b. $2x - 8$

c. $2x - 2$

- 3) Which of the following is NOT equal to $\frac{1}{3}xy$:

a. $\frac{xy}{3}$

☒ b. $\frac{x}{3y}$

c. $\frac{1}{3}yx$

- 4) If $p = 3$ and $q = 4$, then $q^2 - p^2$ is equal to: $4^2 - 3^2 = 16 - 9 = 7$

☐ a. 7

b. -7

c. 1

5) When the brackets are removed from $2(3p - 2q)$ the answer is:

a. $23p - 22q$

$$2 \times 3p - 2 \times 2q = 6p - 4q$$

b. $6p - 4q$

c. $6p + 4q$

6) When $5x + 3x - 4x$ is simplified, the answer is:

a. $12x$

b. $4x$

c. $-4x$

$$8x - 4x = 4x$$

7) When $8a^2$ is divided by $2a^2$, the answer is:

a. $4a^2$

b. $4a$

c. 4

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

8) When $4x + 8y$ is completely factorised, the correct answer is:

a. $4(x + y)$

b. $4(x + 2y)$

c. $4(2x + 2y)$

$$4x + 8y = 2 \times 2 \times x + 2 \times 2 \times 2 \times y$$

$$= 4 \times x + 4 \times 2y = 4(x + 2y)$$

9) When the equation $3x - 8 = 19$ is solved, the value of x is:

a. 8

b. 7

c. 9

$$3x - 8 + 8 = 19 + 8$$

$$3x = 27$$

$$x = 9$$

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10) When $(x+5)(x+2)$ is expanded and simplified, the answer is:

a. $2x + 7$

b. $x^2 + 10$

c. $x^2 + 7x + 10$

$$x \times x + x \times 2 + 5 \times x + 5 \times 2$$

$$x^2 + 2x + 5x + 10 = x^2 + 7x + 10$$

11) When c is made the subject of the formula $\frac{bc^2}{d} = a$, the answer is:

a. $c = \frac{da}{b}$

b. $c = \sqrt{\frac{a-d}{b}}$

c. $c = \sqrt{\frac{ad}{b}}$

$$\frac{bc^2}{d} = a \Rightarrow \frac{bc^2}{d} \times \frac{d}{1} = \frac{a}{1} \Rightarrow bc^2 = ad$$

$$\frac{bc^2}{b} = \frac{ad}{b}$$

$$c^2 = \frac{ad}{b}$$

$$c = \sqrt{\frac{ad}{b}}$$

12) When $x^2 - 9$ is factorised, the answer is:

a. $(x-3)$ ✗

b. $(x-3)(x-3) = x^2 - 3x - 3x + 9 = x^2 - 6x + 9 \neq x^2 - 9$

c. $(x-3)(x+3) = x^2 + 3x - 3x - 9 = x^2 - 9$ ✓

13) $\text{Log } \frac{a}{b}$ is exactly the same as:

a. $\log(a-b)$

b. $\log a - \log b$

c. $\frac{\log a}{\log b}$

14) If $\log_{10} 2 = 0.3010$, then $\log_{10} 2000$ is:

a. 2.3010

☒ b. 3.3010

c. 301

$$\begin{aligned}\log_{10} 2000 &= \log_{10} (2 \times 1000) = \log_{10} 2 + \log_{10} 1000 \\ &= \log_{10} 2 + \log_{10} 10^3 \\ &= 0.3010 + 3 = 3.3010\end{aligned}$$

15) 58_{10} expressed in Binary is:

a. 111001

☒ b. 111010

c. 101111

$$\begin{array}{r} 2 \overline{)58} \\ \underline{29} \\ 14 \\ \underline{7} \\ 3 \\ \underline{1} \\ 0 \end{array} \quad \begin{array}{c} \textcircled{0} \\ \textcircled{1} \\ \textcircled{0} \\ \textcircled{1} \\ \textcircled{1} \\ \textcircled{1} \end{array} \quad 111010$$

16) In common logarithmic form the characteristic of the number 0.002968 is:

a. $\bar{2}$

☒ b. $\bar{3}$

c. 2.968

17) The value of x in $\log_5 125 = x$ is:

a. 5

b. 25

☒ c. 3

$$\log_5 125 = 3 \log_5 5 = 3 \times 1 = 3$$

18) The binary number 1110111_2 expressed as a Base₁₀ i.e. Denary number is:

a. 121

☒ b. 119

c. 117

$$\begin{array}{ccccccc} 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \\ 1 & 1 & 1 & 0 & 1 & 1 & 1 \\ 1 \times 2^6 & + & 1 \times 2^5 & + & 1 \times 2^4 & + & 0 \times 2^3 & + & 1 \times 2^2 & + & 1 \times 2^1 & + & 1 \times 2^0 \\ 64 & + & 32 & + & 16 & + & 4 & + & 2 & + & 1 \\ 96 & + & 23 & = & 119 \end{array}$$

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- 19) When the Octal (Base 8) numbers 37 and 42 are added together, the answer is:

a. 79_8

b. 101_8

c. 110_8

$$\begin{array}{r} 37 \\ +42 \\ \hline 101 \end{array}$$

$$37_8 = 3 \times 8^1 + 7 \times 8^0 = 31_{10}$$

$$42_8 = 4 \times 8^1 + 2 \times 8^0 = 34_{10}$$

$$8^2 \ 8^1 \ 8^0$$

$$1 \ 0 \ 1 = 1 \times 8^2 + 0 \times 8^1 + 1 \times 8^0 = 65$$

- 20) When the Hexadecimal (Base 16) numbers 35_{16} and 48_{16} are added, the correct answer is:

a. 83_{16}

b. 713

c. $7D$

$$\begin{array}{r} 35 \\ +48 \\ \hline 7D \end{array}$$

A	B	C	D	E	F
10	11	12	13	14	15

- 21) The decimal value 625 coded in BCD is:

a. 0110 0010 0100

b. 0110 0010 0101

c. 0110 0010 0111

0	0000	6	2	5
1	0001	0110	0010	0101
2	0010			
3	0011			
4	0100			
5	0101			
6	0110			
7	0111			
8	1000			
9	1001			

- 22) In the simultaneous equations $x + y = 6$, $x - y = 2$. If $y = 2$ then x is:

a. 3

b. 5

c. 4

$$x + 2 = 6$$

$$x = 6 - 2 = 4$$

$$x - 2 = 2$$

$$x = 2 + 2 = 4$$

- 23) When $x^2 - 2x - 8$ is factorised the correct equation is:

a. $(x - 2)(x - 4) = x^2 - 4x - 2x + 16 = x^2 - 6x + 16 \neq x^2 - 2x - 8$

b. $(x + 2)(x + 4) = x^2 + 4x + 2x + 8 = x^2 + 6x + 8 \neq x^2 - 2x - 8$

c. $(x + 2)(x - 4) = x^2 - 4x + 2x - 8 = x^2 - 2x - 8 \checkmark$

24) The logarithm of two numbers multiplied together may be found by:

- a. Adding the logarithms of the two numbers together
- b. Multiplying the logarithms together
- c. Subtracting the logarithms of the two numbers

25) $a^5 \times a^6$ is equal to:

- a. a^{30}
- b. a^{11}
- c. a^{15}

$$x^m \times x^n = x^{m+n}$$

$$a^5 \times a^6 = a^{5+6} = a^{11}$$

26) $\frac{x^9}{x^2}$ is equal to:

- a. x^{18}
- b. x^{11}
- c. x^7

$$\frac{x^a}{x^b} = x^{a-b}$$

$$\frac{x^9}{x^2} = x^{9-2} = x^7$$

27) $\frac{1}{\sqrt{x}}$ is equal to:

- a. $x^{1/2}$
- b. $x^{-1/2}$
- c. x^2

$$\frac{1}{\sqrt{x}} = \frac{1}{x^{1/2}} = x^{-1/2}$$

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

28) 125^0 is equal to:

- a. 125^0
- b. δ
- c. 1

$$a^0 = 1 \quad \text{for any } a \text{ except } a=0$$

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- 29) $\frac{1}{9^{\frac{1}{2}}}$ is equal to:
- $$\frac{1}{9^{\frac{1}{2}}} = \frac{1}{(3^2)^{\frac{1}{2}}} = \frac{1}{3^{2 \times \frac{1}{2}}} = \frac{1}{3^1} = \frac{1}{3}$$
- (a.) $\frac{1}{3}$ $(x^a)^b = x^{ab}$
- b. $\frac{1}{4.5}$
- c. 81

Revision

Basic Algebra

Answers

- | | |
|-------|-------|
| 1. C | 16. B |
| 2. A | 17. C |
| 3. B | 18. B |
| 4. A | 19. B |
| 5. B | 20. C |
| 6. B | 21. B |
| 7. C | 22. C |
| 8. B | 23. C |
| 9. C | 24. A |
| 10. C | 25. B |
| 11. C | 26. C |
| 12. C | 27. B |
| 13. B | 28. C |
| 14. B | 29. A |
| 15. B | |