

Math 134 - Intermediate Algebra

Final Exam Review

The following equations may be useful on the review.

The following equations may be useful while taking this exam.

Slope-Intercept Form: $y = mx + b$

Slope Formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Point-Slope Form: $y - y_1 = m(x - x_1)$

Special Products: $(a + b)(a - b) = a^2 - b^2$

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

Special Forms: $a^2 - b^2 = (a + b)(a - b)$

$$a^2 + 2ab + b^2 = (a + b)^2$$

$$a^2 - 2ab + b^2 = (a - b)^2$$

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Volume of a rectangular prism: $l \times w \times h$

1. (4pt) Complete the table of values. Then plot the solution points on the rectangular coordinate system.

Determine whether the ordered pair is a solution of the equation.

2. (3pt) $3y + 2x = 12$, $(4, 2)$

3. (3pt) $-2x + y = 1$, $(-3, -5)$

Algebraically, find the x- and y-intercepts.

Use the x- and y-intercepts to sketch the graph of the line.

All work (algebra) must be shown. DO NOT USE A TABLE OF VALUES.

4. (3pt) $2x + 4y = 20$

Consider the relation.

5. $g : \{(-3,1), (1,-2), (3,0), (4,5), (-1,2)\}$

a. (1pt) List the domain: _____

b. (1pt) List the range: _____

c.) (2pt) Is the set a function? If yes, explain. If no, explain.

Evaluate the following function at the given values. Show the substitution correctly.

No Decimal Answer.

6. (3pt) $f(x) = \frac{x-3}{2x-5}$ for $f(-1)$

Use the slope formula to find the slope of the line passing through the points.

7. (3pt) $(-2,5), (3,-1)$

Write the equation in slope-intercept form for the line containing the given pair of points.

8. (4pt) $(-2,3)$ and $(2,5)$

Application Problems

9. In 2002, Medicaid long-term care expenses totaled \$92 billion. This figure had risen to \$109 billion by 2006. Let M represent Medicaid long-term care expenses, in billions of dollars, and t the number of years since 2000. Let $t = 0$ represent 2000.

a.) (2pt) Represent the given information as two ordered pairs of the form (t, M) .

b.) (3pt) Write a linear equation in slope-intercept form that relates the long-term expenses M to the number of years t .

c.) (1pt) What will the estimated Medicaid long-term expenses be in 2013?
Write a well-structured sentence with the units correctly stated.

Use the rules of exponents to simplify the following expression. Write your answer using only positive exponents.

10. (3pt) $(a^4b^6)(a^2b)^5$ 11. (3pt) $\left(\frac{-4x^8}{3m^2n^3}\right)^3$ 12. (3pt) $\frac{-15x^{-7}}{5y^2z^{-4}}$ 13. (3pt) $\left(\frac{-2x^3y^{-2}}{3y^{-2}}\right)^{-3}$

Perform the indicated operation(s) and simplify the following algebraic expression:

$$14. (3pt) \left(\frac{2}{3}a^4 + 3a^3 - 7a + \frac{1}{2} \right) + \left(-\frac{1}{3}a^4 + 5a^3 + 3a - \frac{1}{2} \right)$$

$$15. (3pt) (3y-8)(9y+3)$$

$$16. (3pt) (t^3 - 0.3t^2 - 20) - (t^4 - 1.5t^3 + 0.3t^2 - 11)$$

$$17. (3pt) (x+4)(x^2 - 2x+1)$$

Application Problems

18. An electronics company is marketing a new kind of camera. Total revenue is the total amount of money taken in. The company determines that when it sells x cameras, its total revenue is given by

$$R = 175x - 0.4x^2.$$

Total cost is the total cost of producing x cameras. The company determines that the total cost of producing x cameras is given by

$$C = 5000 + 0.6x^2.$$

The total profit P is the difference between revenue and cost.

- (2pt) Find the polynomial representing total profit P .
- (2pt) Using the polynomial, calculate the total profit on the production and sale of 75 cameras.
- (1pt) Write a well-structured sentence(s) with the units correctly stated.

Evaluate the expression.

$$19. (6.5 \times 10^3)(5.2 \times 10^{-8})$$

a. (2pt) Write the answer in decimal notation. _____

b. (2pt) Write the answer in scientific notation. _____

Evaluate the expression.

$$20. \frac{1.23 \times 10^8}{6.87 \times 10^{-13}}$$

a. (2pt) Write the answer in decimal notation rounded to 2 decimal places. _____

b. (2pt) Write the answer in scientific notation rounded to 2 decimal places. _____

21. Every day about 12.4 billion spam e-mails are sent. If each spam e-mail wastes 4 seconds, how many hours are wasted each day due to spam?

a.) (3pt) Write the answer in scientific notation. _____

b.) (3pt) Write the answer in decimal form. _____

c.) (1pt) Write a well-structured sentence(s) with the units correctly stated.

Use Long Division to divide the polynomials. Show all your work.

22. (3pt) $\frac{2t^3 - 9t^2 + 11t - 3}{2t - 3}$ No credit unless long division is shown.

Use Synthetic Division to divide the polynomials. Show all your work.

23. (3pt) $\frac{2x^3 + 7x^2 - 5}{x + 3}$ No credit unless synthetic division is shown.

Completely factor the following algebraic expressions.

24. (3pt) $x^2 - 4x - 45$

25. (3pt) $3x^2 + 10x - 8$

26. (3pt) $-8x^2 - 8x + 30$

27. (3pt) $x^3 + 3x^2 - 4x - 12$

Solve the following polynomial equations by factoring and using the zero-factor property.

28. (4pt) $x^2 - 10x + 24 = 0$

29. (4pt) $8x^2 + 10x = -3$

30. (4pt) $12x^2 + 20x + 4 = 1$

Application Problems

31. A photograph is 3 inches longer than it is wide. Its area is 40 square inches. What is the length and width of the photograph?

a.) (2pt) Write a quadratic equation to find the dimensions.

b.) (2pt) Solve the quadratic equation.

c.) (1pt) Write a well-structured sentence(s) with the units correctly stated.

Application Problems

32. Many people suffering from constricted bronchial muscles are prescribed the drug Albuterol. The number of micrograms A of Albuterol in a person's bloodstream t minutes after 200 micrograms have been inhaled can be approximated by: $A = -50t^2 + 200t$

a.) (3pt) Calculate how long after an inhalation will there be about 150 micrograms of Albuterol in the bloodstream.

b.) (1pt) Write a well-structured sentence(s) with the units correctly stated.