

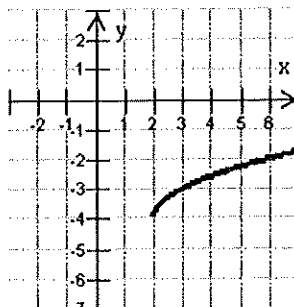
Precalculus/Honors Algebra 3-4 Fall Semester Multiple Choice Final Review

1. For $g(x) = 2x^3 - 8x^2 - 2x + 5$, find $g(-3)$
- A -115
 - B -19
 - C 115
 - D 125
2. If $f(x) = 4 - x^2$ and $g(x) = x + 2$, find $f(g(x))$
- A $-x^2 - 4x$
 - B $-x^3 - 2x^2 + 4x + 8$
 - C $x^2 + 4x$
 - D $x^3 + 2x^2 - 4x - 8$
3. If $f(x) = x^2 + 4x + 5$ and $g(x) = x - 7$, find $3g(f(-2))$
- A -42
 - B -18
 - C -6
 - D 10
4. Given $f(x) = 3x^2 + 7x - 2$ and $g(x) = 4x + 3$, find $(g - f)(x)$
- A $-3x^2 - 3x + 5$
 - B $3x^2 + 3x - 5$
 - C $-3x^2 + 11x + 1$
 - D $3x^2 - 4x - 5$
5. Find the domain of $f(x) = \frac{2x}{\sqrt{x+4}}$
- A $(-4, 4)$
 - B $(-4, \infty)$
 - C $[-4, \infty)$
 - D $(4, \infty)$
6. Describe the transformation of the graph of $f(x) = x^3$ for the graph of $g(x) = (x + 5)^3 - 9$
- A Horizontal shift 5 units to the right. Vertical shift 9 units down.
 - B Horizontal shift 9 units to the right. Vertical shift 5 units up.
 - C Horizontal shift 5 units to the left. Vertical shift 9 units down.
 - D Horizontal shift 9 units to the left. Vertical shift 5 units up.

7. Describe the transformation of the graph of $f(x) = x^2$ for the graph of $g(x) = -\frac{3}{4}(x-8)^2 + 10$
- A Vertical Stretch. Reflects over the x-axis. Horizontal shift 8 units to the right. Vertical shift 10 units up.
 - B Vertical Shrink. Reflects over the x-axis. Horizontal shift 8 units to the left. Vertical shift 10 units up.
 - C Vertical Shrink. Horizontal shift 8 units to the right. Vertical shift 10 units up.
 - D Vertical Shrink. Reflects over the x-axis. Horizontal shift 8 units to the right. Vertical shift 10 units up.

8. Write the equation for the given graph:

- A $y = \sqrt{x-2} - 4$
- B $y = \sqrt{x+4} - 2$
- C $y = \sqrt{x+2} - 4$
- D $y = \sqrt{x-4} - 2$



9. For each of the following functions determine if they are even, odd, both, or neither:

a. $f(x) = 4x^2 + 8x - 2$

- A Even
- B Odd
- C Both
- D Neither

b. $f(x) = |x| + 3$

- A Even
- B Odd
- C Both
- D Neither

c. $f(x) = x^3 - 2x$

- A Even
- B Odd
- C Both
- D Neither

10. Find the inverse of: $f(x) = 2x - 3$

- A $f^{-1}(x) = 3x - 2$
- B $f^{-1}(x) = \frac{1}{2}x + \frac{3}{2}$
- C $f^{-1}(x) = x + 3$
- D $f^{-1}(x) = \frac{x-2}{3}$

11. Find the x-intercept(s): $f(x) = \frac{3x-5}{x+4}$

A $(-4, 0)$

B $(-4, 0), \left(\frac{5}{3}, 0\right)$

C $\left(\frac{5}{3}, 0\right)$

D $\left(\frac{5}{3}, -4\right)$

12. Use long division to divide: $(4x^3 - 8x^2 + 5x - 2) \div (2x - 3)$

A $2x^2 - x + 1 + \frac{1}{2x-3}$

B $2x^2 - 7x + 13 - \frac{41}{2x-3}$

C $2x^2 - x + 1 - \frac{5}{x+1}$

D $4x^2 - 2x - 8 - \frac{14}{x+1}$

13. Use synthetic division to divide: $(4x^3 - 3x + 5) \div (x + 1)$

A $4x^3 - 4x^2 + x + 4$

B $4x^2 - 7x + 12$

C $4x^2 - 4x + 1 + \frac{4}{x+1}$

D $4x^2 + 4x + 1 + \frac{6}{x+1}$

14. Find the horizontal or slant asymptote(s): $f(x) = \frac{x^2 - x}{x + 1}$

A $x = -1$

B $x = 0, x = 1$

C $y = x - 2$

D $y = 1$

15. Find the horizontal or slant asymptote(s): $f(x) = \frac{2x-1}{x}$

A $x = 0$

B $x = \frac{1}{2}$

C $y = 2x$

D $y = 2$

16. Find the vertical asymptote(s): $f(x) = \frac{x-6}{x^2-4}$

- A $x = \pm 2$
- B $x = 2$
- C $x = 6$
- D $y = 0$

17. Divide, then express your answer in standard form: $\frac{8-7i}{1-2i}$

- A $-\frac{6}{5} - \frac{23}{5}i$
- B $-\frac{22}{3} - 3i$
- C $2 + \frac{23}{5}i$
- D $\frac{22}{5} + \frac{9}{5}i$

18. Multiply, then express your answer in standard form: $(6-2i)(2-3i)$

- A $6-22i$
- B $12-16i$
- C $18-16i$
- D $18-22i$

19. Find the real zeros of the function: $f(x) = 6x^4 + 11x^3 + 2x^2 - 5x - 2$

- A $-1, \frac{2}{3}$
- B $-1, 0, \frac{2}{3}$
- C $-1, -\frac{1}{2}, \frac{2}{3}$
- D $-1, -\frac{2}{3}, -\frac{1}{2}, \frac{2}{3}$

20. Find all the zeros of the function: $f(x) = x^4 - 4x^3 + 8x^2 - 16x + 16$

- A 2
- B $-2, 2$
- C $2, \pm 2i$
- D $\pm 2, \pm 2i$

21. Find a polynomial function that has a zero at 2, and a multiplicity of 2 for zeros at 0 and -3

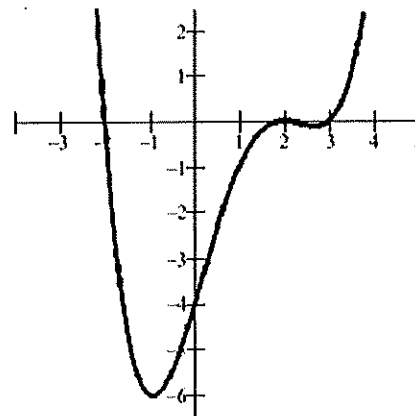
- A $f(x) = x^3 + x^2 - 6x$
- B $f(x) = x^5 + 4x^4 - 3x^3 - 18x^2$
- C $f(x) = x^5 - 10x^4 - 3x^3 - 18x^2$
- D $f(x) = x^5 - 4x^4 - 3x^3 + 18x^2$

22. Find a 4th degree polynomial function that the following zeros: -2, 3, 2i

- A $f(x) = x^4 + x^3 - 2x^2 + 4x - 24$
- B $f(x) = x^4 + x^3 - 10x^2 - 4x + 24$
- C $f(x) = x^4 - x^3 - 2x^2 - 4x - 24$
- D $f(x) = x^4 - x^3 - 8x^2 + 12x$

23. Which of the following is the equation for the given graph?

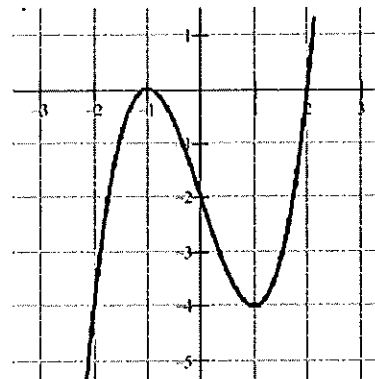
- A $y = \frac{-1}{6}(x-2)^2(x+2)(x-3)$
- B $y = \frac{1}{6}(x-2)^2(x+2)(x-3)$
- C $y = \frac{1}{6}(x+2)^2(x-2)(x+3)$
- D $y = \frac{1}{4}(x-2)^2(x+2)(x-3)$



24. The figure shows the graph of $f(x) = (x+1)(x-2)(x-a)$

Determine the value of a

- A -2
- B -1
- C 1
- D 2



25. Match the following equations with the appropriate graphs:

_____ I. $y = \frac{-1}{2}(x-1)^3(x+2)$

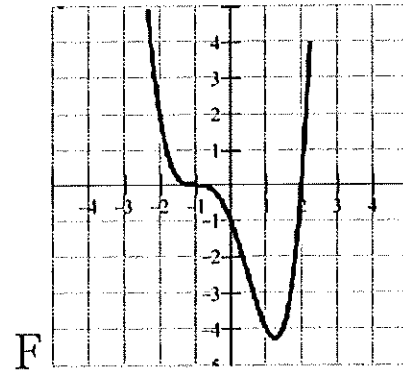
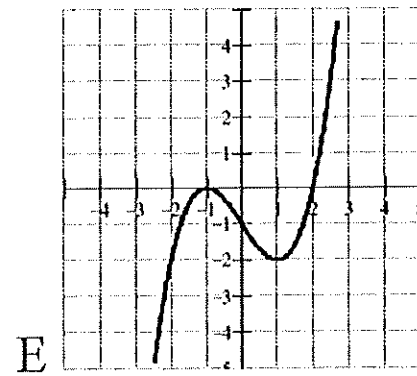
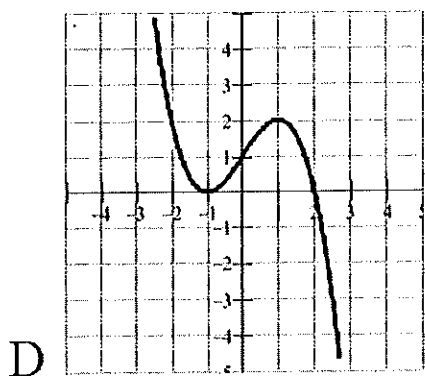
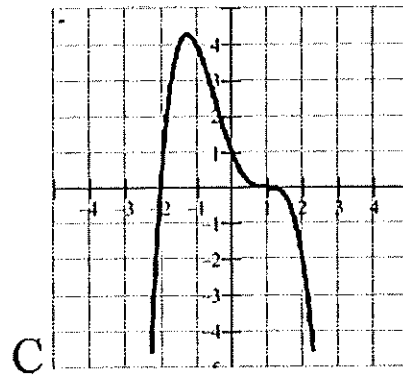
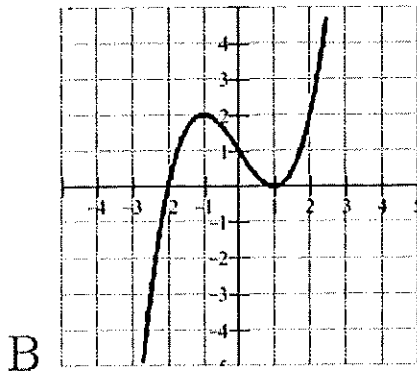
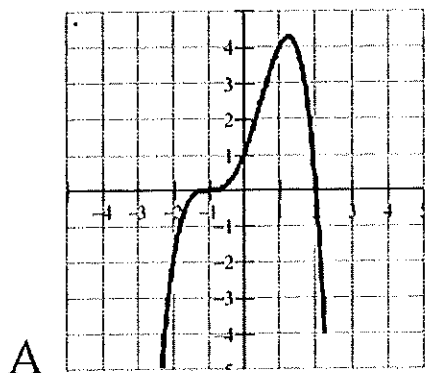
_____ II. $y = \frac{1}{2}(x+1)^3(x-2)$

_____ III. $y = -\frac{1}{2}(x+1)^3(x-2)$

_____ IV. $y = \frac{1}{2}(x+1)^2(x-2)$

_____ V. $y = -\frac{1}{2}(x+1)^2(x-2)$

_____ VI. $y = \frac{1}{2}(x-1)^2(x+2)$



26. Write in exponential form: $\log_a y = x$

A $y^a = x$

B $a^y = x$

C $y^x = a$

D $a^x = y$

27. Evaluate $\log_5 8$ using the change of base formula

A 0.2041

B 0.7740

C 1.0586

D 1.2920

28. Rewrite $4\ln(3) - \frac{1}{2}\ln(9)$ as a single logarithm

- A $\ln 2.7$
- B $\ln 3$
- C $\ln 27$
- D $\ln 243$

29. Rewrite $\log 2 + 3\log 4$ as a single logarithm

- A $\log 14$
- B $\log 20$
- C $\log 24$
- D $\log 128$

30. Write as a sum, difference, or multiple of logarithms: $\log \sqrt[5]{\frac{(x-1)^2}{(x-3)(x+2)^3}}$

- A $\sqrt[5]{2\log(x-1) - \log(x-3) + 3\log(x+2)}$
- B $\frac{1}{5}[2\log(x-1) - \log(x-3) - 3\log(x+2)]$
- C $\sqrt[5]{\frac{2\log(x-1) + \log(x-3)}{3\log(x+2)}}$
- D $\frac{1}{5}\left(\frac{2\log(x-1)}{\log(x-3) + 3\log(x+2)}\right)$

31. Write as a sum, difference, or multiple of logarithms: $\log\left(\frac{xy^3}{z^2w}\right)^7$

- A $7(\log x + 3\log y - 2\log z - \log w)$
- B $7(\log x + 3\log y - 2\log z + \log w)$
- C $7\left[\frac{\log x \cdot 3\log y}{2\log z \cdot \log w}\right]$
- D $\left[\frac{\log x + 3\log y}{2\log z + \log w}\right]^7$

32. Solve $8^x = 40$ for x in common log form.

- A $\log \frac{8}{40}$
- B $\log \frac{40}{8}$
- C $\frac{\log 8}{\log 40}$
- D $\frac{\log 40}{\log 8}$

33. Solve $5^x = 32$ for x to the nearest hundredth.

- A .46
- B .81
- C 2.15
- D 6.40

34. Solve for x : $4^{2x-7} = 1024$

- A $\frac{1}{5}$
- B 5
- C 6
- D 131.5

35. Solve for x : $9^{5x} = 243^{3x-2}$

- A $\frac{2}{5}$
- B $\frac{54}{76}$
- C 2
- D 27

36. Solve for x : $\log(10^{3x-11}) = 40$

- A $\frac{11 + \log 40}{3}$
- B $\frac{40}{3 \log 10} - \frac{11}{3}$
- C 5
- D 17

37. Solve for x : $\ln e^{5x+3} = 22$

- A $\frac{19}{5}$
- B 5
- C $\frac{22}{5 \ln e} + \frac{3}{5}$
- D $\frac{-3 + \ln 22}{5}$

38. Solve for x : $\log(1-2x) - \log(x-1) = 1$

- A $\frac{1}{3}$
- B $\frac{2}{3}$
- C $\frac{11}{12}$
- D *no solution*

39. Solve for x : $\log_4(x) + \log_4(x+2) = \log_4(3x+56)$

- A -54
- B -7
- C -7, 8
- D 8

40. You win \$10,000 in the state lottery and deposit the earnings in a bank account. The money is invested at a rate of 6.2% compounded continuously. How many years will it take to double your money?

- A .11 *years*
- B 1.12 *years*
- C 4.86 *years*
- D 11.18 *years*

41. Find the initial amount invested at $7\frac{1}{4}\%$ interest compounded quarterly if, after 6 years, it has grown to \$20,000.

- A \$12,945.29
- B \$12,995.82
- C \$13,141.54
- D \$30,779.14

42. Determine the annual rate of interest compounded continuously for the sum of money in an account to quadruple in 25 years.

- A 2.4%
- B 5.5%
- C 5.7%
- D 16%

43. Match the following conics:

_____ I. $5x^2 = 3y - 4$

A Hyperbola

_____ II. $7x^2 - 5x + 6y^2 + 7y = 9$

B Parabola

_____ III. $7x^2 - 5x + 7y^2 + 6y = 9$

C Ellipse

_____ IV. $7x^2 - 5x - 7y^2 + 6y = 9$

D Circle

44. Rewrite the equation of the circle in standard form: $2x^2 + 2y^2 - 8x + 12y + 2 = 0$

A $(x-2)^2 + (y+3)^2 = 12$

B $(x+2)^2 + (y-3)^2 = 12$

C $(x-2)^2 + (y+3)^2 = 15$

D $(x-4)^2 + (y+6)^2 = 25$

45. Find the vertex, focus, and directrix of the following parabola: $x^2 - 2x + 8y = -9$

A vertex: $(1, -1)$; focus: $(1, -3)$; directrix: $y = 1$

B vertex: $(1, -3)$; focus: $(1, -1)$; directrix: $y = 1$

C vertex: $(1, -1)$; focus: $(1, -3)$; directrix: $x = 1$

D vertex: $(1, -1)$; focus: $(1, -3)$; directrix: $y = -1$

46. Find equation of the ellipse with vertices $(-3, 1)$ and $(7, 1)$, and foci $(-2, 1)$ and $(6, 1)$

A $\frac{(x-2)^2}{25} + \frac{(y-1)^2}{9} = 1$

B $\frac{(x+2)^2}{25} + \frac{(y+1)^2}{9} = 1$

C $\frac{(x-2)^2}{25} - \frac{(y-1)^2}{9} = 1$

D $\frac{(x-2)^2}{5} + \frac{(y-1)^2}{3} = 1$

47. Find equation of the hyperbola with vertices $(2, 3)$ and $(2, -3)$, and foci $(2, 5)$ and $(2, -5)$

A $\frac{y^2}{9} + \frac{(x-2)^2}{16} = 1$

B $\frac{y^2}{9} - \frac{(x-2)^2}{16} = 1$

C $\frac{(x-2)^2}{16} - \frac{y^2}{9} = 1$

D $\frac{y^2}{9} - \frac{(x+2)^2}{16} = 1$

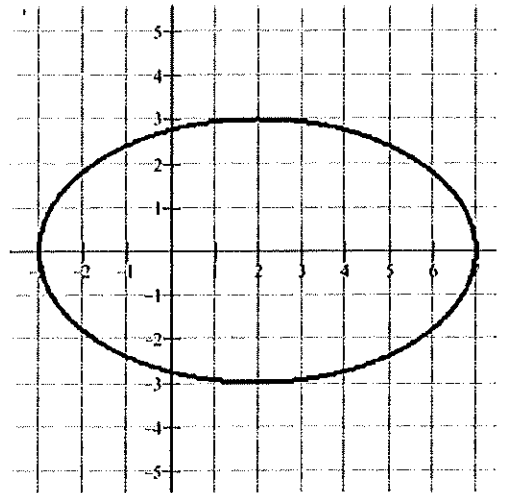
48. Which equation represents the graph for the given ellipse?

A $\frac{(x-2)^2}{25} + \frac{y^2}{9} = 1$

B $\frac{(x-2)^2}{25} - \frac{y^2}{9} = 1$

C $\frac{(x-2)^2}{5} + \frac{y^2}{3} = 1$

D $\frac{(x-2)^2}{5} - \frac{y^2}{3} = 1$



49. Write an explicit formula for the arithmetic sequence: $-6, -2, 2, 6, \dots$

A $-4n - 2$

B $4n - 2$

C $4n - 7$

D $4n - 10$

50. Write an explicit formula for the arithmetic sequence with a first term of 15 and a common difference of 4.

A $4 + (n-1)15$

B $4 - (n-1)15$

C $15 + (n-1)4$

D $15 - (n-1)4$

51. Find the 90th term of the **arithmetic** sequence with $a_1 = 3$ and $a_2 = 9$
(assume that n begins with 1).

- A -531
- B 273
- C 537
- D 804

52. Find the **sum** of the first 100 terms of the **arithmetic** sequence whose nth term is $a_n = 9n - 6$
(assume that n begins with 1).

- A 894
- B 44,550
- C 44,850
- D 49,700

53. Find the sum: $\sum_{n=2}^7 \frac{2}{n+3}$

- A $\frac{12}{45}$
- B $\frac{2131}{1260}$
- C $\frac{2761}{1260}$
- D $\frac{179}{10}$

54. Evaluate: $\sum_{n=1}^{\infty} 5\left(\frac{2}{3}\right)^{n-1}$

- A 3
- B $\frac{10}{3}$
- C $\frac{15}{2}$
- D 15

55. Find the coefficient of x^3y^3 in the expansion of $(3x - 2y)^6$

- A -25920
- B -4320
- C -216
- D 20

56. Find the coefficient of x^7y^2 in the expansion of $(x + 4y)^9$

- A 16
- B 36
- C 576
- D 1152

57. A card is drawn at random from a standard deck of 52 playing cards. Find the probability that the card is a face card.

- A $\frac{1}{13}$
- B $\frac{3}{13}$
- C $\frac{1}{4}$
- D $\frac{4}{13}$

58. A password is comprised of 3 letters followed by 4 digits. How many passwords are possible?

- A 118
- B 26,000,000
- C 175,760,000
- D 456,976,000

59. A phone number has seven digits. How many different telephone numbers are possible if it cannot begin with a 0 or 1?

- A 5040
- B 604,800
- C 2,097,152
- D 8,000,000

60. A bag contains 9 quarters, 5 dimes, and 3 nickels. If three coins are selected without replacement, what is the probability of selecting three quarters?

- A $\frac{1}{504}$
- B $\frac{504}{4913}$
- C $\frac{21}{170}$
- D $\frac{763}{510}$

61. A class is given a list of 20 study questions from which 12 will be part of their upcoming final. If a given student knows how to solve 15 of the problems, find the probability that the student will be able to answer 10 questions correctly.

- A $\frac{455}{184756}$
- B $\frac{77}{3230}$
- C $\frac{77}{323}$
- D $\frac{5}{6}$

62. A drama teacher must fill extra roles for 7 females and 5 males for the upcoming school production of "Cats". If 10 females and 8 males tryout and all are equally qualified, in how many ways can the teacher chose the cast?

- A 35
- B 80
- C 176
- D 6720