

Algebra 2BE – Foundations Unit Practice Test

1. Solve and simplify $x^2 = 250$

$$x = \pm \sqrt{250} = \pm 5\sqrt{10}$$

2. Rewrite $x^{\frac{2}{7}}$ with a radical

$$\sqrt[7]{x^2}$$

3. Multiply $(2x-5)(x^2+x-4)$

$2x$	$2x^3$	$2x^2$	$-8x$
-5	$-5x^2$	$-5x$	$+20$

$$= \boxed{2x^3 - 3x^2 - 13x + 20}$$

4. Simplify $5x^2 + 3x(x-4) - 4(3-x)$

$$5x^2 + 3x^2 - 12x - 12 + 4x = \boxed{8x^2 - 8x - 12}$$

5. Simplify $(3x^2 + 5x - 12) - (2x^2 - 7x + 3)$

$$3x^2 + 5x - 12 - 2x^2 + 7x - 3 = \boxed{x^2 + 12x - 15}$$

6. Multiply $(3x^2)(7x^3y)(xy^4)$

$$= 21x^6y^5$$

7. Write two expressions equivalent to $(3^{10})^x$

$$3^{10x} = (3^2)^{5x} = (3^5)^{2x} \text{ etc}$$

8. Write an equation that has no solution. (Is "never" true).

$$ax + b = ax + c \text{ if } b \neq c \text{ Ex } 3x - 5 = 3x + 1$$

9. Write an equation that has infinitely many solutions. (Is "always" true).

$$ax + b = ax + b \text{ Ex: } 2(x + 4) = 2x + 8$$

10. $\sqrt[3]{3a^2 + 37} - \frac{3}{x} = 1$. If $a > 0$ and $x = 3$ in the equation, what is the value of a ?

$$\left(\sqrt[3]{3a^2 + 37}\right) - \frac{3}{3} = 1 \implies \sqrt[3]{3a^2 + 37} = 4 \implies 3a^2 + 37 = 64 \implies 3a^2 = 27 \implies a^2 = 9 \implies a = \pm 3$$

$a > 0 \implies a = 3$

11. If $\frac{x}{y} = 5$ what is the value of $\frac{15y}{x}$

$$x = 5y$$

$$\frac{15y}{x} = \frac{15y}{5y} = \frac{15}{5} = 3$$

12. If $x > 5$, write a simplified expression equivalent to $\frac{1}{(x+5)(x+3)} + \frac{1}{(x+5)(x+3)}$ *Need a common denominator.*

$$= \frac{1}{(x+5)(x+3)} + \frac{1}{(x+5)(x+3)} = \frac{2}{(x+5)(x+3)} = \frac{2x+8}{x^2+8x+15} = \boxed{\frac{x^2+8x+15}{2x+8}}$$

13. In the given formula, solve for P in terms of m, r, and N. $m = \frac{\left(\frac{r}{50}\right)\left(1 + \frac{r}{50}\right)^N}{\left(1 + \frac{r}{50}\right)^N - 1} P$.

$$m \frac{\left(1 + \frac{r}{50}\right)^N - 1}{\left(\frac{r}{50}\right)\left(1 + \frac{r}{50}\right)^N} = P$$

Multiply by
reciprocal
on both
sides.

14. Solve $\frac{3x-7}{2} = 5$ and describe each step in the process.

Multiply $3x - 7 = 10$

Add $3x = 17$

Divide $x = 17/3$

15. Factor $x^3 - 27$ Difference of cubes

$$(x - 3)(x^2 + 3x + 9)$$

$$\begin{array}{r|l} *12 & -8 \\ -6 & -2 \end{array}$$

16. Factor $x^2 - 8x + 12$

$$(x - 6)(x - 2)$$

17. Factor $12x^2 - 3$ completely.

$$3(4x^2 - 1) \text{ Diff of squares}$$

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

$$\begin{array}{r|l} * & 5 \\ -36 & \\ 9 & -4 \end{array}$$

18. Factor $3x^2 + 5x - 12$

$$3x^2 + 9x - 4x - 12$$

$$3x(x+3) - 4(x+3)$$

$$(3x - 4)(x + 3)$$

19. Simplify $\frac{7x+7}{21x+21} = \frac{7(x+1)}{21(x+1)} = \frac{7}{21} = \boxed{\frac{1}{3}}$

20. If $\frac{x^{a^2}}{x^{b^2}} = x^{10}$, $x > 1$ and $a - b = 5$, what is the value of $a + b$?

$$a^2 - b^2 = 10$$

$$(a - b)(a + b) = 10$$

$$\frac{5}{5}(a + b) = \frac{10}{5}$$

$$\boxed{a + b = 2}$$