

# ALGEBRA 2 TEST 1

Name \_\_\_\_\_

Date \_\_\_\_\_

**Directions: Complete as many problems as you can in the 30 minutes allotted to you. No calculators!**

1.  $5^6 \times 5^2 =$   
 (A)  $25^8$  (B)  $25^{12}$  (C)  $5^8$  (D)  $5^{12}$  (E)  $5^{36}$
2. Simplify  $aba^2ab^3ab^{-2}$   
 (A)  $a^5b^2$  (B)  $a^4b^2$  (C)  $a^5b$  (D)  $a^2b^2$  (E)  $a^2b$
3. Double the year that you were born. Now subtract 4 years from this product and then take half of this difference. Add 2003 years to your answer and subtract out the year in which you were born. What year would it be?  
 (A) 1998 (B) 1999 (C) 2000 (D) 2001 (E) 2002
4. Solve  $4x + 10 = -2 + 5x$   
 (A) -12 (B) -10 (C) -8 (D) 8 (E) 12
5. Solve  $30 = \frac{3}{5}a$   
 (A) 18 (B)  $28\frac{1}{3}$  (C)  $29\frac{2}{5}$  (D)  $31\frac{2}{3}$  (E) 50
6. Twice the opposite of a number is 6 less than 4 times the number. Find the number.  
 (A) -1 (B) 1 (C) 3 (D)  $\frac{4}{3}$  (E)  $\frac{8}{5}$
7.  $2q + 5$  quarters equals how many nickels?  
 (A)  $10q + 5$  (B)  $10q + 10$  (C)  $10q + 25$  (D)  $\frac{2q+5}{2}$  (E)  $\frac{2q+5}{5}$
8. Solve  $\frac{a}{1\frac{1}{4}} = 20$   
 (A)  $18\frac{3}{4}$  (B)  $21\frac{1}{4}$  (C) 16 (D) 24 (E) 25
9. It took you  $w$  weeks to manually seal the envelopes but it took a machine only  $d$  days. How many weeks would it save to use the machine?  
 (A)  $w - d$  (B)  $\frac{w-d}{7}$  (C)  $7w - d$  (D)  $w - \frac{d}{7}$  (E)  $\frac{d}{7} - w$
10. Solve  $2.7877 - 10^8 + 0.11\% + c + 4\frac{2}{3} - \frac{7}{8} = -10^8 + 4.7877 - \frac{7}{8} + \frac{14}{3} - c + 0.11\%$  .  
 (A) 2 (B) 1 (C) 0 (D) -1 (E) -2
11.  $c^{\sqrt{z}} + c^{\sqrt{z}} =$   
 (A)  $c^z$  (B)  $c^{2\sqrt{z}}$  (C)  $2c^z$  (D)  $2c^{\sqrt{z}}$  (E)  $2c^{2\sqrt{z}}$
12.  $\frac{b^2}{4} + \frac{b^2}{6} =$   
 (A)  $\frac{b^2}{5}$  (B)  $\frac{5b^2}{12}$  (C)  $\frac{5b^4}{12}$  (D)  $\frac{5b^2}{24}$  (E)  $\frac{5b^4}{24}$
13. If  $w < x < 0 < y < z$ , which of the following has the smallest value?  
 (A)  $\frac{x^{32}}{w^3}$  (B)  $\frac{w+x}{w-x}$  (C)  $z^2 - y^2$  (D)  $wx - wy$  (E) answer unknown

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14. The average of three algebraic expressions is  $y - 6$ . If the first algebraic expression is  $4y + 2$ , and the second algebraic expression is  $2y + 8$ , find the third algebraic expression.

- (A)  $-3y - 28$  (B)  $3y + 28$  (C)  $-2y - 14$  (D)  $-3y - 16$  (E)  $-5y - 16$

15. Simplify  $\sqrt{\frac{9x - 9z + 9y}{5z + x + y - 6z}}$  if  $x + y \neq z$ .

- (A) 1 (B) 3 (C)  $3(x - z + y)$  (D)  $6(x - z + y)$  (E)  $9(x - z + y)$

16. The ratio of wins to losses was  $a$  to  $b$ . Which of the following would not be equivalent to the ratio of losses to the total number of games played?

- (A)  $\frac{b}{a + b}$  (B)  $\frac{b^3}{ab^2 + b^3}$  (C)  $\frac{-ab^2}{-a^2b - ab^2}$  (D)  $\frac{ba^3}{a^5 + ba^3}$  (E)  $\frac{-b^3a^2}{-a^3b^2 - b^3a^2}$

17. What is the difference between the two areas of the following two rectangles? Assume  $y > 3$ .



- (A)  $4y + 9$  (B)  $4y - 9$  (C)  $4y + 6$  (D)  $4y - 6$  (E) not enough information given

18. If  $\frac{3}{4}y = 16$ , then  $\frac{3}{8}y - 5$  equals

- (A) 2 (B) 3 (C) 4 (D) 4.5 (E) 5

19. If  $ab = c$  and  $b \neq 0$ , then  $\frac{a}{b} =$

- (A)  $cb$  (B)  $cb^2$  (C)  $\frac{c}{b}$  (D)  $\frac{2c}{b}$  (E)  $\frac{c}{b^2}$

20. Simplify  $\frac{-16}{-4^2 + 4^2}$

- (A) -16 (B)  $-\frac{1}{2}$  (C) 0 (D)  $\frac{1}{2}$  (E) undefined

21. If  $7(\sqrt{2x} - 3\pi) = \frac{2}{3}$ , what is the value of  $\frac{\sqrt{2x} - 3\pi}{3}$ ?

- (A)  $\frac{2}{63}$  (B)  $\frac{1}{21}$  (C)  $\frac{2}{21}$  (D)  $\frac{4}{21}$  (E)  $\frac{6}{21}$

22. Your tank is exactly full after you add 10% of what you originally had. How full was your tank before you added the gas?

- (A)  $\frac{8}{9}$  (B)  $\frac{9}{10}$  (C)  $\frac{10}{11}$  (D)  $\frac{11}{12}$  (E)  $\frac{12}{13}$

23. How long would it take a car traveling at  $(2t - 3)$  miles per hour to travel  $(2tr + 2tp - 3r - 3p)$  miles?

- (A)  $r + p$  (B)  $r - p$  (C)  $p - r$  (D)  $r + 2p$  (E)  $2r + p$

24. How many 32 cent stamps can be purchased with  $x$  dollars?

- (A)  $\frac{x}{32}$  (B)  $\frac{32}{x}$  (C)  $32x$  (D)  $\frac{32}{100x}$  (E)  $\frac{100x}{32}$

25. If  $n$  is an odd integer, which is the next consecutive odd integer?

- (A)  $n + 1$  (B)  $n + 2$  (C)  $n + 3$  (D)  $n + 4$  (E)  $n + 5$

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# ALGEBRA 2 TEST 1 ANSWERS

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

1.  $5^6 \cdot 5^2 = 5^8$

2.  $aba^2ab^3ab^{-2} = a^5b^2$

3.  $\frac{1}{2}(2y-4) + 2003 - y = y - 2 + 2003 - y = 2001$

4.  $x = 12$

5.  $\frac{5}{3} \cdot 30 = \frac{5}{3} \cdot \frac{3}{5}a \rightarrow 50 = a$

6.  $-2n = 4n - 6 \rightarrow n = 1$

7.  $5(2q+5) = 10q + 25$

8.  $1\frac{1}{4}\left(\frac{a}{1\frac{1}{4}}\right) = \frac{5}{4} \cdot 20 \rightarrow a = 25$

9.  $d$  days =  $\frac{d}{7}$  weeks. Therefore  $w = \frac{d}{7}$

10.  $2c = 2 \rightarrow c = 1$

11.  $c^{\sqrt{z}} + c^{\sqrt{z}} = 2c^{\sqrt{z}}$

12.  $\frac{b^2}{4} + \frac{b^2}{6} = \frac{3b^2}{12} + \frac{2b^2}{12} = \frac{5b^2}{12}$

13. Choice A is the only choice that is negative.

14.  $\frac{(4y+2)+(2y+8)+x}{3} = y - 6 \rightarrow 6y + 10 + x = 3y - 18 \rightarrow x = -3y - 28$

15.  $\sqrt{\frac{9x-9z+9y}{5z+x+y-6z}} = \sqrt{\frac{9(x-z+y)}{x-z+y}} = \sqrt{9} = 3$

16. Choice D is the only choice that does not reduce to  $\frac{b}{a+b}$ .

17.  $y(y+4) - (y-3)(y+3) = y^2 + 4y - y^2 + 9 = 4y + 9$

18. If  $\frac{3}{4}y = 16$ , then  $\frac{3}{8}y = \frac{1}{2}\left(\frac{3}{4}y\right) = \frac{1}{2} \cdot 16 = 8$ . Therefore  $\frac{3}{8}y - 5 = 8 - 5 = 3$

19.  $\frac{ab}{b^2} = \frac{c}{b^2} = \frac{a}{b}$

20.  $\frac{-16}{-16+16} = \frac{-16}{0}$  undefined

21. To obtain a denominator of 3, multiply both sides of  $7(\sqrt{2x} - 3\pi) = \frac{2}{3}$  by  $\frac{1}{21}$  and simplify.

This will produce  $\frac{\sqrt{2x} - 3\pi}{3} = \frac{2}{3} \cdot \frac{1}{21} = \frac{2}{63}$

22.  $x + 0.1x = 1 \quad x = \frac{1}{1.1} = \frac{10}{11}$

23.  $\text{time} = \frac{d}{r} = \frac{2tr + 2tp - 3r - 3p}{2t - 3} = \frac{2t(r+p) - 3(r+p)}{2t - 3} = \frac{(2t-3)(r+p)}{2t-3} = r + p$

24.  $\frac{100x}{32}$

25.  $n+2$  because consecutive odd integers differ by two.