FINAL EXAM REVIEW 49 QUESTIONS MATH1314 12-12-19 Fall 2019 2011 COLLEGE ALGEBRA 07-25-19 07-25-19

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MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation by factoring.

1) $12x^2 + 31x + 20 = 0$ 1) ______

A) $\left\{-\frac{5}{12}, -\frac{1}{5}\right\}$ B) $\left\{\frac{5}{4}, -\frac{4}{3}\right\}$ C) $\left\{\frac{5}{4}, \frac{4}{3}\right\}$ D) $\left\{-\frac{5}{4}, -\frac{4}{3}\right\}$

Answer: D

Objective: (1.5) Solve Quadratic Equations by Factoring

ALVAREZ VIDEO 4

Solve the equation by completing the square.

2) $x^2 + 14x + 33 = 0$ 2) ______

A) {-11, 44} B) $\{-\sqrt{33}, \sqrt{33}\}$ C) {3, 11} D) {-11, -3}

Answer: D

Objective: (1.5) Solve Quadratic Equations by Completing the Square

ALVAREZ VIDEO 6

Solve the equation using the quadratic formula.

3) $x^2 - 14x + 53 = 0$ 3) ______

A) {7 - 2i, 7 + 2i} B) {7 - 4i, 7 + 4i} C) {5, 9} D) {7 + 2i}

Answer: A

Objective: (1.5) Solve Quadratic Equations Using the Quadratic Formula

ALVAREZ VIDEO 8

Solve the radical equation, and check all proposed solutions.

4) $\sqrt{22x + 11} = x + 6$ 4) ______

A) {-5} B) {3} C) {-4} D) {5}

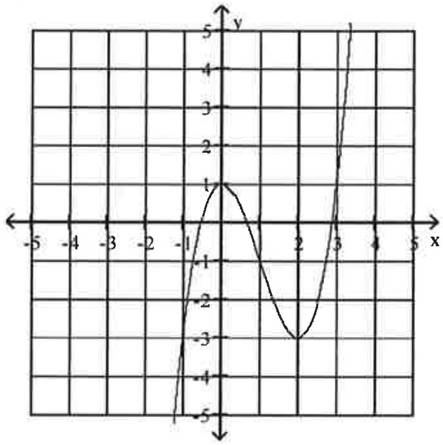
Answer: D

Objective: (1.6) Solve Radical Equations

ALVAREZ --VIDEO 9

Use the graph of the given function to find any relative maxima and relative minima.

5) $f(x) = x^3 - 3x^2 + 1$ 5) _______



A) maximum: (0, 1); minimum: (2, −3)
B) no maximum or minimum
C) maximum: none; minimum: (2, −3)
D) maximum: (0, 1); minimum: none

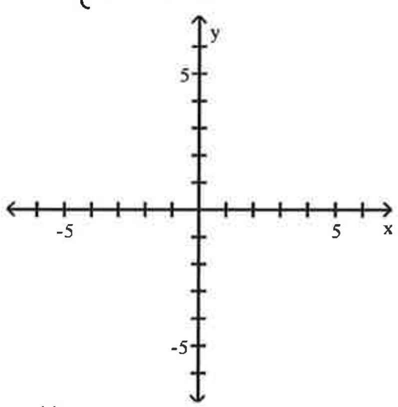
Answer: A

Objective: (2.2) Use Graphs to Locate Relative Maxima or Minima

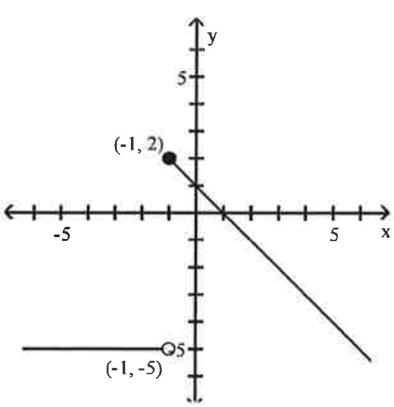
ALVAREZ--VIDEO 15

Graph the function.

6) $f(x) = \begin{cases} x + 1 & \text{if } x < 1 \\ -5 & \text{if } x \geq 1 \end{cases}$ 6) _______



A)



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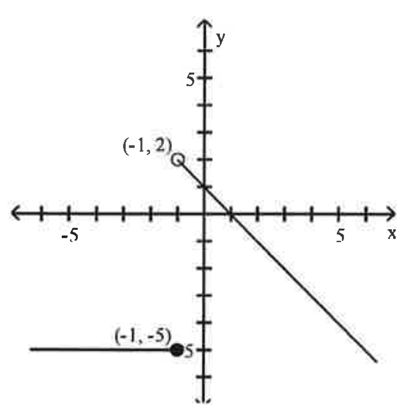

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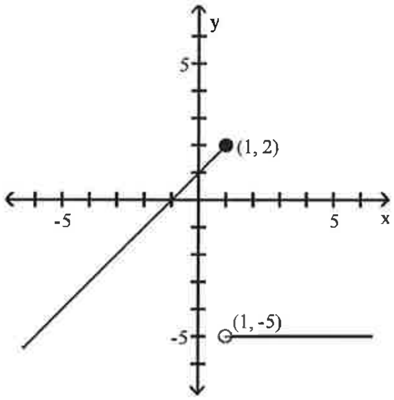
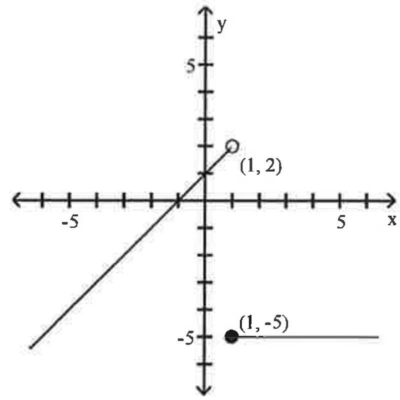


D)



Answer: D
Objective: (2.2) Understand and Use Piecewise Functions

ALVAREZ--VIDEO 17

Find and simplify the difference quotient $\frac{f(x + h) - f(x)}{h}$, $h \neq 0$ for the given function.

7) $f(x) = x^2 + 9x - 2$ 7) _______

A) $2x + h - 2$

B) $\frac{2x^2 + 2x + 2xh + h^2 + h - 4}{h}$

C) $2x + h + 9$

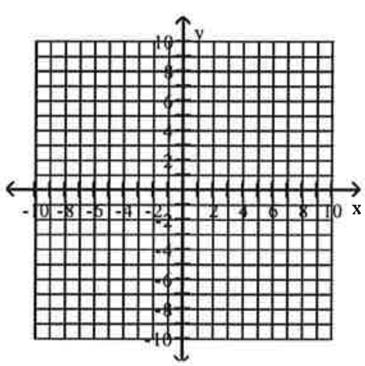
D) 1

Answer: C
Objective: (2.2) Find and Simplify a Function's Difference Quotient

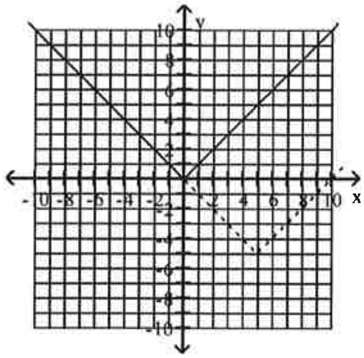
ALVAREZ-- VIDEO 18

Begin by graphing the standard absolute value function $f(x) = |x|$. Then use transformations of this graph to graph the given function.

8) $h(x) = |x - 5| - 5$ 8) _______



A)



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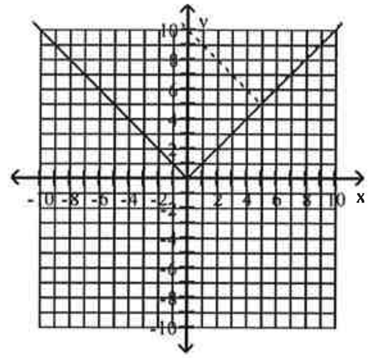
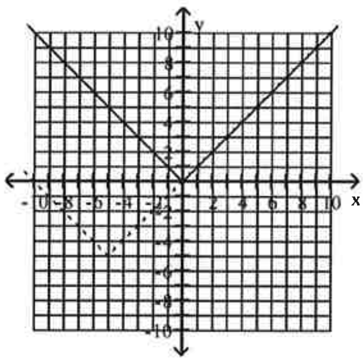
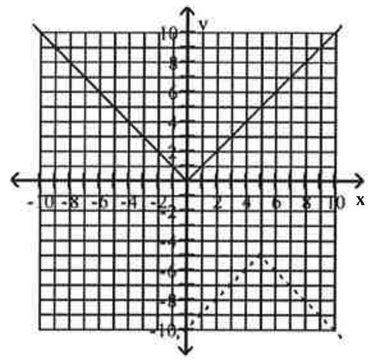


C)



D)



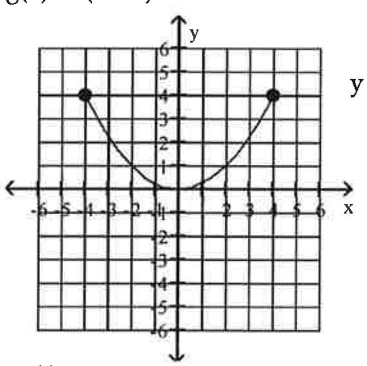
Answer: A

Objective: (2.5) Use Horizontal Shifts to Graph Functions

ALVAREZ--VIDEO 21

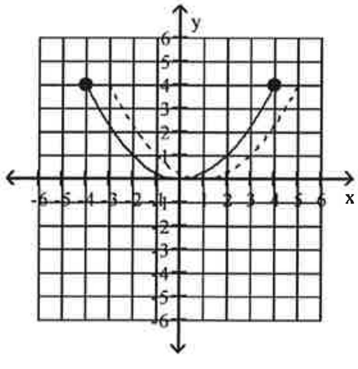
Use the graph of the function f, plotted with a solid line, to sketch the graph of the given function g.

9) $g(x) = f(x + 1)$ 9) ________



$y = f(x)$

A)



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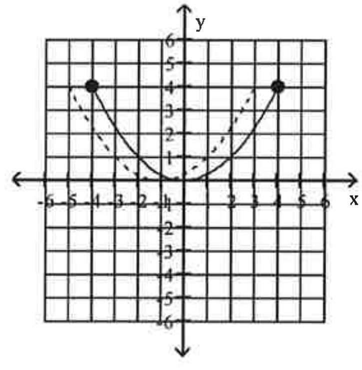

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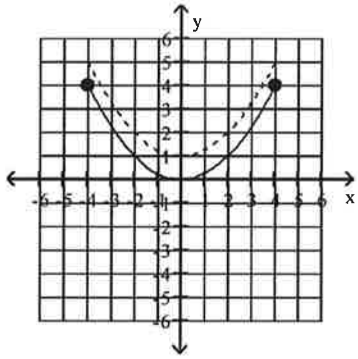
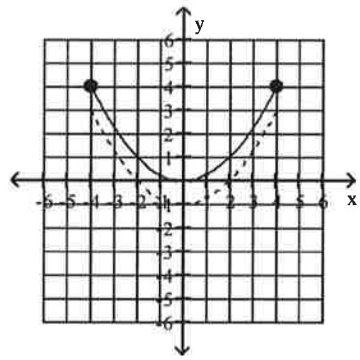


D)



Answer: B

Objective: (2.5) Use Horizontal Shifts to Graph Functions

ALVAREZ --VIDEO 22

Find the domain of the function.

10) $f(x) = \sqrt{24 - x}$ 10) ______

A) $(-\infty, 24) \cup (24, \infty)$
B) $(-\infty, 2\sqrt{6}]$
C) $(-\infty, 24]$
D) $(-\infty, 2\sqrt{6}) \cup (2\sqrt{6}, \infty)$

Answer: C

Objective: (2.6) Find the Domain of a Function

ALVAREZ--VIDEO 23

Given functions f and g, perform the indicated operations.

11) $f(x) = 9x - 2, \quad g(x) = 4x - 7$ 11) ______

Find $f - g$.

A) $5x - 9$
B) $-5x - 5$
C) $5x + 5$
D) $13x - 9$

Answer: C

Objective: (2.6) Combine Functions Using the Algebra of Functions, Specifying Domains

ALVAREZ--VIDEO 25

12) $f(x) = 3x^2 - 8x, \quad g(x) = x^2 - 5x - 24$ 12) ______

Find $\frac{f}{g}$.

A) $\frac{3x}{x + 1}$
B) $\frac{3x^2 - 8x}{x^2 - 5x - 24}$
C) $\frac{3 - x}{24}$
D) $\frac{3x - 8}{-5}$

Answer: B

Objective: (2.6) Combine Functions Using the Algebra of Functions, Specifying Domains

ALVAREZ VIDEO 26

13) $f(x) = 9 - 2x$, $g(x) = -4x + 2$ 13) ______
Find $f + g$.
A) $5x$ B) $-4x + 9$ C) $2x + 11$ D) $-6x + 11$

Answer: D
Objective: (2.6) Combine Functions Using the Algebra of Functions, Specifying Domains

ALVAREZ--VIDEO 27

14) $f(x) = 3x - 6$, $g(x) = 5x - 7$ 14) ______
Find fg.
A) $8x^2 - 51x - 13$ B) $15x^2 - 37x + 42$ C) $15x^2 - 51x + 42$ D) $15x^2 + 42$

Answer: C
Objective: (2.6) Combine Functions Using the Algebra of Functions, Specifying Domains

ALVAREZ VIDEO 28

For the given functions f and g , find the indicated composition.

15) $f(x) = 3x + 14$, $g(x) = 2x - 1$ 15) ______
$(f \circ g)(x)$
A) $6x + 27$ B) $6x + 13$ C) $6x + 11$ D) $6x + 17$

Answer: C
Objective: (2.6) Form Composite Functions

ALVAREZ--VIDEO 30

16) $f(x) = 4x^2 + 6x + 5$, $g(x) = 6x - 7$ 16) ______
$(g \circ f)(x)$
A) $24x^2 + 36x + 37$ B) $24x^2 + 36x + 23$ C) $4x^2 + 36x + 23$ D) $4x^2 + 6x - 2$

Answer: B
Objective: (2.6) Form Composite Functions

ALVAREZ--VIDEO 31

Find the inverse of the one-to-one function.

17) $f(x) = \frac{8}{3x + 7}$ 17) ______

A) $f^{-1}(x) = \frac{8}{3x} - \frac{7}{3}$ B) $f^{-1}(x) = \frac{7}{3} - \frac{8}{3x}$

C) $f^{-1}(x) = \frac{3x + 7}{8}$ D) $f^{-1}(x) = \frac{8}{3y} - \frac{7}{3}$

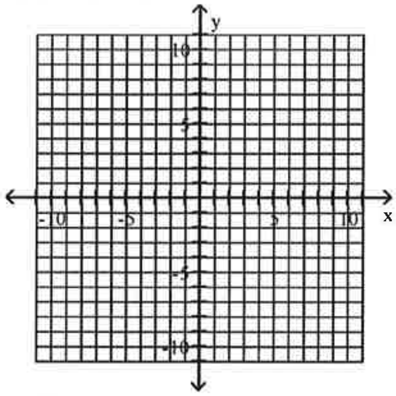
Answer: A
Objective: (2.7) Find the Inverse of a Function

ALVAREZ VIDEO 32

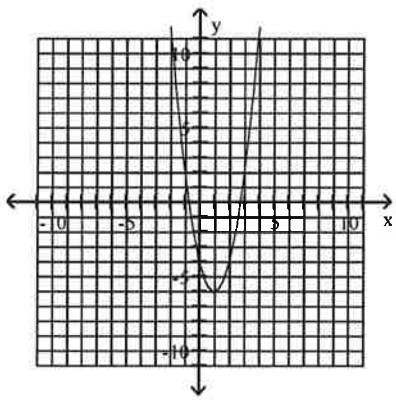
Use the vertex and intercepts to sketch the graph of the quadratic function.

18) $f(x) = 2(x + 6)^2 + 1$

18) ______



A)



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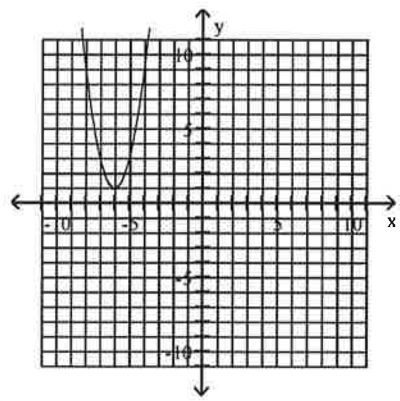

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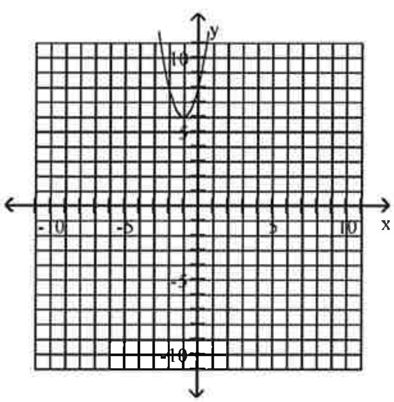

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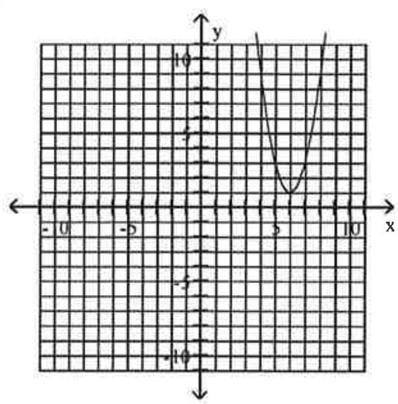
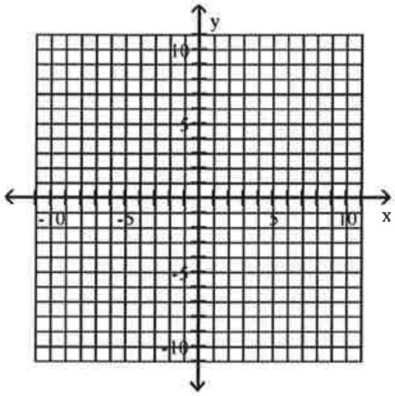


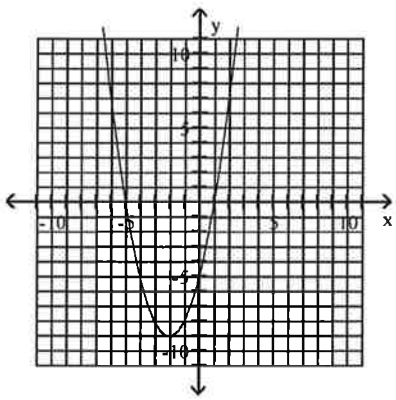
Answer: B
Objective: (3.1) Graph Parabolas

ALVAREZ--VIDEO 37

19) $f(x) = -x^2 - 4x + 5$ 19) ______



A)



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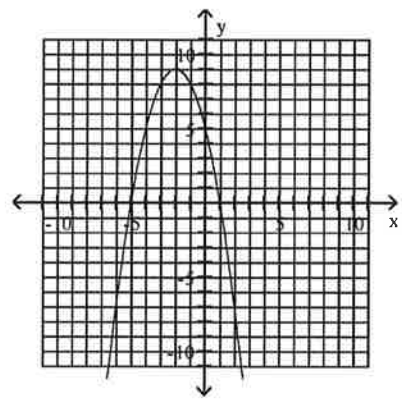
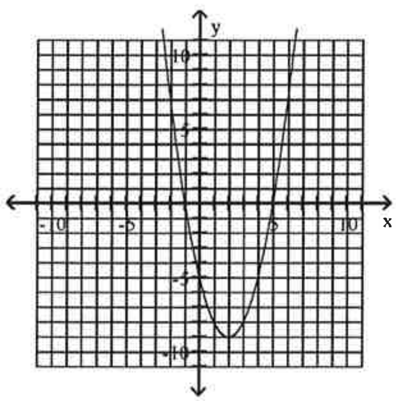


C)



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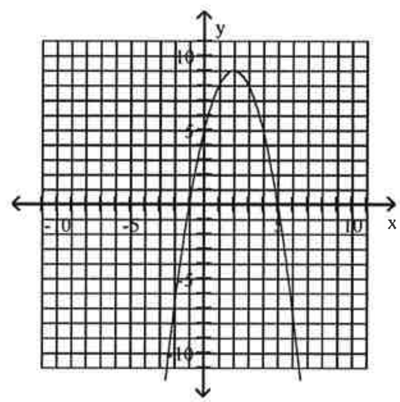


Answer: B
Objective: (3.1) Graph Parabolas

ALVAREZ--VIDEO 38

Solve the problem.

20) An arrow is fired into the air with an initial velocity of 160 feet per second. The height in feet of the arrow t seconds after it was shot into the air is given by the function $h(x) = -16t^2 + 160t$. Find the maximum height of the arrow. 20) ______

A) 1200 ft B) 80 ft C) 400 ft D) 720 ft

Answer: C

Objective: (3.1) Solve Problems Involving a Quadratic Function's Minimum or Maximum Value

ALVAREZ--VIDEO 39

Find the zeros of the polynomial function.

21) $f(x) = x^3 + 5x^2 - x - 5$ 21) ______

A) $x = -5, x = 5$ B) $x = 1, x = -5, x = 5$

C) $x = 25$ D) $x = -1, x = 1, x = -5$

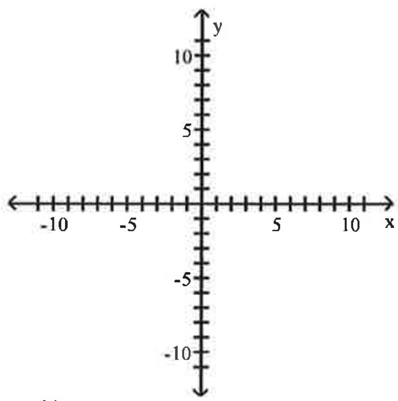
Answer: D

Objective: (3.2) Use Factoring to Find Zeros of Polynomial Functions

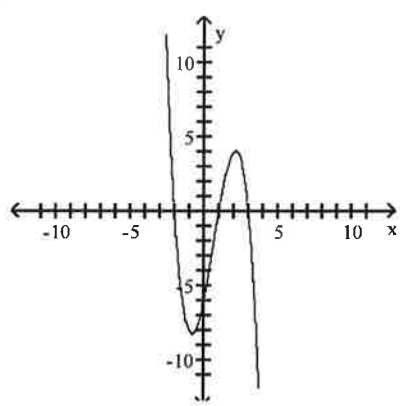
ALVAREZ--VIDEO 42

Graph the polynomial function.

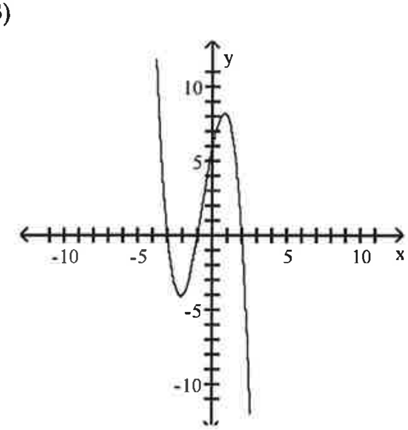
22) $f(x) = x^3 - 2x^2 - 5x + 6$ 22) ______



A)



B)



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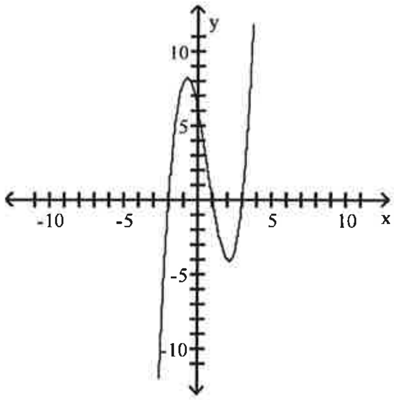
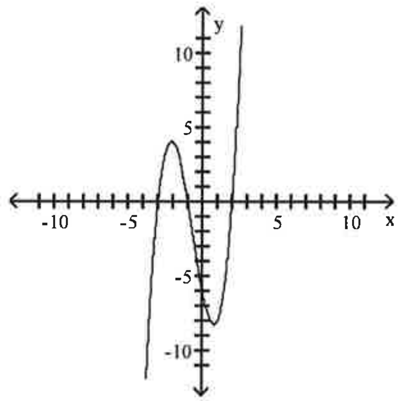


D)



Answer: C

Objective: (3.2) Graph Polynomial Functions

ALVAREZ--VIDEO 43

Use synthetic division to show that the number given to the right of the equation is a solution of the equation, then solve the polynomial equation.

23) $x^3 - 2x^2 - 5x + 6 = 0; 3$ 23) ______

A) {1, 2, 3} B) {-1, 2, 3} C) {-1, -2, 3} D) {1, -2, 3}

Answer: D

Objective: (3.3) Use the Factor Theorem to Solve a Polynomial Equation

ALVAREZ--VIDEO 45

Solve the polynomial equation. In order to obtain the first root, use synthetic division to test the possible rational roots.

24) $x^3 + 3x^2 - 4x - 12 = 0$ 24) ______

A) {-2, 2, 3} B) {-3} C) {-3, -2, 2} D) {-2}

Answer: C

Objective: (3.4) Solve Polynomial Equations

ALVAREZ--VIDEO 48

25) $x^3 + 3x^2 - 8x + 10 = 0$ 25) ______

A) {-5, 5} B) {1 + i, 1 - i, 5i} C) {1 + i, 1 - i, 5} D) {1 + i, 1 - i, -5}

Answer: D

Objective: (3.4) Solve Polynomial Equations

ALVAREZ--VIDEO 49

26) $x^4 - 3x^3 + 26x^2 - 22x - 52 = 0$ 26) ______

A) {1, -2, 1 + 5i, 1 - 5i} B) {1, -2, $1 + \sqrt{5}$, $1 - \sqrt{5}$}

C) {-1, 2, 1 + 5i, 1 - 5i} D) {-1, 2, 1 + 6i, 1 - 6i}

Answer: C

Objective: (3.4) Solve Polynomial Equations

ALVAREZ-- VIDEO 50

Find the vertical asymptotes, if any, of the graph of the rational function.

27) $\dfrac{x - 81}{x^2 - 15x + 56}$ 27) ______

A) $x = 8, x = 7$
B) $x = -8, x = -7$
C) $x = -81$
D) $x = 8, x = 7, x = -81$

Answer: A

Objective: (3.5) Identify Vertical Asymptotes

ALVAREZ--VIDEO 54

Find the horizontal asymptote, if any, of the graph of the rational function.

28) $g(x) = \dfrac{4x^2 - 7x - 5}{7x^2 - 3x + 7}$ 28) ______

A) $y = \dfrac{7}{3}$
B) $y = 0$
C) $y = \dfrac{4}{7}$
D) no horizontal asymptote

Answer: C

Objective: (3.5) Identify Horizontal Asymptotes

ALVAREZ--VIDEO 56

Find the slant asymptote, if any, of the graph of the rational function.

29) $f(x) = \dfrac{x^2 + 3x - 8}{x - 4}$ 29) ______

A) $y = x + 3$
B) $y = x$
C) $y = x + 7$
D) no slant asymptote

Answer: C

Objective: (3.5) Identify Slant Asymptotes

ALVAREZ--VIDEO 57

Solve the problem.

30) The function $f(x) = 700(0.5)^{x/50}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. Find the amount of radioactive material in the vault after 130 years. Round to the nearest whole number. 30) ______

A) 910 pounds
B) 115 pounds
C) 135 pounds
D) 536 pounds

Answer: B

Objective: (4.1) Evaluate Exponential Functions

ALVAREZ--VIDEO 59

31) The size of the bear population at a national park increases at the rate of 4.9% per year. If the size of the current population is 146, find how many bears there should be in 7 years. Use the function $f(x) = 146e^{0.049t}$ and round to the nearest whole number. 31) ______

A) 208 B) 206 C) 210 D) 204

Answer: B

Objective: (4.1) Evaluate Functions with Base e

ALVAREZ--VIDEO 60

32) The function $D(h) = 7e^{-0.4h}$ can be used to determine the milligrams D of a certain drug in a patient's bloodstream h hours after the drug has been given. How many milligrams (to two decimals) will be present after 9 hours? 32) ______

A) 0.19 mg B) 0.55 mg C) 4.69 mg D) 256.19 mg

Answer: A

Objective: (4.1) Evaluate Functions with Base e

ALVAREZ--VIDEO 62

Find the domain of the logarithmic function.

33) $f(x) = \ln(6 - x)$ 33) ______

A) $(-\infty, 6)$ B) $(-6, \infty)$ C) $(-\infty, 0)$ D) $(-\infty, 6)$ or $(6, \infty)$

Answer: A

Objective: (4.2) Find the Domain of a Logarithmic Function

ALVAREZ--VIDEO 63

Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

34) $\log_a\left(\dfrac{x^4\sqrt[3]{x+5}}{(x-2)^2}\right)$ 34) ______

A) $4\log_a x + \frac{1}{3}\log_a(x+5) - 2\log_a(x-2)$ B) $\log_a x^4 + \log_a(x+5)^{1/3} - \log_a(x-2)^2$

C) $\log_a x^4 + \log_a(x+5)^{-3} - \log_a(x-2)^2$ D) $4\log_a x - 3\log_a(x+5) - 2\log_a(x-2)$

Answer: A

Objective: (4.3) Expand Logarithmic Expressions

ALVAREZ--VIDEO 66

Solve the equation by expressing each side as a power of the same base and then equating exponents.

35) $4^{x+10} = 8^{x-2}$ 35) ______

A) {22} B) {26} C) {16} D) {12}

Answer: B

Objective: (4.4) Use Like Bases to Solve Exponential Equations

ALVAREZ--VIDEO 70

Solve the exponential equation. Use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution.

36) $7e^x = 10$ 36) ______

A) 0.36 B) -0.36 C) 0.15 D) -0.15

Answer: A

Objective: (4.4) Use Logarithms to Solve Exponential Equations

ALVAREZ--VIDEO 72

37) $4^{x+6} = 7$ 37) ______

A) -0.54 B) 1.49 C) -4.60 D) 6.71

Answer: C

Objective: (4.4) Use Logarithms to Solve Exponential Equations

ALVAREZ-- VIDEO 73

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

38) $\log_3 (x + 4) = 1$ 38) ______

A) {-3} B) {5} C) {-1} D) {7}

Answer: C

Objective: (4.4) Use the Definition of a Logarithm to Solve Logarithmic Equations

ALVAREZ-- VIDEO 75

39) $\log x + \log (x - 1) = \log 12$ 39) ______

A) {4, -3} B) {-3} C) $\left\{\frac{13}{2}\right\}$ D) {4}

Answer: D

Objective: (4.4) Use the One-to-One Property of Logarithms to Solve Logarithmic Equations

ALVAERZ--VIDEO 80

Solve the problem.

40) Find out how long it takes a $2500 investment to double if it is invested at 8% compounded quarterly. Round to the nearest tenth of a year. Use the formula $A = P\left(1 + \frac{r}{n}\right)^{nt}$. 40) ______

A) 9 years B) 9.2 years C) 8.6 years D) 8.8 years

Answer: D

Objective: (4.4) Solve Applied Problems Involving Exponential and Logarithmic Equations

ALVAREZ VIDEO 81

41) The formula $A = 175e^{0.032t}$ models the population of a particular city, in thousands, t years after 1998. When will the population of the city reach 205 thousand? 41) ______

A) 2005 B) 2006 C) 2004 D) 2003

Answer: D

Objective: (4.4) Solve Applied Problems Involving Exponential and Logarithmic Equations

ALVAREZ--VIDEO 82

42) The function $A = A_0e^{-0.0077x}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. If 800 pounds of the material are placed in the vault, how much time will need to pass for only 504 pounds to remain? 42) ______

A) 70 years B) 120 years C) 60 years D) 65 years

Answer: C

Objective: (4.4) Solve Applied Problems Involving Exponential and Logarithmic Equations

ALVAREZ--VIDEO 83

43) The population of a certain country is growing at a rate of 2.5% per year. How long will it take for this country's population to double? Use the formula $t = \frac{\ln 2}{k}$, which gives the time, t, for a population with growth rate k, to double. (Round to the nearest whole year.) 43) ______

A) 28 years B) 27 years C) 29 years D) 30 years

Answer: A

Objective: (4.4) Solve Applied Problems Involving Exponential and Logarithmic Equations

ALVAREZ--VIDEO 84

Solve.

44) The half-life of silicon-32 is 710 years. If 90 grams is present now, how much will be present in 400 years? (Round your answer to three decimal places.) 44) ______

A) 60.904 B) 1.813 C) 86.553 D) 0

Answer: A

Objective: (4.5) Model Exponential Growth and Decay

ALVAREZ VIDEO 86

Solve the system of equations.

45) $x + y + z = -6$ 45) ______

$x - y + 3z = 2$

$3x + y + z = -14$

A) {(-3, -4, 1)} B) {(-4, -3, 1)} C) {(1, -3, -4)} D) {(1, -4, -3)}

Answer: B

Objective: (5.2) Solve Systems of Linear Equations in Three Variables

ALVAREZ-VIDEO 89

Use Cramer's rule to solve the system.

46) $2x + 3y = -4$ 46) ______

$5x + y = -23$

A) {(-5, 2)} B) {(2, -5)} C) {(-2, -5)} D) {(-5, -2)}

Answer: A

Objective: (6.5) Solve a System of Linear Equations in Two Variables Using Cramer's Rule

AlVAREZ VIDEO 96

Find the indicated sum.

47) $\sum_{i=3}^{5} (i^2 + 2)$ 47) ______

A) 30 B) 56 C) 65 D) 18

Answer: B

Objective: (8.1) Use Summation Notation

ALVAREZ--VIDEO 98

Use the Binomial Theorem to expand the binomial and express the result in simplified form.

48) $(2x + 3)^3$ 48) ______

A) $4x^6 + 6x^3 + 729$ B) $8x^3 + 36x^2 + 36x + 27$

C) $8x^3 + 36x^2 + 54x + 27$ D) $4x^2 + 12x + 9$

Answer: C

Objective: (8.5) Expand a Binomial Raised to a Power

ALVAREZ--VIDEO 99

Write the first three terms in the binomial expansion, expressing the result in simplified form.

49) $(x + 2)^{15}$ 49) ______

A) $x^{15} + 30x^{14} + 420x^{13}$ B) $x^{15} + 30x^{14} + 840x^{13}$

C) $x^{15} + 28x^{14} + 420x^{13}$ D) $x^{15} + 28x^{14} + 840x^{13}$

Answer: A

Objective: (8.5) Find a Particular Term in a Binomial Expansion

ALVAREZ VIDEO 100

1 Part 1

Solve by factoring

Possible

12 · 1   20 · 1

6 · 2   10 · 2

3 · 4   4 · 5

$12x^2 + 31x + 20 = 0$

$(3x + 4)(4x + 5) = 0$

Let $3x + 4 = 0$ or $4x + 5 = 0$

$3x + 4 - 4 = 0 - 4$ or $4x + 5 - 5 = 0 - 5$

$3x = -4$ or $4x = -5$

$\frac{3x}{3} = \frac{-4}{3}$ or $\frac{4x}{4} = \frac{-5}{4}$

$x = -4/3$ or $x = -5/4$

1 Part B

$12x^2 + 31x + 20 = 0$

$a = 12, \quad b = 31, \quad c = 20$

Solve

Use Quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(31) \pm \sqrt{(31)^2 - 4(12)(20)}}{2(12)}$$

$$x = \frac{-31 \pm \sqrt{961 - 960}}{24}$$

$$x = \frac{-31 \pm \sqrt{1}}{24}$$

$$x = \frac{-31 \pm 1}{24}$$

$x = \frac{-31 - 1}{24}$ or $x = \frac{-31 + 1}{24}$

$x = \frac{-32}{24}$ or $x = \frac{-30}{24}$

$x = \frac{\cancel{8}(-4)}{\cancel{8}(3)}$ or $x = \frac{\cancel{6}(-5)}{\cancel{6}(4)}$

$x = \frac{-4}{3}$ or $x = \frac{-5}{4}$

(2)

$x^2+14x+33=0$ Solve Complete the Square

$x^2+14x=-33$ rewrite

$x^2+14x+\left(\frac{1}{2}(14)\right)^2=-33+\left(\frac{1}{2}(14)\right)^2$

$x^2+14x+(7)^2=-33+(7)^2$

$x^2+14x+49=-33+49$

$(x+7)(x+7)=16$

$(x+7)^2=16$

$\sqrt{(x+7)^2}=\pm\sqrt{16}$

$x+7=\pm 4$

$x+7=-4$ or $x+7=4$

$x+7-7=-4-7$ or $x+7-7=4-7$

$x=-11$ or $x=-3$

(3) $x^2 - 14x + 53 = 0$

Solve by the Quadratic Formula

$1x^2 - 14x + 53 = 0$

$a = 1, \quad b = -14, \quad c = 53$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-14) \pm \sqrt{(-14)^2 - 4(1)(53)}}{2(1)}$$

Example formula

$\sqrt{-1} = i$

$\sqrt{-4} = 2i$

$\sqrt{-9} = 3i$

$\sqrt{-16} = 4i$

$\sqrt{-25} = 5i$

$$x = \frac{14 \pm \sqrt{196 - 212}}{2}$$

$$x = \frac{14 \pm \sqrt{-16}}{2}$$

$$x = \frac{14 \pm 4i}{2}$$

$x = 7 \pm 2i$

$x = 7 + 2i$ or $x = 7 - 2i$

4.

Solve

$$\sqrt{22x+11} = x+6$$
$$\left(\sqrt{22x+11}\right)^2 = (x+6)^2$$
$$22x+11 = (x+6)(x+6)$$
$$22x+11 = x^2+6x+6x+36$$
$$22x+11 = x^2+12x+36$$
$$0 = x^2+12x+36-22x-11$$
$$0 = x^2-10x+25$$
$$0 = (x-5)(x-5)$$

Set $x-5=0$ OR $x-5=0$

$x-5+5=0+5$ OR $x-5+5=0+5$

$x=5$ or $x=5$

Check

$$\sqrt{22x+11} = x+6$$
$$\sqrt{22(5)+11} = (5)+6$$
$$\sqrt{110+11} = 5+6$$
$$\sqrt{121} = 11$$
$$11 = 11$$

Good

answer

$$\boxed{x=5}$$

5. find the relative max or min

$f(x) = x^3 - 3x^2 + 1$

window

x-min = -12

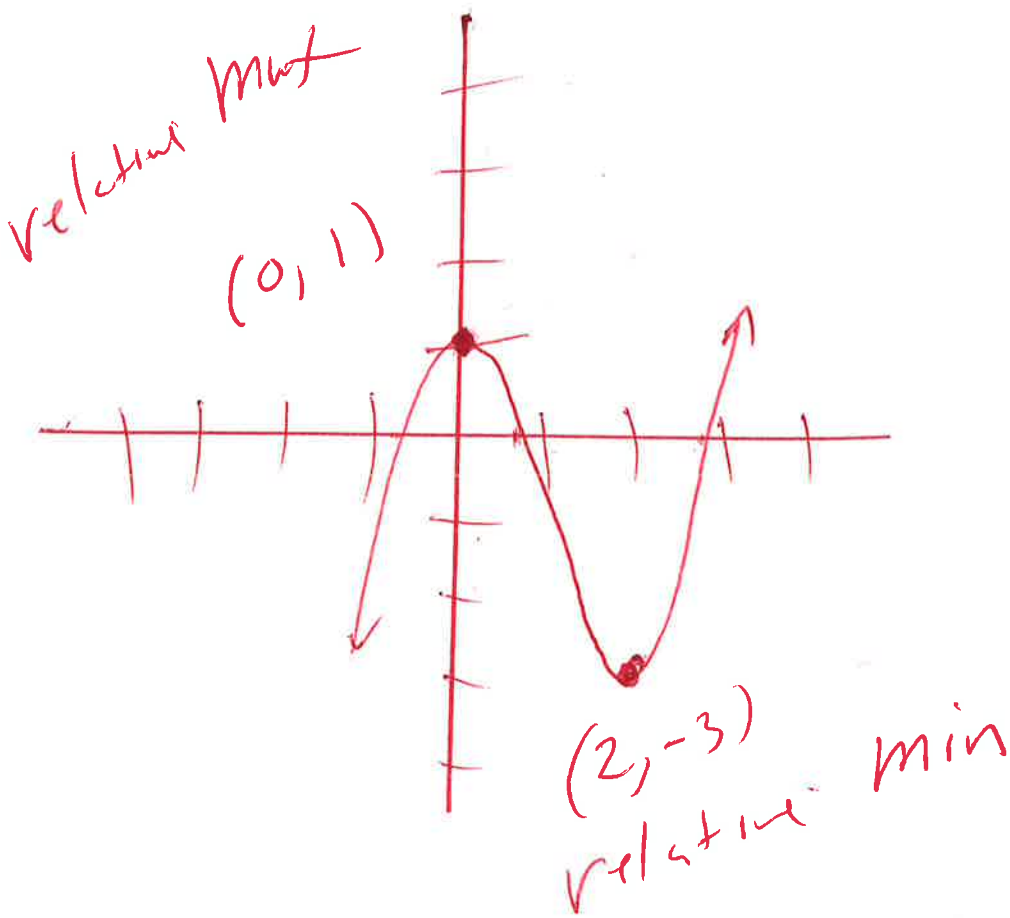
x-max = 12

y-min = -10

y-max = 10

$y_1 = x\wedge 3 - 3x\wedge 2 + 1$

use graphing calculator



(6) graph $f(x) = \begin{cases} x+1 & \text{if } x<1 \\ -5 & \text{if } x \geq 1 \end{cases}$

window

x-min = -12

x-max = 12

y-min = -10

y-max = 10

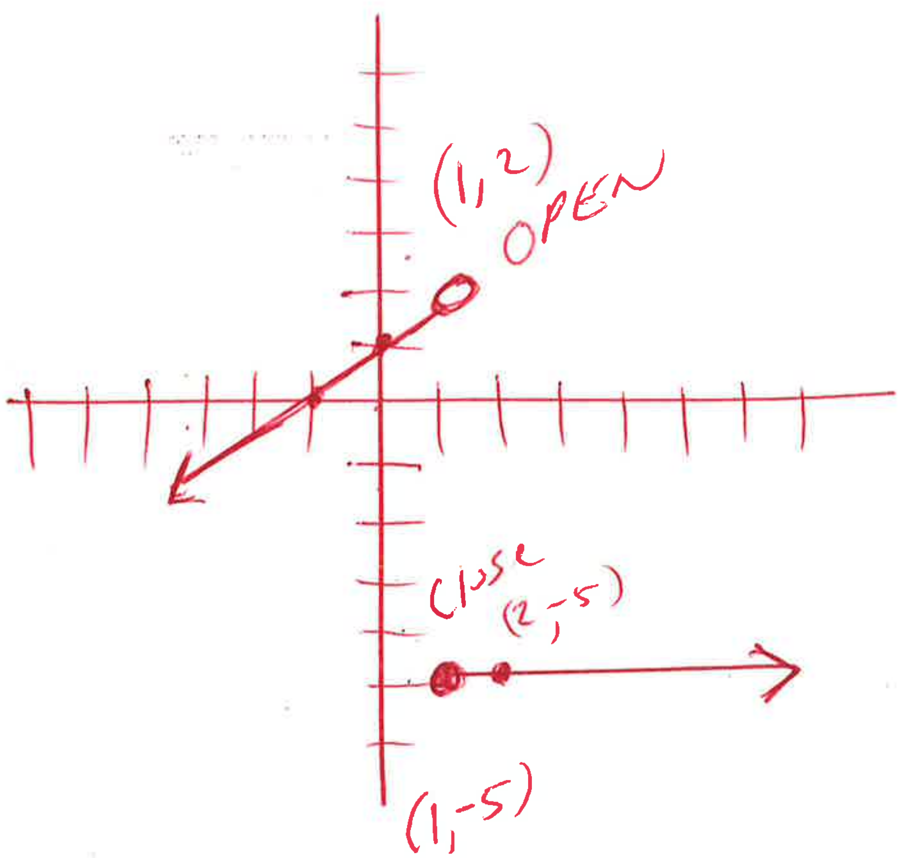
2ND Math

$y_1 = x+1 \div (x<1)$ OPEN circle

2ND Math

$y_2 = -5 \div (x \geq 1)$ close circle

Use graphing calculator



1. $f(x) = x^2 + 9x - 2$

$$\frac{f(x+h) - f(x)}{h} =$$

$$\frac{\left((x+h)^2 + 9(x+h) - 2\right) - (x^2 + 9x - 2)}{h} =$$

$$\frac{(x+h)(x+h) + 9x + 9h - 2 - x^2 - 9x + 2}{h} =$$

$$\frac{x^2 + xh + xh + h^2 + 9x + 9h - 2 - x^2 - 9x + 2}{h} =$$

$$\frac{\cancel{x^2} + 2xh + h^2 + \cancel{9x} + 9h \cancel{-2} \cancel{-x^2} \cancel{-9x} \cancel{+2}}{h} =$$

$$\frac{2xh + h^2 + 9h}{h} =$$

$$\frac{2xh}{h} + \frac{h^2}{h} + \frac{9h}{h} =$$

$$2x + h + 9 =$$

8. graph

$h(x) = |x - 5| - 5$

window

x-min = -12

x-max = 12

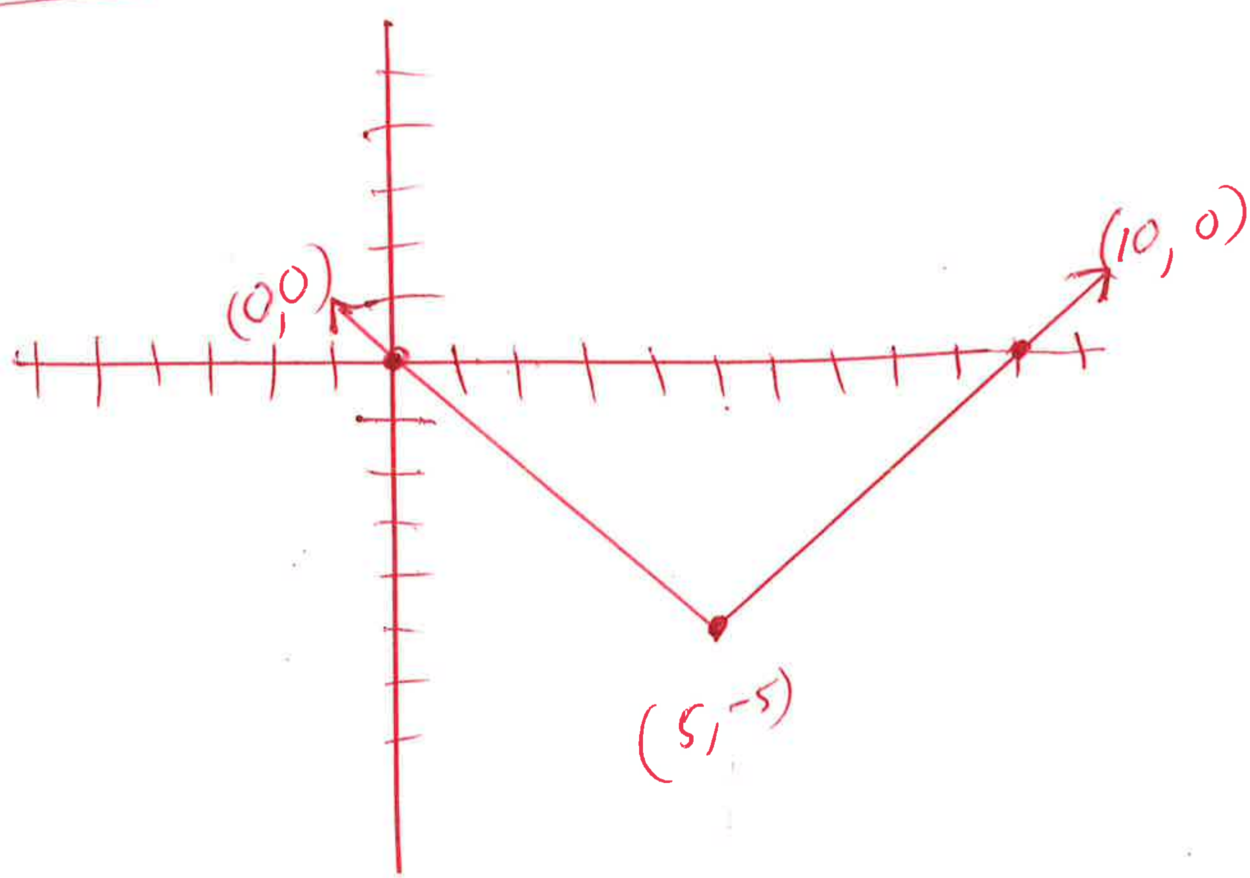
y-min = -10

y-max = 10

use graphing calculator

y_1 = math, num, abs, enter

$y_1 = \text{abs}(x \overset{\text{BIG}}{—} 5) \overset{\text{BIG}}{—} 5$

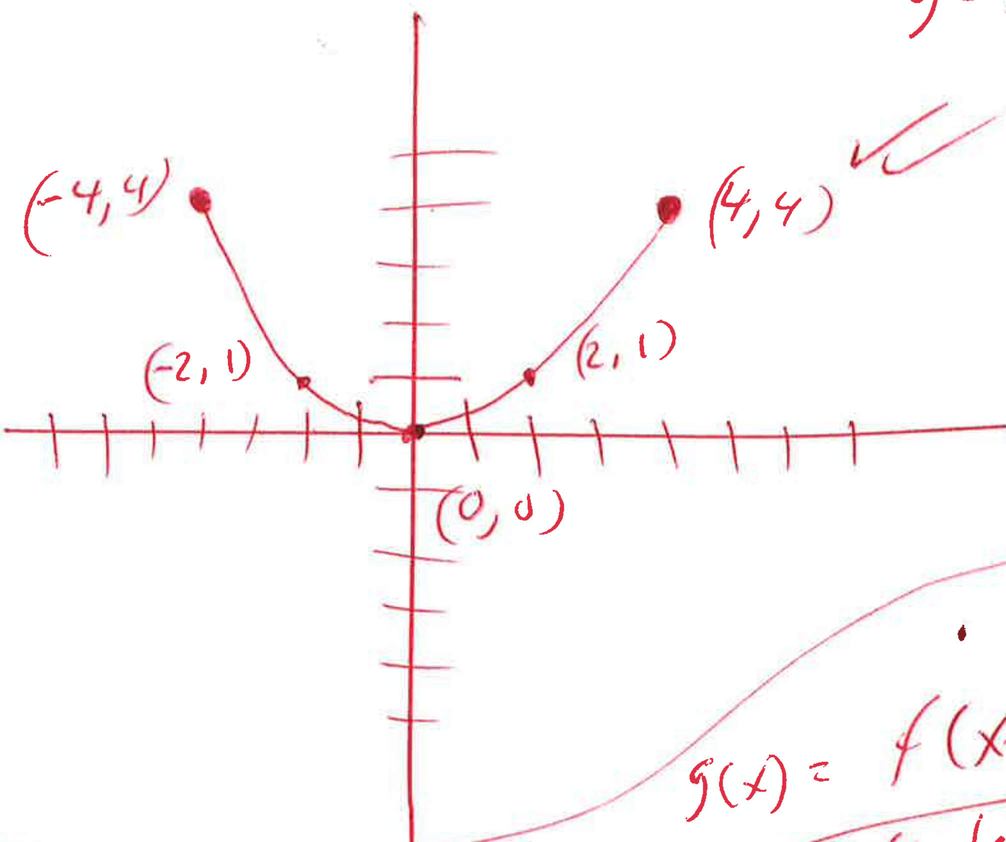


9. find graph

$g(x) = f(x+1)$

$y = f(x)$

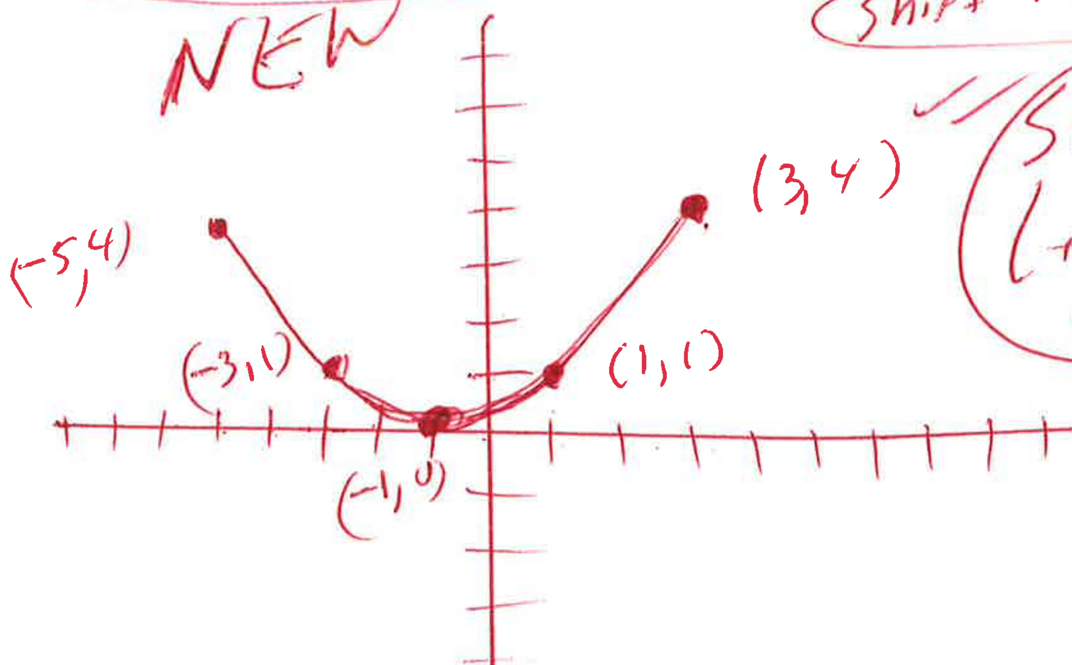
OLD



$g(x) = f(x+1)$ oppo..

shift left -1

NEW



Shift left -1

(10) find domain

$f(x) = \sqrt{24-x}$

let $24 - x \geq 0$

$\cancel{24} - x - \cancel{24} \geq 0 - 24$

$-x \geq -24$

$\frac{-x}{-1} \leq \frac{-24}{-1}$ divide by a negative turn the alligator around

$x \leq 24$

$(-\infty, 24]$

formula domain

$f(x) = \sqrt{Ax+B}$

let $Ax + B \geq 0$

(11.) $f(x) = 9x - 2$ and $g(x) = 4x - 7$

find $(f - g)(x) =$

$f(x) - g(x) =$

$(9x - 2) - (4x - 7) =$

$9x - 2 - 4x + 7 =$

$5x + 5 =$

(12)

$f(x) = 3x^2 - 8x$ and $g(x) = x^2 - 5x - 24$

find $\left(\frac{f}{g}\right)(x) =$

$$\frac{f(x)}{g(x)} =$$

$$\frac{3x^2 - 8x}{x^2 - 5x - 24} =$$

13.

$f(x) = 9 - 2x$ and $g(x) = -4x + 2$

find $(f+g)(x) =$

$f(x) + g(x) =$

$(9 - 2x) + (-4x + 2) =$

$9 - 2x - 4x + 2 =$

$-6x + 11 =$

(14.)

$f(x) = 3x - 6$ and $g(x) = 5x - 7$

find $(f \cdot g)(x) =$

$f(x) \cdot g(x) =$

$(3x-6)(5x-7) =$

$15x^2 - 21x - 30x + 42 =$

$15x^2 - 51x + 42 =$

(15.) $f(x) = 3x + 14$ and $g(x) = 2x - 1$

find $(f \circ g)(x) =$

$f(g(x)) =$

$f(2x-1) =$

$3(2x-1) + 14 =$

$6x - 3 + 14 =$

$6x + 11 =$

(16) $f(x) = 4x^2 + 6x + 5$ and $g(x) = 6x - 7$

Find $(g \circ f)(x) =$

$g(f(x)) =$

$g(4x^2 + 6x + 5) =$

$6(4x^2 + 6x + 5) - 7 =$

$24x^2 + 36x + 30 - 7 =$

$24x^2 + 36x + 23 =$

(17)

find the inverse of the one-to-one function

$$f(x) = \frac{8}{3x+7}$$

$$y = \frac{8}{3x+7}$$ Set y =

$$x = \frac{8}{3y+7}$$ inverse variable x–y

$$\frac{x}{1} = \frac{8}{3y+7}$$ rewrite

$$x(3y+7) = 1(8)$$ Cross mult

$$3xy + 7x = 8$$

$$3xy + \cancel{7x} - \cancel{7x} = 8 - 7x$$

$$3xy = 8 - 7x$$

$$\frac{\cancel{3x}y}{\cancel{3x}} = \frac{8-7x}{3x}$$

$$y = \frac{8-7x}{3x}$$

$$y = \frac{8}{3x} - \frac{7\cancel{x}}{3\cancel{x}}$$

$$y = \frac{8}{3x} - \frac{7}{3}$$

inverse

$$f^{-1}(x) = \frac{8}{3x} - \frac{7}{3}$$

18. Graph

$f(x) = 2(x+6)^2 + 1$

vertex $= (-6, 1)$

formula

$f(x) = a(x+b)^2 + c$

vertex $= (-b, c)$

window

x-min = -12

x-max = 12

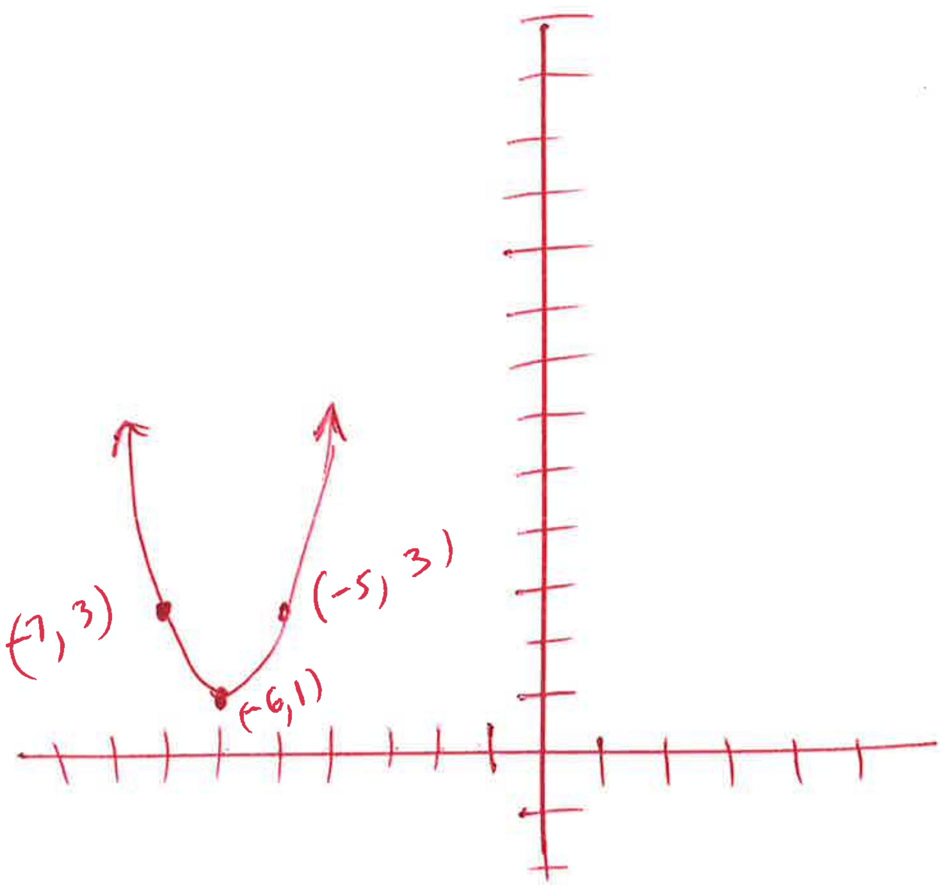
y-min = -10

y-max = 10

use graphing calculator

$y = 2(x+6)^2 + 1$

x	$f(x)$
-7	3
-6	1
-5	3



19.

Graph

$f(x) = -x^2 - 4x + 5$

window

x-min = -12

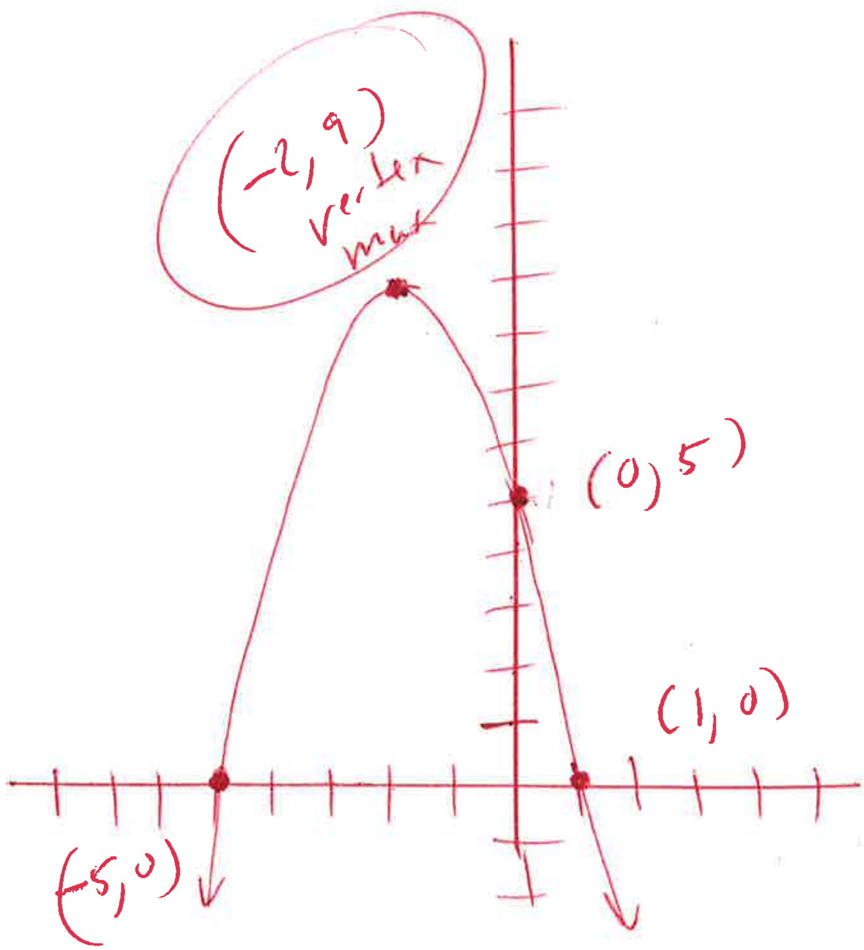
x-max = 12

y-min = -10

y-max = 10

use a graphing calculator

$y_1 = -x^2 - 4x + 5$



20. find max

$h(x) = -16x^2 + 160x$

$a = -16, \quad b = 160, \quad c = 0$

$\max = \text{vertex} = \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

$\text{vertex} = \left(-\frac{(160)}{2(-16)}, f\left(-\frac{(160)}{2(-16)}\right)\right)$

$\text{vertex} = \left(\frac{-160}{-32}, f\left(\frac{-160}{-32}\right)\right)$

$\text{vertex} = (5, f(5))$

$\text{vertex} = (5, -16(5)^2 + 160(5))$

$\text{vertex} = (5, -16(5)(5) + 160(5))$

$\text{vertex} = (5, -16(25) + 160(5))$

$\text{vertex} = (5, -400 + 800)$

$\text{vertex} = (5, 400)$

Max

21. Find zeros

$f(x) = 1x^3 + 5x^2 - x - 5$

Use synthetic division and try $x = 1$

Possible rational roots

$\frac{\pm 5}{\pm 1}$

$\frac{\pm 5, \pm 1}{\pm 1}$

$\frac{\pm 5}{1}$ $\frac{\pm 1}{1}$

$\pm 5, \pm 1$

$$\begin{array}{r|rrrr} 1 & 1 & 5 & -1 & -5 \\ & & 1 & 6 & 5 \\ \hline & 1 & 6 & 5 & 0 \end{array}$$

0 rem

$x^2 + 6x + 5 = 0$

$(x+1)(x+5) = 0$

and $x + 1 = 0$ or $x + 5 = 0$

$x + 1 - 1 = 0 - 1$ or $x + 5 - 5 = 0 - 5$

$x = -1$ or $x = -5$

answer

$\boxed{1, -1, -5}$

(22) Graph

$f(x) = x^3 - 2x^2 - 5x + 6$

window

x-min = -12

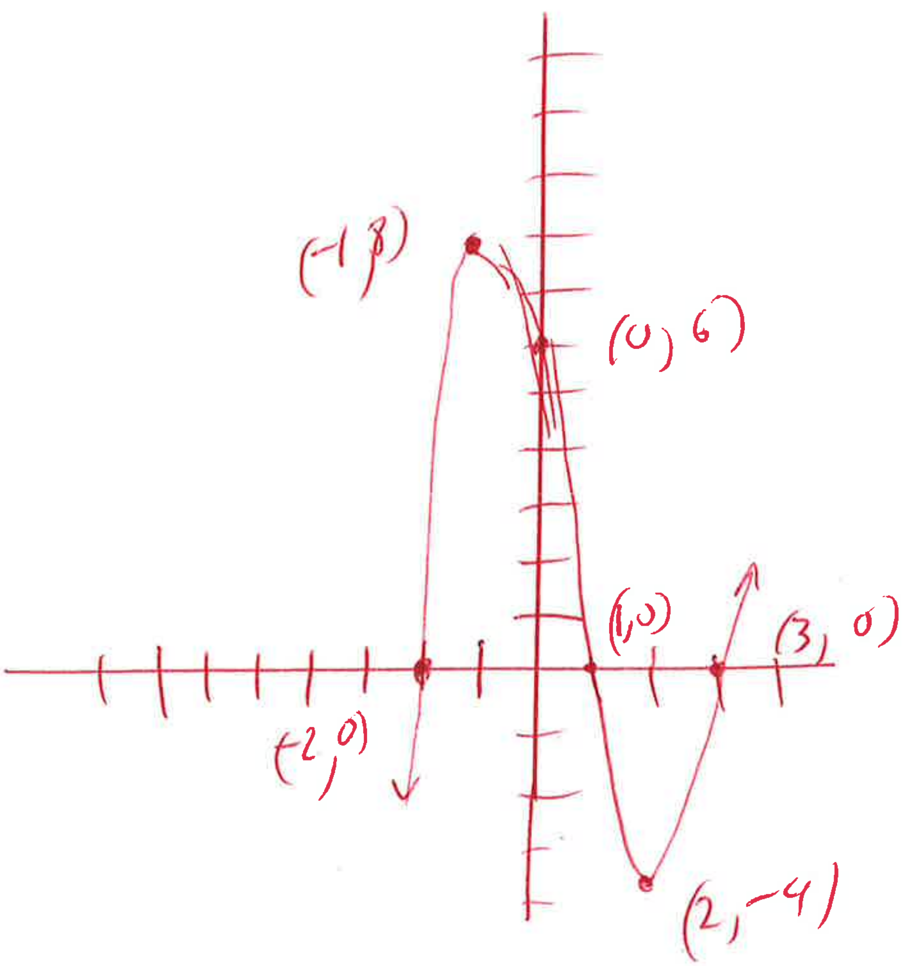
x-max = 12

y-min = -10

y-max = 10

Use a graphing Calculator

$y_1 = x^3 - 2x^2 - 5x + 6$



23. Solve

$1x^3 - 2x^2 - 5x + 6 = 0$ Free Solution given $x = 3$ is a solution

Use Synthetic division try $x = 3$

$$\begin{array}{r|rrrr} 3 & 1 & -2 & -5 & 6 \\ & & 3 & 3 & -6 \\ \hline & 1 & 1 & -2 & 0 \end{array}$$ rem

$x^2 + x - 2 = 0$

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

Let $x - 1 = 0$ or $x + 2 = 0$

$x - 1 + 1 = 0 + 1$ or $x + 2 - 2 = 0 - 2$

$x = 1$ or $x = -2$

answer

$\boxed{3, \ 1, \ -2}$

Solve

24.

$1x^3 + 3x^2 - 4x - 12 = 0$

Possible rational roots

$\frac{\pm 12}{\pm 1}$

$\frac{\pm 1, \pm 12, \pm 6, \pm 4, \pm 3, \pm 2}{\pm 1}$

$\pm 12, \pm 6, \pm 4, \pm 3, \pm 2, \pm 1$

use synthetic division

try $x = 2$

$$\begin{array}{r|rrrr} 2 & 1 & 3 & -4 & -12 \\ & & 2 & 10 & 12 \\ \hline & 1 & 5 & 6 & 0 \end{array}$$

rem

$x^2 + 5x + 6 = 0$

$(x + 2)(x + 3) = 0$

so $x + 2 = 0$ or $x + 3 = 0$

$x + 2 - 2 = 0 - 2$ or $x + 3 - 3 = 0 - 3$

$x = -2$ or $x = -3$

answer

$\boxed{2, -2, -3}$

Solve

28.

$$1x^3+3x^2-8x+10=0$$

Use synthetic division

try $x=-5$ ✓

Possible ration roots

$$\frac{\pm 10}{\pm 1}$$

$$\frac{\pm 10, \pm 5, \pm 2, \pm 1}{\pm 1}$$

$\pm 10, \pm 5, \pm 2, \pm 1$

$$\begin{array}{r|rrrr} -5 & 1 & 3 & -8 & 10 \\ & & -5 & 10 & -10 \\ \hline & 1 & -2 & 2 & 0 \end{array}$$ rem

$$1x^2-2x+2=0$$

$a=1,\quad b=-2,\quad c=2$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$x=\frac{-(-2)\pm\sqrt{(-2)^2-4(1)(2)}}{2(1)}$$

$$x=\frac{2\pm\sqrt{4-8}}{2}$$

$$x=\frac{2\pm\sqrt{-4}}{2}$$

$$x=\frac{2\pm 2i}{2}$$

$$x=\frac{2}{2}\pm\frac{2i}{2}$$

$$x=1\pm 1i$$

$$x=1\pm i$$

answer

$$\boxed{-5,\ 1-i,\ 1+i}$$

Solve

26.

$1x^4 - 3x^3 + 26x^2 - 22x - 52 = 0$

use synthetic division

Possible rational roots

$\frac{\pm 52}{\pm 1}$

$\frac{\pm 52, \pm 26, \pm 13, \pm 2, \pm 1}{\pm 1}$

$\pm 52, \pm 26, \pm 13, \pm 2, \pm 1$

try $x = -1$

$$\begin{array}{r|rrrrr} -1 & 1 & -3 & 26 & -22 & -52 \\ & & -1 & 4 & -30 & 52 \\ \hline & 1 & -4 & 30 & -52 & 0 \end{array}$$

rem

try $x = 2$

$$\begin{array}{r|rrrr} 2 & 1 & -4 & 30 & -52 \\ & & 2 & -4 & 52 \\ \hline & 1 & -2 & 26 & 0 \end{array}$$

rem

$1x^2 - 2x + 26 = 0$

$a = 1, \quad b = -2, \quad c = 26$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(26)}}{2(1)}$

$x = \frac{2 \pm \sqrt{4 - 104}}{2}$

$x = \frac{2 \pm \sqrt{-100}}{2}$

$x = \frac{2 \pm 10i}{2}$

$x = 1 \pm 5i$

$x = 1 + 5i$ or $x = 1 - 5i$

answer

$\boxed{-1, 2, 1+5i, 1-5i}$

(27) Find vertical asymptotes

$$\frac{x-81}{x^2-15x+56}$$

set $x^2-15x+56=0$

$(x-7)(x-8)=0$

$x-7=0$ or $x-8=0$

$x-7+7=0+7$ OR $x-8+8=0+8$

$x=7$ or $x=8$

(28.) find horizontal asymptote

$$g(x) = \frac{4x^2-7x-5}{7x^2-3x+7} =$$

$$\lim_{x\to\infty}\left(\frac{4x^2-7x-5}{7x^2-3x+7}\right) =$$

$$\lim_{x\to\infty}\left(\frac{4x^2-7x-5}{7x^2-3x+7}\right)\left(\frac{\frac{1}{x^2}}{\frac{1}{x^2}}\right) =$$

$$\lim_{x\to\infty}\frac{\frac{4\cancel{x^2}}{\cancel{x^2}}-\frac{7x}{x^2}-\frac{5}{x^2}}{\frac{7x^2}{x^2}-\frac{3x}{x^2}+\frac{7}{x^2}} =$$

formula

$$\lim_{x\to\infty}\frac{1}{x^n}=0$$

$$\lim_{x\to\infty}\frac{4-\frac{7}{x}-\frac{5}{x^2}}{7-\frac{3}{x}+\frac{7}{x^2}} =$$

$$\frac{4-0-0}{7-0+0} =$$

$$\frac{4}{7} =$$

answer

horizontal asymptote $y = \frac{4}{7}$

(29) find Slant asymptote

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

~~odd~~

use synthetic division

$$\begin{array}{r|rrr} 4 & 1 & 3 & -8 \\ & & 4 & 28 \\ \hline & 1 & 7 & 20 \end{array}$$

20 rem

$y = x + 7$

SLANT asymptote

30. $f(x) = 700(0.5)^{\frac{x}{50}}$

$f(130) = 700(0.5)^{\frac{130}{50}}$

$f(130) = 700(0.5)^\wedge(130/50)$

$= 115.4569422$

OR

$= 115$

Round

(31)

$$f(x) = 146e^{0.049x}$$

2ND LN

$$f(7) = 146e^{0.049(7)}$$

$$f(7) = 146e^{\wedge}(0.049(7))$$

$$= 205.7386392$$

OR

$$= 206$$

Round

32a

$D(h) = 7e^{-0.4h}$ 2ND LN

$D(9) = 7e^{-0.4(9)}$

$D(9) = 7e^{\wedge}(-0.4(9))$

$= 0.1912660571$

OR

$= 0.19$

Round

(33) find domain

formula domain

$f(x) = \ln(Ax+B)$

set $Ax+B > 0$

$$f(x) = \ln(6-x)$$

set $6 - x > 0$

$$\cancel{6} - x - \cancel{6} > 0 - 6$$

$$-x > -6$$

$$\frac{-x}{-1} < \frac{-6}{-1}$$

divide by a negative turn alligator around

$$x < 6$$

$$(-\infty, 6)$$

34 expand

$$\log_a\left(\frac{x^4\sqrt[3]{x+5}}{(x-2)^2}\right) =$$

$$\log_a\left(x^4\sqrt[3]{x+5}\right) - \log_a(x-2)^2 =$$

$$\log_a(x^4) + \log_a\sqrt[3]{x+5} - \log_a(x-2)^2 =$$

$$\log_a(x^4) + \log_a(x+5)^{1/3} - \log_a(x-2)^2 =$$

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

formulas

$$\log_a\left(\frac{A}{B}\right) = \log_a(A) - \log_a(B)$$

$$\log_a(A \cdot B) = \log_a(A) + \log_a(B)$$

$$\log_a(A^N) = N\log_a(A)$$

35.

$$4^{x+10} = 8^{x-2}$$

Solve

$$(2^2)^{x+10} = (2^3)^{x-2}$$

$$\cancel{2}^{2x+20} = \cancel{2}^{3x-6}$$

$$2x+20 = 3x-6$$

$$2x+\cancel{20}-\cancel{20} = 3x-6-20$$

$$2x = 3x-26$$

$$2x-3x = \cancel{3x}-26-\cancel{3x}$$

$$-1x = -26$$

$$\frac{-1x}{-1} = \frac{-26}{-1}$$

$$x = 26$$

(36) $7e^x = 10$ Solve

$\frac{7e^x}{7} = \frac{10}{7}$

$e^x = \frac{10}{7}$

$\ln(e^x) = \ln\left(\frac{10}{7}\right)$

$x\ln(e) = \ln\left(\frac{10}{7}\right)$

$x(1) = \ln\left(\frac{10}{7}\right)$

$x = \ln\left(\frac{10}{7}\right)$

$x = 0.356674943$

OR

$x = 0.36$

Round

formula

$\ln(A^N) = N\ln(A)$

$\ln(e) = 1$

37) $4^{x+6} = 7$

$\ln\left(4^{x+6}\right) = \ln(7)$

$(x+6)\ln(4) = \ln(7)$

$\frac{(x+6)\cancel{\ln(4)}}{\cancel{\ln(4)}} = \frac{\ln(7)}{\ln(4)}$

$x+6 = \frac{\ln(7)}{\ln(4)}$

$x+\cancel{6}-\cancel{6} = \frac{\ln(7)}{\ln(4)} - 6$

$x = \frac{\ln(7)}{\ln(4)} - 6$

$x = -4.596322539$

OR

$x = -4.60$

Round

formula

$\ln(A^N) =$

$N\ln(A) =$

38 $\log_3 (x+4) = 1$ Solve

$\log_3 (x+4) = 1$

$3^1 = x+4$ rewrite

$3 = x+4$

$3-4 = x+4-4$

$-1 = x$

39 Solve

$$\log(x) + \log(x-1) = \log(12)$$

$$\log(x)(x-1) = \log(12)$$

$$x(x-1) = 12$$

$$x^2 - x = 12$$

$$x^2 - x - 12 = 0$$

$$(x+3)(x-4) = 0$$

Possible
$12 \cdot 1$
$6 \cdot 2$
$3 \cdot 4$

$x+3=0$ or $x-4=0$

$x+3-3=0-3$ or $x-4+4=0+4$

$\cancel{x=-3}$ or $x=4$

Formula
$\log(A)+\log(B)=$
$\log(AB)=$

Check

$$\log(x)+\log(x-1)=\log(12)$$

$$\log(-3)+\log(-3-1)=\log(12)$$

$$\log(-3)+\log(-4)=\log(12)$$

BAD BAD

$$\log(4)+\log(4-1)=\log(12)$$

$$\log(4)+\log(3)=\log(12)$$

Good Good Good

answer

$$\boxed{x=4}$$

40 $A = P\left(1+\frac{r}{N}\right)^{Nt}$

Solve

$A = 5000$

$P = 2500$

$r = 8\% = .08$

$N = 4$ = Quarterly

$t = ?$

$5000 = 2500\left(1+\frac{.08}{4}\right)^{4t}$

$5000 = 2500(1+.02)^{4t}$

$5000 = 2500(1.02)^{4t}$

$\frac{5000}{2500} = \frac{2500(1.02)^{4t}}{2500}$

formula

$\ln(A^N) = N\ln(A)$

$2 = (1.02)^{4t}$

$\ln(2) = \ln(1.02)^{4t}$

$\ln(2) = 4t\ln(1.02)$

$\frac{\ln(2)}{(4\ln(1.02))} = \frac{4t\ln(1.02)}{(4\ln(1.02))}$

$8.750697195 = t$

YEARS

OR

$8.8 = t$

YEARS

Round

41 $A = 175e^{0.032t}$

$A = 205$

$t = ?$

$205 = 175e^{0.032t}$

$\frac{205}{175} = \frac{\cancel{175}e^{0.032t}}{\cancel{175}}$

$\frac{205}{175} = e^{0.032t}$

$\ln\left(\frac{205}{175}\right) = \ln\left(e^{0.032t}\right)$

$\ln\left(\frac{205}{175}\right) = 0.032t \ln(e)$

$\ln\left(\frac{205}{175}\right) = 0.032t(1)$

$\ln\left(\frac{205}{175}\right) = 0.032t$

$\frac{\ln\left(\frac{205}{175}\right)}{0.032} = \frac{\cancel{0.032}t}{\cancel{0.032}}$

$4.944500163 = t$

YEARS

$5.0 = t$

YEARS

Round

answer

$$\begin{array}{r} 1998 \\ +\ 5.00 \\ \hline 2003.00 \end{array}$$

2003

ANSWER

42

Solve

$A = 504$

$A_0 = 800$

$A = A_0 e^{-0.0077x}$

$504 = 800 e^{-0.0077x}$

$\frac{504}{800} = \frac{\cancel{800} e^{-0.0077x}}{\cancel{800}}$

$.63 = e^{-0.0077x}$

$\ln(.63) = \ln(e^{-0.0077x})$

$\ln(.63) = -0.0077x \ln(e)$

$\ln(.63) = -0.0077x(1)$

$\ln(.63) = -0.0077x$

$\frac{\ln(.63)}{-0.0077} = \frac{-0.0077x}{-0.0077}$

$60.00460514 = x$ years

OR

$60 = x$ years

Round

formula

$\ln A^N =$

$N \ln(A) =$

$\ln(e) =$

$1 =$

(43) $A = Pe^{rt}$

double

$A = 200$

$P = 100$

$r = 2.5\% = .025$

$t = ?$

$200 = 100e^{.025t}$

$\frac{200}{100} = \frac{100e^{.025t}}{100}$

$2 = e^{.025t}$

$\ln(2) = \ln(e^{.025t})$

$\ln(2) = .025t\ln(e)$

$\ln(2) = .025t\,(1)$

$\ln(2) = .025t$

$\frac{\ln(2)}{.025} = \frac{.025t}{.025}$

$27.72588722 = t$

or

$28 = t$ Round

formula

$\ln(A^N) = N\ln(A)$

$\ln(e) = 1$

44.

$$A = P\left(\frac{1}{2}\right)^{\frac{t}{710}}$$

$p = 90$

$t = 400$

$$A = 90\left(\frac{1}{2}\right)^{\frac{400}{710}}$$

$$A = 90(1/2)^\wedge(400/710)$$

$$A = 60.9043266$$

OR

$$A = 60.904$$

Round

(45.) $x+y+z=-6$

$x-y+3z=2$

$3x+y+z=-14$

Solve System

2ND, Matrix, Edit, [A], 3x4, enter

$$[A]=\begin{bmatrix} 1 & 1 & 1 & -6 \\ 1 & -1 & 3 & 2 \\ 3 & 1 & 1 & -14 \end{bmatrix}$$

2ND, Matrix, Math, ↓, rref(), enter

2ND Matrix

rref([A])

$$\begin{array}{cc} \begin{bmatrix} 1 & 0 & 0 & -4 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & 1 \end{bmatrix} & \begin{matrix} x \\ y \\ z \end{matrix} \end{array}$$

answer

$(x, y, z) = (-4, -3, 1)$

(46) $2x+3y=-4$
$5x+y=-23$

use Cramer Rule

$$x = \frac{\begin{vmatrix} -4 & 3 \\ -23 & 1 \end{vmatrix}}{\begin{vmatrix} 2 & 3 \\ 5 & 1 \end{vmatrix}} = -5 \qquad y = \frac{\begin{vmatrix} 2 & -4 \\ 5 & -23 \end{vmatrix}}{\begin{vmatrix} 2 & 3 \\ 5 & 1 \end{vmatrix}} = 2$$

$(x, y) = (-5, 2)$ answer

OR

Solve by elimination

$2x+3y=-4$
$5x+y=-23$

$\begin{pmatrix} 2x+3y=-4 \\ 5x+1y=-23 \end{pmatrix}\begin{pmatrix} -1 \\ 3 \end{pmatrix}$ mult

$-2x-\cancel{3y}=4$
$15x+\cancel{3y}=-69$

$13x+0=-65$

$13x=-65$

$\frac{13x}{13}=\frac{-65}{13}$

$x=-5$

Subst

$2x+3y=-4$

$2(-5)+3y=-4$

$-10+3y=-4$

$\cancel{-10}+3y\cancel{+10}=-4+10$

$3y=6$

$\frac{3y}{3}=\frac{6}{3}$

$y=2$

$(x, y) = (-5, 2)$ answer

47

$$\text{Stop} \rightarrow \sum_{\text{Start} \rightarrow i=3}^{5} (i^2+2) =$$

$$((3)^2+2) + ((4)^2+2) + ((5)^2+2) =$$

$$((3)(3)+2) + ((4)(4)+2) + ((5)(5)+2) =$$

$$(9+2) + (16+2) + (25+2) =$$

$$(11) + (18) + (27) =$$

$$11 + 18 + 27 =$$

$$56 =$$

OR use graphing Calculator

Math, ↓ summation Σ, enter

$$\sum_{\square=\square}^{\square} \square \quad 56$$

48 use the binomial theorem

$(2x+3)^3 =$

$${}_3C_0(2x)^3(3)^0 + {}_3C_1(2x)^2(3)^1 + {}_3C_2(2x)^1(3)^2 + {}_3C_3(2x)^0(3)^3 =$$

$$(1)(2^3x^3)(1)+(3)(2^2x^2)(3)+(3)(2^1x^1)(9)+(1)(1)(27) =$$

$$(1)(8x^3)(1)+(3)(4x^2)(3)+(3)(2x)(9)+(1)(1)(27) =$$

$$8x^3 + 36x^2 + 54x + 27 =$$

Answer

use graphing calculator

3, math, PRB, nCr, enter, 0, enter = 1

3, math, PRB, nCr, enter, 1, enter = 3

3, math, PRB, nCr, enter, 2, enter = 3

3, math, PRB, nCr, enter, 3, enter = 1

49. write the first three terms in the binomial expansion

$$(X+2)^{15}$$

$${}_{15}C_{0}(X)^{15}(2)^{0} + {}_{15}C_{1}(X)^{14}(2)^{1} + {}_{15}C_{2}(X)^{13}(2)^{2} =$$

$$(1)(x^{15})(1) + (15)(x^{14})(2) + (105)(x^{13})(4) =$$

$$X^{15} + 30X^{14} + 420X^{13} =$$

Use graphing calculator

15, Math, Prb, nCr, enter, 0, enter = 1
15, Math, Prb, nCr, enter, 1, enter = 15
15, Math, Prb, nCr, enter, 2, enter = 105