Algebra 1 Final Review

A **1.** Find $(3x + 2)(4x^2 - 2x - 7)$. $12x^3 - 6x^2 - 21x + 8x^2 - 4x - 14$

A $12x^3 + 2x^2 - 25x - 14$ **B** $12x^3 + 14x^2 + 25x + 14$ **C** $7x^3 + 9x^2 - 25x - 14$

D $7x^3 + 7x^2 - 4x - 5$ **E** $7x^3 + 2x^2 - 25x - 14$

D **2.** Factor $7x^2 - 16x + 4$. $(7x - 2)(x - 2)$

A $(x - 3)(7x + 5)$ **B** $(x + 2)(7x - 4)$ **C** $(x - 4)(7x + 1)$ **D** $(x - 2)(7x - 2)$ **E** $(x + 3)(7x - 5)$

A **3.** Solve $x(x + 3) - 2 = 2 + x(x + 1)$. $x^2 + 3x - 2 = 2 + x^2 + x$ $2x = 4$

A 2 **B** –2 **C** 1 **D** 0 **E** - 1

A **4.** Which binomial is a factor of $80y^2 - 120y + 45$? $5(16y^2 - 24y + 9)$ $5(4y - 3)^2$

A $4y - 3$ **B** $8y - 9$ **C** $16y - 9$ **D** $8y - 15$ **E** $8y + 9$

A **5.** Simplify $2a^2(5a - 6) - 5a(a^2 - 3a + 4) - 7(a - 5)$.

$10a^3 - 12a^2 - 5a^3 + 15a^2 - 20a - 7a + 35$

A $5a^3 + 3a^2 - 27a + 35$ **B** $5a^3 - 27a^2 + 13a - 35$ **C** $5a^3 - 10a - 7$

D $5a^3 - 3a^2 + 12a + 35$ **E** None of these $5a^3 + 3a^2 - 27a + 35$

E **6.** Factor $24x^2y - 66xy^2 + 54x^2y^2$ completely. $6xy(4x - 11y + 9xy)$

A $2xy(12x - 33y + 27xy)$ **B** $(4x^2 + 6y)(6x - 9y^2)$ **C** $6x^2y^2(4y - 11x + 9)$

D $6x^2y^2(4x - 11x - 9y)$ **E** $6xy(4x - 11y + 9xy)$

E **7.** Solve $0 = (3w + 4)(2w - 7)$ $-\frac{4}{3}$ and $\frac{7}{2}$

A $\left\{-\frac{3}{4}, \frac{2}{7}\right\}$ **B** $\left\{\frac{3}{4}, -\frac{2}{7}\right\}$ **C** $\left\{\frac{4}{3}, \frac{2}{7}\right\}$ **D** $\left\{\frac{4}{3}, -\frac{7}{2}\right\}$ **E** $\left\{-\frac{4}{3}, \frac{7}{2}\right\}$

A **8.** Factor $x^2 - 10x + 9$. $(x - 9)(x - 1)$

A $(x - 1)(x - 9)$ **B** $(x - 1)(x + 9)$ **C** $(x + 1)(x + 9)$ **D** $(x + 1)(x - 9)$ **E** $(x - 10)(x + 1)$

C **9.** Find $(4a^2 + b)^2$. $(4a^2 + b)$ $16a^4 + 4a^2b + 4a^2b + b^2$

A $16a^4 + b^2$ **B** $8a^4 + b^2$ **C** $16a^4 + 8a^2b + b^2$

D $4a^4 + 8a^2b + b^2$ **E** $8a^4 + 8a^2 + b^2$

A **10.** Factor $121r^2 - 64t^2$. $(11r-8t)(11r+8t)$

A $(11r + 8t)(11r - 8t)$ B $(11r + 8t)(11r + 8t)$ C $(11r - 8t)(11r - 8t)$

D $(121r + 8t)(r - 8b)$ E prime/non factorable

C **11.** The length of a rectangle is twice the width. The area is 72 square centimeters. What is the length?

$l = 2w$ $A = lw$ $72 = (2w)w$ $36 = w^2$ $w = 6$

A 48 cm B 24 cm C 12 cm D 6 cm E 18 cm

B **12.** Solve $v^2 = 13v - 42$. $v^2 - 13v + 42 = 0$ $(v-6)(v-7) = 0$

A {–6, –7} B {6, 7} C {–6, 7} D {6, –7} E {−10, −3}

C **13.** Consider the equation $y = x^2 + 5x - 6$. Determine whether the function has a maximum or minimum value. State the maximum of minimum value. What are the domain and range of the function?

A min.; (0, 0)
D: {all real numbers}
R: {all real numbers}

B max.; (0, 0)
D: {all real numbers}
R: $\{y \mid y \le 0\}$

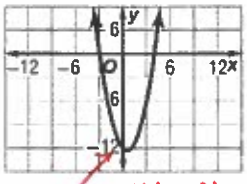
$x = \frac{-5}{2(1)}$

C min.; (–2.5, –12.25)
D: {all real numbers}
R: $\{y \mid y \ge -12.25\}$

D max.; (2.5, –12.25)
D: $\{x \mid x \le 2.5\}$
R: {all real numbers}

E min.; (-6, 1)
D: {all real numbers}
R: $\{y \mid y \ge 1\}$

C **14.** Which equation corresponds to the graph shown?



A $y = x^2 + 7x - 12$ B $y = x^2 + 5x + 12$ C $y = x^2 - x - 12$

D $y = x^2 + 12x - 1$ E $y = 2(x-1)^2 - 12$

$y = (x-4)(x+3)$ $c = -12$

B **15.** Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of $y = 2x^2 - 12x + 6$.

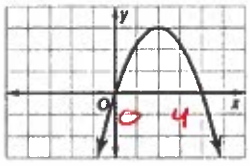
$x = \frac{12}{4} = 3$

A $x = -3$; (–3, 60) B $x = 3$; (3, –12) C $x = -3$; (–3, 78)

D $x = 3$; (3, 6) E $x = 3$; (3, 6)

$18 - 36 + 6 = -12$

C **16.** What are the zeros of the quadratic equation whose related function is graphed at the right?



A 2 B 3 C 0, 4 D –4, 0 E 2, 3

D **17.** Describe how is the function $g(x) = (x + 3)(x - 1)$ is related to the function $f(x) = x^2$?

$x^2 + 2x - 3$ or $(x+1)^2 - 4$

A translated left 3 units & down 1 B translated left 1 C translated right 1

D translated left 1 & down 4 E translated right 1 & up 4

B **18.** How is the parent function $f(x) = x^2$ translated to create the graph of $g(x) = (x - 3)^2 + 2$? 3 R U 2

A down 2 units B right 3 units & up 2 units C left 3 units & up 2 units

D up 2 units E left 3 units & down 2 units

B **19.** What is the vertex form of $n^2 - 12n - 10 = 0$? $(n-12n+36)-36-10=0$

A $0 = (n+6)^2 + 26$ B $0 = (n-6)^2 - 46$ C $0 = (n-12)^2 + 134$

D $0 = (n-5)(n+2)$ E $0 = (n-6)^2 + 26$

D **20.** Which equation is equivalent to $2x^2 - 24x - 14 = 0$? $2(x^2-12x-7)=0$

A $(x-6)^2 = 50$ B $(x-3)^2 = 13$ C $(x-3)^2 = 20$

D $(x-6)^2 = 43$ E $2(x-6)^2 = 43$

$x^2-12x+36 = 7+36$

$(x-6)^2 = 43$

For Questions 21-23, simplify each expression.

D **21.** $5\sqrt{3} \cdot 2\sqrt{21}$ $10 \cdot 3\sqrt{7}$

A $70\sqrt{3}$ B $10\sqrt{63}$ C $49\sqrt{3}$ D $30\sqrt{7}$ E $7\sqrt{24}$

B **22.** $\sqrt{\frac{x^2}{12}}$ $\frac{x}{2\sqrt{3}}$ $\frac{x\sqrt{3}}{6}$

A $\frac{x^2}{2\sqrt{3}}$ B $\frac{x\sqrt{3}}{6}$ C $\frac{x}{6}$ D $\frac{x}{\sqrt{12}}$ E $\frac{x}{\sqrt{6}}$

A **23.** $2\sqrt{y} \cdot 5\sqrt{y} \cdot 2\sqrt{y}$. $20\sqrt{y^3}$ $20y\sqrt{y}$

A $20\,y\sqrt{y}$ B $20\sqrt{y}$ C $20y^2\sqrt{y}$ D $20y^3$ E $20\sqrt{y^3}$

For Questions 24-25, solve the equation by using the Quadratic Formula.

D **24.** $4x^2 + 11x - 3 = 0$ $\frac{-11 \pm \sqrt{121-4(4)(-3)}}{8}$ $\frac{-11 \pm \sqrt{121+48}}{8}$ $\frac{-11 \pm 13}{8}$

A $\frac{-11 \pm \sqrt{73}}{8}$ B $-\frac{1}{4}, 3$ C $\frac{11 \pm \sqrt{73}}{8}$ D $-3, \frac{1}{4}$ E no solutions

E **25.** $y^2 + 2y + 3 = 0$ $4-4(1)(3)$ $4-12 \rightarrow$ no sol

A -1, -2 B -3,-1 C 1, 2 D 3, 1 E no solutions

A **26.** Determine the number of real solutions of $7x^2 - 18x + 12 = 0$. $324-4(7)(-18)$

A 2 B infinitely many C none D 1 E 12

B **27.** Look for a pattern in the table of values to determine which model best describes the data.

x	0	1	2	3
y	1	7	49	343

A linear B exponential C quadratic D rational E none of these

D **28.** How does the translated graph of $y = \sqrt{x+3}$ compare to the parent graph?

A translated up 3 B translated down 3 C translated right 3

D translated left 3 E no change

D

29. Which equation has a domain of $\{x \mid x \geq 2\}$?

A $y = \sqrt{x} + 2$ (0,2) B $y = \sqrt{x} - 2$ (0,-2) C $y = \sqrt{x+2}$ (-2,0) D $y = \sqrt{x-2}$ (2,0) E $y = \frac{x}{2}$

A

30. $\sqrt{18} - \sqrt{54} + 2\sqrt{50}$ $3\sqrt{2} - 3\sqrt{6} + 10\sqrt{2}$

A $13\sqrt{2} - 3\sqrt{6}$ B $-4\sqrt{3} + 4\sqrt{5}$ C $-4\sqrt{3} - 4\sqrt{5}$ D $8\sqrt{2} - 3\sqrt{6}$ E $2\sqrt{6}$

E

31. $(\sqrt{14} + \sqrt{3})(\sqrt{6} - \sqrt{17})$ $\sqrt{84} - \sqrt{238} + \sqrt{18} - \sqrt{51}$ $2\sqrt{21} - \sqrt{238} + 3\sqrt{2} - \sqrt{51}$

A $2\sqrt{5} - \sqrt{21} + 3 - \sqrt{10}$ B $\sqrt{21} - 4\sqrt{2}$ C $\sqrt{21}$

D $\sqrt{21} + \sqrt{2}$ E $2\sqrt{21} - \sqrt{238} + 3\sqrt{2} - \sqrt{51}$

B

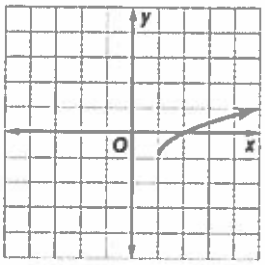
32. Solve $\sqrt{3x-2} + 4 = 8$. $3x - 2 = 16$

A 12 B 6 C $\frac{2}{3}$ D $\frac{3}{2}$ E $\frac{50}{3}$

33. What is the equation of the graph?

B

A $y = \sqrt{x+1} - 1$ B $y = \sqrt{x-1} - 1$ C $y = \sqrt{x+1} + 1$ D $y = \sqrt{x-1} + 1$ E $y = 2x - 1$

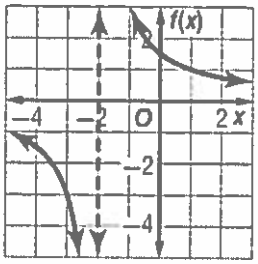


V: (1,-1)

A

34. Which rational function is graphed?

A $f(x) = \frac{3}{x+2}$ B $f(x) = \frac{3}{x-2}$ C $f(x) = \frac{x}{x+2}$ D $f(x) = \frac{x}{x-2}$ E $x = -2$



C: (-2,0)

A

35. Solve $\frac{x-1}{4} = \frac{3x}{6}$ $6x - 6 = 12x$ $-6 = 6x$

A -1 B $\frac{-1}{6}$ C $\frac{-1}{3}$ D 1 E $\frac{1}{2}$

$6(x+1)$

36. Solve $\frac{5x}{3x+3} - \frac{10}{3(x+1)} = \frac{7}{6}$. $2(5x) - 2(10) = 7(x+1)$

A

$3(x+1)$

A 9 B $-\frac{27}{11}$ C $\frac{67}{9}$ D $\frac{7}{3}$ E $\frac{17}{5}$

$7x + 7$

$10x - 20 =$

$3x = 27$

$x = 9$

3

37. What is the domain and the range for the following functions?

A. $f(x) = \frac{1}{x+2} - 3$

C: (-2, -3)

Domain: $x \neq -2$; $\mathbb{R}$

Range: $y \neq -3$; $\mathbb{R}$

B. $f(x) = \sqrt{x-3} + 4$

V: (3, 4)

Domain: $x \geq 3$

Range: $y \geq 4$

C. $f(x) = (x+1)^2 + 3$

V: (-1, 3)

Domain: $\mathbb{R}$

Range: $y \geq 3$

38. What value does n have on the graphed function to the right for $(1, n)$?

1