

Math 1300 – Intermediate Algebra
Final Exam Review

Name: _____

This review is comprehensive but should not be the only material used to study for the final exam. It should not be considered a preview of the final exam. It does not substitute for studying previous tests, quizzes, homework, class notes, text discussions, etc. There may be questions on the final exam unlike questions on this review, and vice versa. No question on this review will be exactly duplicated on the final exam. This review is longer than the final exam. You may obtain help working the review sheet in the Math Lab located in 925-N.

1. Factor each expression completely.

(1) $27a^2b^3 - 18ab^2$

(3) $x(a - b) + 8(a - b)$

(5) $x^2 + 6xy + 9y^2$

(7) $1 - 25x^2$

(9) $mx + my - nx - ny$

(11) $-x^2 + 7x - 10$

(13) $x^2 + 3x + 7$

(2) $x^2 - 2x - 15$

(4) $a^2 + 81b^2$

(6) $6x^2 + 4xy - 2x$

(8) $5x^2 - 6x - 8$

(10) $8x^3 - 32x$

(12) $4x^2 + 11x - 3$

(14) $6x^2 + 17x - 14$

2. Write each fraction in lowest terms.

(1) $\frac{4xy + 2x}{2xy^2}$

(2) $\frac{21mn^3}{35m^2n}$

(3) $\frac{m - n}{n - m}$

(4) $\frac{3a + 21}{a^2 + 8a + 7}$

(5) $\frac{a^2 + b^2}{a + b}$

(6) $\frac{x^2 + 2x + 1}{x^2 - x - 2}$

3. Perform the indicated operations and simplify.

(1) $\frac{4x^2}{15z} \cdot \frac{25y^2z}{6x}$

(2) $\frac{x^2 + 3x + 2}{3x + 9} \cdot \frac{x + 3}{x^2 - 4}$

(3) $\frac{3x}{x^2 - x} \div \frac{x^2}{2x - 2}$

(4) $\frac{2x + 9}{x^2 - 49} - \frac{x + 2}{x^2 - 49}$

(5) $\frac{2}{x + 1} + \frac{x + 3}{x^2 + x}$

(6) $2t + \frac{7}{3t}$

(7) $\frac{3}{x - 3} - \frac{2}{x + 4} + \frac{3x - 2}{x^2 + x - 12}$

(8) $\frac{a^2 - 4}{a^2 + 4a + 3} \div \frac{2a - 4}{a + 1}$

4. Simplify each complex fraction.

(1) $\frac{\frac{3m}{7}}{\frac{n}{14m}}$

(2) $\frac{\frac{b}{3} + 1}{\frac{2}{3}}$

5. Find the domain of each rational function.

$$(1) f(x) = \frac{5x - 6}{7}$$

$$(2) f(x) = \frac{4x}{x - 2}$$

$$(3) f(x) = \frac{x + 2}{x^2 - 4}$$

6. Solve each equation.

$$(1) x^2 = 4 - 2x$$

$$(2) 3x^2 - 11x = 0$$

$$(3) \frac{2}{3} = \frac{4}{x}$$

$$(4) x^2 - 36 = 0$$

$$(5) \sqrt{x + 5} = x - 1$$

$$(6) 2(x + 2) - 3(2x - 1) = 5$$

$$(7) \frac{8}{x + 3} - \frac{4}{x - 2} = \frac{x + 8}{x^2 + x - 6}$$

$$(8) \sqrt{x} + 5 = 0$$

$$(9) 3(x + 2)(x - 1) = 0$$

$$(10) \sqrt{x + 12} = x$$

$$(11) \frac{3}{x + 3} - 2 = \frac{-x}{x + 3}$$

$$(12) \frac{1}{2x + 1} = \frac{3}{6x - 5}$$

$$(13) 3x^2 - 5x = 2$$

$$(14) \frac{x + 1}{x} = \frac{10}{3}$$

$$(15) \text{ Solve the equation: } \frac{13x}{6} - \frac{1}{2} = \frac{5x}{3}. \text{ What is the value of } x - 10?$$

7. Simplify.

$$(1) \sqrt{49}$$

$$(2) \sqrt{\frac{81}{100}}$$

$$(3) \sqrt[3]{64}$$

$$(4) \sqrt{25x^4y^2}$$

$$(5) \sqrt[4]{-1}$$

$$(6) \sqrt{200x^7y^5}$$

$$(7) \sqrt[3]{-8}$$

Perform the operation and simplify.

$$(8) (2x + \sqrt{5})(2x - \sqrt{5})$$

$$(9) \sqrt{9 + 16}$$

$$(10) 5\sqrt{2}(\sqrt{6} - \sqrt{8})$$

$$(11) \sqrt{27} + \sqrt{75} - \sqrt{48}$$

$$(12) x\sqrt{32x} - \sqrt{50x^3} + \sqrt{18x}$$

Rationalize the denominator.

$$(13) \frac{3}{\sqrt{7}}$$

$$(14) \frac{-5\sqrt{2}}{\sqrt{11}}$$

8. Find the distance between the given points.

$$(1) (5, 9) \text{ and } (8, 13)$$

$$(2) (3, 6) \text{ and } (1, -2)$$

9. Find the midpoint of the line segment joining each pair of points.

$$(1) (8, -5) \text{ and } (2, 3)$$

$$(2) (0, 4) \text{ and } (0, -5)$$

10. Simplify as much as possible making all exponents positive. Assume all variables represent positive numbers.

$$(1) 125^{\frac{1}{3}}$$

$$(2) 16^{-\frac{3}{2}}$$

$$(3) x^{\frac{3}{5}} \cdot x^{\frac{1}{2}}$$

$$(4) (9x^4y^2)^{\frac{1}{2}}$$

$$(5) (27x^3)^{-\frac{1}{3}}$$

11. Rewrite with rational exponents.

$$(1) \sqrt{2+5y}$$

$$(2) \frac{1}{\sqrt[3]{4x}}$$

12. Graph each linear function.

$$(1) f(x) = -\frac{3}{5}x + 3$$

$$(2) f(x) = -\frac{1}{4}x + 1$$

$$(3) f(x) = -2$$

$$(4) f(x) = \frac{1}{3}x$$

13. Find the slope of the lines passing through the given points.

$$(1) (3, -1) \text{ and } (-6, 2)$$

$$(2) (7, 8) \text{ and } (6, 5)$$

(3) Are these two lines parallel, perpendicular or neither?

14. Find equations of the described lines in function notation.

$$(1) \text{ Slope } 3; \text{ through } (1, 2)$$

$$(2) \text{ Slope } \frac{1}{2}; \text{ through } (-6, 2)$$

$$(3) \text{ Slope } -2; \text{ through } (1, -3)$$

$$(4) \text{ Parallel to } f(x) = 3x - 4; \text{ through } (1, 5)$$

$$(5) \text{ Perpendicular to } 2x - 3y = 1; \text{ through } (-4, 8)$$

ANSWERS

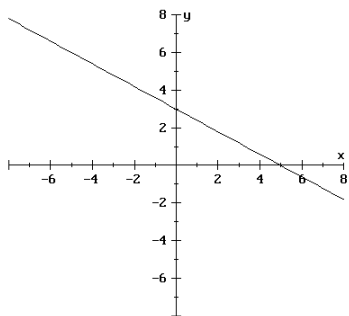
1. (1) $9ab^2(3ab - 2)$ (2) $(x - 5)(x + 3)$
(3) $(a - b)(x + 8)$ (4) Prime
(5) $(x + 3y)^2$ (6) $2x(3x + 2y - 1)$
(7) $(1 - 5x)(1 + 5x)$ (8) $(5x + 4)(x - 2)$
(9) $(x + y)(m - n)$ (10) $8x(x + 2)(x - 2)$
(11) $-(x - 5)(x - 2)$ (12) $(4x - 1)(x + 3)$
(13) Prime (14) $(3x - 2)(2x + 7)$
2. (1) $\frac{2y + 1}{y^2}$ (2) $\frac{3n^2}{5m}$ (3) -1
(4) $\frac{3}{a + 1}$ (5) In lowest terms (6) $\frac{x + 1}{x - 2}$
3. (1) $\frac{10xy^2}{9}$ (2) $\frac{x + 1}{3x - 6}$ (3) $\frac{6}{x^2}$ (4) $\frac{1}{x - 7}$ (5) $\frac{3}{x}$
(6) $\frac{6t^2 + 7}{3t}$ (7) $\frac{4}{x - 3}$ (8) $\frac{a + 2}{2(a + 3)}$
4. (1) $\frac{6m^2}{n}$ (2) $\frac{b + 3}{2}$
5. (1) $\{x \mid x \text{ is a real number}\}$ (2) $\{x \mid x \text{ is a real number and } x \neq 2\}$
(3) $\{x \mid x \text{ is a real number and } x \neq 2, -2\}$
6. (1) $x = -1 \pm \sqrt{5}$ (2) $x = 0, x = \frac{11}{3}$ (3) $x = 6$
(4) $x = -6, x = 6$ (5) $x = 4$ (6) $x = \frac{1}{2}$
(7) $x = 12$ (8) No solution (9) $x = -2, x = 1$
(10) $x = 4$ (11) No solution (12) No solution
(13) $x = 2, x = -\frac{1}{3}$ (14) $x = \frac{3}{7}$ (15) -9
7. (1) 7 (2) $\frac{9}{10}$ (3) 4 (4) $5x^2y$
(5) Not a real number (6) $10x^3y^2\sqrt{2xy}$ (7) -2
(8) $4x^2 - 5$ (9) 5 (10) $10\sqrt{3} - 20$
(11) $4\sqrt{3}$ (12) $3\sqrt{2x} - x\sqrt{2x}$
(13) $\frac{3\sqrt{7}}{7}$ (14) $\frac{-5\sqrt{22}}{11}$
8. (1) 5 (2) $2\sqrt{17}$

9. (1) $(5, -1)$ (2) $(0, -\frac{1}{2})$

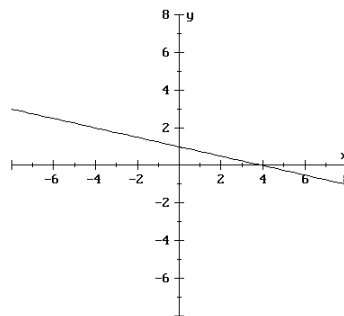
10. (1) 5 (2) $\frac{1}{64}$ (3) $x^{\frac{11}{10}}$ (4) $3x^2y$ (5) $\frac{1}{3x}$

11. (1) $(2 + 5y)^{\frac{1}{2}}$ (2) $(4x)^{-\frac{1}{3}}$

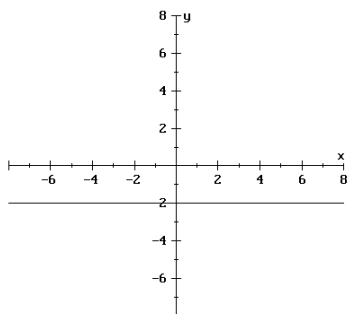
12. (1)



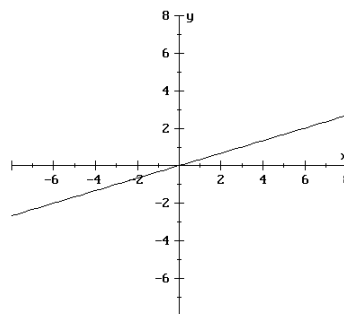
(2)



(3)



(4)



13. (1) $-\frac{1}{3}$ (2) 3 (3) Perpendicular

14. (1) $f(x) = 3x - 1$ (2) $f(x) = \frac{1}{2}x + 5$
 (3) $f(x) = -2x - 1$ (4) $f(x) = 3x + 2$
 (5) $f(x) = -\frac{3}{2}x + 2$

15. Yes

16. (1) $(11, 16]$ (2) $[3, 6)$

17. (1) 0 (2) 1 (3) $\sqrt{3}$ (4) -1

18. (1) 4 (2) 225 miles (3) 20 teachers
 (4) $L = 13$ yds, $W = 9$ yds (5) 27 (6) 9 in.
 (7) 5 inches (8) 13 ft.

Updated Fall 2009