

# ALGEBRA 2 TEST 2

Name \_\_\_\_\_

Date \_\_\_\_\_

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

- Five years ago, Tom was  $k$  years old. How old will Tom be in 6 more years?  
 (A)  $k - 11$  (B)  $k - 1$  (C)  $1 - k$  (D)  $k + 1$  (E)  $k + 11$
- Subtract  $-4c^3 + 5c^2 - 6c + 3$  from  $8c^3 - 4c^2 - 7c - 9$ .  
 (A)  $4c^3 + c^2 - 13c - 6$  (B)  $-12c^3 + 9c^2 + c + 12$  (C)  $12c^3 - 9c^2 - c - 12$   
 (D)  $12c^3 + c^2 - 13c - 6$  (E)  $12c^3 - 9c^2 - c - 6$
- If  $\sqrt[3]{x} = \frac{8}{\sqrt[4]{y}}$ , find  $\sqrt[4]{y}$  when  $\sqrt[3]{x} = 2$ .  
 (A) 4 (B) 16 (C) 32 (D) 64 (E)  $2^8$
- $3y - \frac{2}{y}$  is equivalent to which of the following?  
 (A)  $3y^2 - 2$  (B)  $\frac{3y^2 - 2}{y}$  (C)  $y$  (D) 1 (E)  $\frac{3y - 2}{y}$
- Evaluate  $(a + b)a - b(a + b)$  if  $a = -4$   $b = 2$   
 (A) -24 (B) -12 (C) -2 (D) 12 (E) 28
- $\frac{4}{x^2} + \frac{7}{x^2} =$   
 (A)  $\frac{11}{2x^2}$  (B)  $\frac{11}{2x^4}$  (C)  $\frac{11}{x^2}$  (D)  $\frac{11}{4x}$  (E)  $\frac{11}{x^4}$
- Which point satisfies the linear inequality  $-2y > 4x + 2$  ?  
 (A)  $\left(\frac{1}{2}, -3\right)$  (B)  $(-2, 4)$  (C)  $(0, 0)$  (D)  $\left(-\frac{1}{2}, 1\right)$  (E)  $(3, -6)$
- Solve  $\frac{a_1}{b_1 c_1} = \frac{a_2}{b_2 c_2}$  for  $c_2$ .  
 (A)  $\frac{a_1 c_1}{b_1}$  (B)  $\frac{a_1 b_2}{a_2 b_1 c_1}$  (C)  $\frac{a_2 b_2}{a_1 b_1 c_1}$  (D)  $\frac{a_2 b_1 c_1}{a_1 b_2}$  (E)  $\frac{a_1 b_1 c_1}{a_2 b_2}$
- $r^a p^{\sqrt{2}} r^a p^{\sqrt{2}} =$   
 (A)  $r^{2a} p^2$  (B)  $r^{a^2} p^2$  (C)  $r^{2a} p^{2\sqrt{2}}$  (D)  $r^{a^2} p^{2\sqrt{2}}$  (E)  $2r^a p^{\sqrt{2}}$
- Simplify  $\left[(a - b)^{\frac{1}{4}}\right]^3$   
 (A)  $(a - b)^{-2\frac{3}{4}}$  (B)  $(a - b)^{\frac{3}{4}}$  (C)  $(a - b)^{\frac{1}{12}}$  (D)  $(a - b)^{\frac{1}{64}}$  (E)  $(a - b)^{\frac{3}{4}}$
- Given  $\sqrt[3]{\frac{g+h}{f}} + 8 = -117 \frac{97}{113}$ , find the value of  $\sqrt[3]{\frac{g+h}{f}} + 6$ .  
 (A)  $-121 \frac{97}{113}$  (B)  $-119 \frac{97}{113}$  (C)  $-117 \frac{97}{113}$  (D)  $-115 \frac{97}{113}$  (E)  $-113 \frac{97}{113}$
- Given  $8\sqrt{r+p+q} - 5 = 5\sqrt{q+p+r} + 13$ , find  $4\sqrt{p+q+r} - 3$ .  
 (A) 6 (B) 10 (C) 12 (D) 17 (E) 21

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13. Given  $\frac{(x-y+z)^2}{b} = b$ , find the value of  $(x+z-y)^2 + b$ .
- (A)  $3b$  (B)  $3b^2$  (C)  $2b^2$  (D)  $b^2 + b$  (E)  $b^3$
14. Solve  $\frac{m}{70\%} + \frac{m}{70\%} = 140$
- (A) 49 (B) 98 (C) 196 (D) 200 (E) 400
15. If  $\frac{3}{4}(a^2 - 16) = 24$ , find the value of  $\frac{16}{(a+4)(a-4)}$ .
- (A) 1 (B) 2 (C)  $\frac{1}{2}$  (D)  $\frac{8}{9}$  (E)  $\frac{4}{3}$
16. If  $x = -4$ , which of the following is true?
- (A)  $\frac{1}{x^{15}} < \frac{1}{x^{10}} < \frac{1}{x^{20}}$  (B)  $\frac{1}{x^{15}} < \frac{1}{x^{20}} < \frac{1}{x^{10}}$  (C)  $\frac{1}{x^{10}} < \frac{1}{x^{15}} < \frac{1}{x^{20}}$  (D)  $\frac{1}{x^{20}} < \frac{1}{x^{10}} < \frac{1}{x^{15}}$  (E)  $\frac{1}{x^{20}} < \frac{1}{x^{15}} < \frac{1}{x^{10}}$
17. Express  $c$  in terms of  $a$  and  $b$  if  $c = 3x^4ba^5$  and  $x = 2ba^{-2}$ .
- (A)  $24b^5a^{-3}$  (B)  $24b^5a^{21}$  (C)  $48b^5a^{-3}$  (D)  $48b^5a^{21}$  (E)  $48b^4a^{-3}$
18. Given  $x - 3 + y - z = 10$  and  $x - y - 10 + 2z = -5$ , find the value of  $\left(\frac{2y-3z}{2}\right)^2$ .
- (A) 1 (B) 4 (C) 9 (D) 16 (E) 36
19. Find the value of  $b$  if  $\frac{(4a+6-2b+2a)^5}{[2(3a+3-b)]^4} = 6a-8$  where  $b \neq 3a+3$ .
- (A) 1 (B) 4 (C) 5 (D) 6 (E) 7
20. Find the value of  $4\left(\sqrt[3]{-4x^2+12x+27}\right)$  if  $-5x+10=-5$ .
- (A) -8 (B) 0 (C) 8 (D) 12 (E) 16
21. If 20% of  $\frac{1}{4}x$  is 0.4, what is 200% of  $\frac{1}{2}x$ ?
- (A) 5 (B) 8 (C) 50 (D) 80 (E) 800
22. What is the final result if 80 is increased by 400%?
- (A) 240 (B) 320 (C) 400 (D) 480 (E) 560
23. Find the value of  $\frac{\frac{x+1}{y}}{\frac{z}{w-3}}$  if  $\frac{2z}{w-3} = \frac{1}{2}$  and  $\frac{x+1}{y} = \frac{1}{2}$ .
- (A)  $\frac{1}{8}$  (B)  $\frac{1}{4}$  (C) 1 (D) 2 (E) 8
24. If you spend 30 minutes watching television the night before your algebra 2 test and you obtain a 80%, how many minutes could you spend watching television the night before your algebra 2 test if you want to obtain a 100%? Assume that time watching television the night before an algebra 2 test is inversely proportional to your grade.
- (A) 10 (B) 12 (C) 15 (D) 20 (E) 24
25. If  $0.6(0.7x+0.8) = 4$ , then which of the following is equivalent to 40?
- (A)  $0.6(0.7x+0.8)+26$  (B)  $6(7x+8)$  (C)  $6(0.7x+0.8)$  (D)  $\frac{0.6(0.7x+0.8)}{10}$  (E)  $\frac{6(7x+8)}{100}$

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# ALGEBRA 2 TEST 2 ANSWERS

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

1. Tom is  $k + 5$  years old now. In 6 more years, he will be  $k + 11$ .

$$2. \quad 8c^3 - 4c^2 - 7c - 9 - (-4c^3 + 5c^2 - 6c + 3) = 12c^3 - 9c^2 - c - 12$$

$$3. \text{ Substituting 2 in for } \sqrt[3]{x} \text{ yields } 2 = \frac{8}{\sqrt[4]{y}}. \text{ Therefore } \sqrt[4]{y} = \frac{8}{2} = 4.$$

$$4. \quad 3y - \frac{2}{y} = \frac{3y^2 - 2}{y}$$

$$5. \quad (a+b)a - b(a+b) = (-4+2)(-4) - 2(-4+2) = 8+4 = 12$$

$$6. \quad \frac{4}{x^2} + \frac{7}{x^2} = \frac{11}{x^2}$$

$$7. \quad (-2)(-3) > 4\left(\frac{1}{2}\right) + 2 \rightarrow 6 > 4$$

$$\left(\frac{1}{2}, -3\right) \text{ satisfies the inequality.}$$

$$8. \quad \frac{a_1}{b_1c_1} = \frac{a_2}{b_2c_2} \rightarrow a_1b_2c_2 = a_2b_1c_1 \rightarrow c_2 = \frac{a_2b_1c_1}{a_1b_2}$$

$$9. \quad r^a p^{\sqrt{2}} r^a p^{\sqrt{2}} = r^{2a} p^{2\sqrt{2}}$$

$$10. \quad \left[(a-b)^{\frac{1}{4}}\right]^3 = (a-b)^{\frac{3}{4}}$$

$$11. \quad \sqrt[3]{\frac{g+h}{f}} + 6 \text{ is 2 less than } \sqrt[3]{\frac{g+h}{f}} + 8, \text{ therefore } \sqrt[3]{\frac{g+h}{f}} + 6 = -117 \frac{97}{113} - 2 = -119 \frac{97}{113}$$

$$12. \text{ Solve } 8\sqrt{r+p+q} - 5 = 5\sqrt{q+p+r} + 13 \text{ as if it were } 8x - 5 = 5x + 13. \text{ Since } x = 6, \text{ then } \sqrt{r+p+q} = 6.$$

$$\text{Then } 4\sqrt{p+q+r} - 3 = 4(6) - 3 = 21$$

$$13. \text{ Since } \frac{(x-y+z)^2}{b} = b, \text{ multiplying both sides by } b \text{ results in } (x-y+z)^2 = b^2. \text{ Therefore } (x+z-y)^2 + b = b^2 + b.$$

$$14. \quad \frac{m}{70\%} + \frac{m}{70\%} = 140 \rightarrow \frac{10}{7}m + \frac{10}{7}m = 140 \rightarrow \frac{20}{7}m = 140 \rightarrow m = 49$$

$$15. \quad \frac{3}{4}(a^2 - 16) = 24 \rightarrow a^2 - 16 = 32 \rightarrow (a+4)(a-4) = 32. \text{ Therefore } \frac{16}{(a+4)(a-4)} = \frac{16}{32} = \frac{1}{2}.$$

$$16. \quad \frac{1}{x^{15}} \text{ is the only negative fraction. Therefore it must come first, which eliminates C, D, and E. } \frac{1}{x^{20}} \text{ will have 10 more factors of -4 in the}$$

$$\text{denominator than } \frac{1}{x^{10}} \text{ which will produce a larger denominator. Therefore } \frac{1}{x^{20}} < \frac{1}{x^{10}} \text{ which eliminates A. Therefore B.}$$

$$17. \quad c = 3x^4ba^5 = 3(2ba^{-2})^4ba^5 = 3 \cdot 16b^4a^{-8}ba^5 = 48b^5a^{-3}$$

$$18. \quad \begin{cases} x-3+y-z=10 \\ x-y-10+2z=-5 \end{cases} \rightarrow \begin{cases} x+y-z=13 \\ x-y+2z=5 \end{cases} \rightarrow 2y-3z=8 \rightarrow \frac{2y-3z}{2}=4 \text{ Therefore } \left(\frac{2y-3z}{2}\right)^2 = (4)^2 = 16$$

$$19. \quad \frac{(4a+6-2b+2a)^5}{[2(3a+3-b)]^4} = 6a-8 \rightarrow \frac{(6a-2b+6)^5}{(6a-2b+6)^4} = 6a-8 \rightarrow 6a-2b+6 = 6a-8 \rightarrow b=7$$

$$20. \text{ Solving } -5x+10=-5 \text{ for } x \text{ yields } x=3. \text{ Substituting yields } 4\left(\sqrt[3]{-4(3)^2+12x+27}\right) = 4\left(\sqrt[3]{-36+36+27}\right) = 4\left(\sqrt[3]{27}\right) = 4 \times 3 = 12$$

$$21. \quad \frac{1}{5} \cdot \frac{1}{4}x = \frac{4}{10} \rightarrow \frac{1}{20}x = \frac{4}{10} \rightarrow x = \frac{4}{10} \cdot \frac{20}{1} = 4 \cdot 2 = 8$$

$$22. \quad 80 \cdot 500\% = 80 \cdot 5 = 400$$

$$23. \quad \frac{\frac{x+1}{y}}{\frac{z}{w-3}} = \frac{1}{2} \div \frac{1}{4} = \frac{1}{2} \cdot \frac{4}{1} = 2$$

$$24. \quad k = tg = 30 \cdot 80 = 2400 \rightarrow t = \frac{k}{g} = \frac{2400}{100} = 24 \text{ minutes}$$

$$25. \text{ Multiplying both sides by 10 will result in 40 on the right side. Therefore } 6(0.7x+0.8) = 40.$$