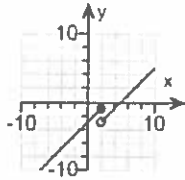


4. The domain of the piecewise function is $(-\infty, \infty)$.
 a. Graph the function.
 b. Use your graph to determine the function's range.

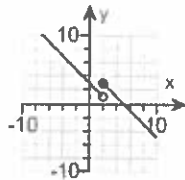
$$f(x) = \begin{cases} x + 1 & \text{if } x < 2 \\ x - 1 & \text{if } x \geq 2 \end{cases}$$

a. Choose the correct graph below.

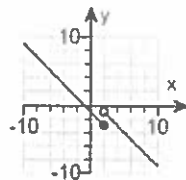
A.



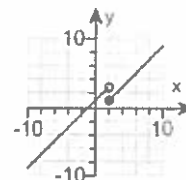
B.



C.



D.



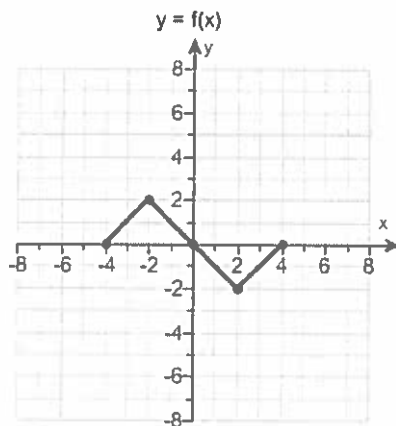
b. The range of $f(x)$ is . (Type your answer in interval notation.)

5. Find the difference quotient of f ; that is, find $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$, for the following function. Be sure to simplify.

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

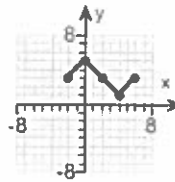
$$\frac{f(x+h) - f(x)}{h} = \text{} \quad (\text{Simplify your answer.})$$

6. Use the graph of $y = f(x)$ to graph the function $g(x) = f(x+2) + 3$.

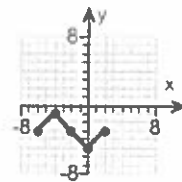


Choose the correct graph of g below.

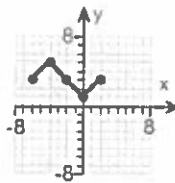
A.



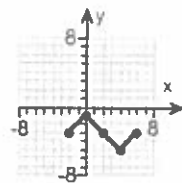
B.



C.



D.



7. Find the domain of the function.

$$f(x) = \sqrt{36 - 4x}$$

What is the domain of f ?

(Type your answer in interval notation.)

8. For $f(x) = x + 3$ and $g(x) = 4x + 5$, find the following functions.

a. $(f \circ g)(x)$; b. $(g \circ f)(x)$; c. $(f \circ g)(1)$; d. $(g \circ f)(1)$

a. $(f \circ g)(x) = \text{[]}$ (Simplify your answer.)

b. $(g \circ f)(x) = \text{[]}$ (Simplify your answer.)

c. $(f \circ g)(1) = \text{[]}$

d. $(g \circ f)(1) = \text{[]}$

9. Find the distance between the pair of points.

(1,9) and (7,17)

The distance between the points is units.

(Round to two decimal places as needed.)

10. Find the midpoint of the line segment with the given endpoints.

(8,2) and (4,6)

The midpoint of the segment is .

(Type an ordered pair.)

11.

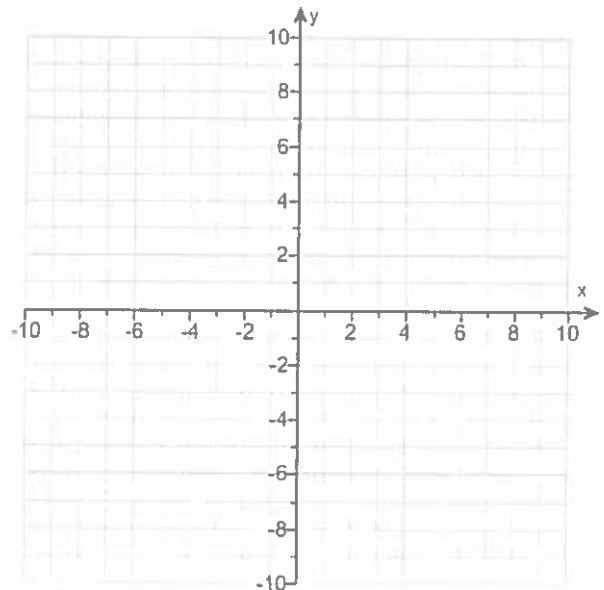
Complete the square and write the equation of the circle in standard form. Then determine the center and radius of the circle to graph the equation.

$$x^2 + y^2 + 4x + 6y + 9 = 0$$

The equation in standard form is .

(Simplify your answer.)

Use the graphing tool to graph the circle.



12.

Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation of the parabola's axis of symmetry. Use the graph to determine the domain and range of the function.

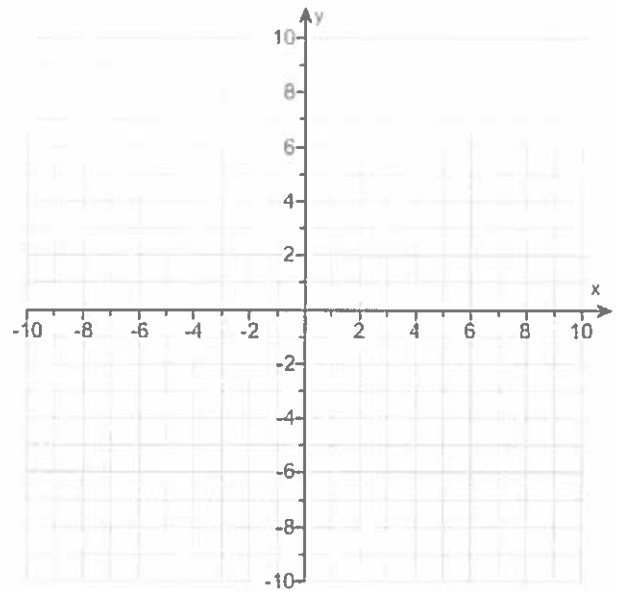
$$f(x) = 2x - x^2 + 8$$

Use the graphing tool to graph the equation. Use the vertex and one of the intercepts to draw the graph.

The axis of symmetry is .
(Type an equation.)

The domain of the function is .
(Type your answer in interval notation.)

The range of the function is .
(Type your answer in interval notation.)



13. Consider the function $f(x) = -2x^2 + 12x - 6$.

- Determine, without graphing, whether the function has a minimum value or a maximum value.
- Find the minimum or maximum value and determine where it occurs.
- Identify the function's domain and its range.

a. The function has a (1) value.

b. The minimum/maximum value is . It occurs at $x =$.

c. The domain of f is . (Type your answer in interval notation.)

The range of f is . (Type your answer in interval notation.)

- (1) maximum
 minimum

14. The following equation is given.

$$x^3 - 5x^2 - 9x + 45 = 0$$

- a. List all rational roots that are possible according to the Rational Zero Theorem.

(Use a comma to separate answers as needed.)

- b. Use synthetic division to test several possible rational roots in order to identify one actual root.

One rational root of the given equation is .

(Simplify your answer.)

- c. Use the root from part (b.) and solve the equation.

The solution set of $x^3 - 5x^2 - 9x + 45 = 0$ is .

(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

15. Find the vertical asymptotes, if any, and the values of x corresponding to holes, if any, of the graph of the rational function.

$$h(x) = \frac{x+3}{x(x-9)}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice. (Type an equation. Use a comma to separate answers as needed.)

- A. The vertical asymptote(s) is(are) _____ . There are no holes.
- B. The vertical asymptote(s) is(are) _____ and hole(s) corresponding to _____ .
- C. There are no vertical asymptotes but there is(are) hole(s) corresponding to _____ .
- D. There are no discontinuities.

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

$$g(x) = \frac{16x^2}{4x^2 + 9}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The horizontal asymptote is _____ . (Type an equation.)
- B. There is no horizontal asymptote.

17. Use properties of logarithms to expand the logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$$\ln \left[\frac{x^8 \sqrt{x^2 + 2}}{(x+2)^3} \right]$$

$$\ln \left[\frac{x^8 \sqrt{x^2 + 2}}{(x+2)^3} \right] = \text{ }$$

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

$$25^{x+5} = 625^{x-8}$$

The solution set is .

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

$$\log_2(x+2) - \log_2(x-5) = 3$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is .
- (Simplify your answer. Use a comma to separate answers as needed.)
- B. There is no solution.

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

$$\log x + \log(x-5) = \log 36$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is .
- (Simplify your answer. Use a comma to separate answers as needed.)
- B. There is no solution.

21. Complete the table for a savings account subject to continuous compounding.

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

Amount Invested	Annual Interest Rate	Accumulated Amount	Time t in years
\$7000	7%	\$14,000	?

Let A represent the accumulated amount, P the amount invested, r the annual interest rate, and t the time. Find the time, t .

$t \approx$ years

(Round to one decimal place as needed.)

22. Solve the given system of equations.

$$x + y + 5z = -32$$

$$x + y + 7z = -42$$

$$x - 7y + 6z = -21$$

Select the correct choice below and fill in any answer boxes within your choice.

- A. There is one solution. The solution set is $\{(\text{_____}, \text{_____}, \text{_____})\}$. (Simplify your answers.)
- B. There are infinitely many solutions.
- C. There is no solution.

23. Write the first four terms of the sequence whose general term is given.

$$a_n = \frac{2n}{n+7}$$

$a_1 =$ (Simplify your answer.)

$a_2 =$ (Simplify your answer.)

$a_3 =$ (Simplify your answer.)

$a_4 =$ (Simplify your answer.)

24. Find the indicated sum.

$$\sum_{k=1}^5 k(k+2)$$

$\sum_{k=1}^5 k(k+2) =$ (Simplify your answer.)

25. Use the binomial theorem to expand the binomial.

$$(4x - 2)^3$$

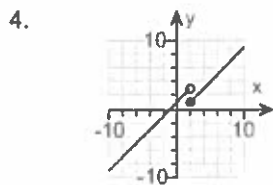
$(4x - 2)^3 =$ (Simplify your answer.)

1. $4, -\frac{1}{2}$

2. A. The solution set is $\{-1\}$. (Use a comma to separate answers as needed.)

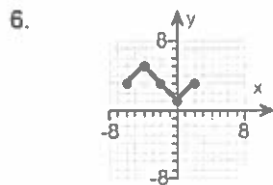
3. A. The function f has (a) relative maxima(maximum) at -1 and the relative maxima(maximum) are(is) 8 .
(Use a comma to separate answers as needed.)

A. The function f has (a) relative minima(minimum) at 2 and the relative minima(minimum) are(is) -19 .
(Use a comma to separate answers as needed.)



D. $(-\infty, \infty)$

5. $2x + h - 5$



C.

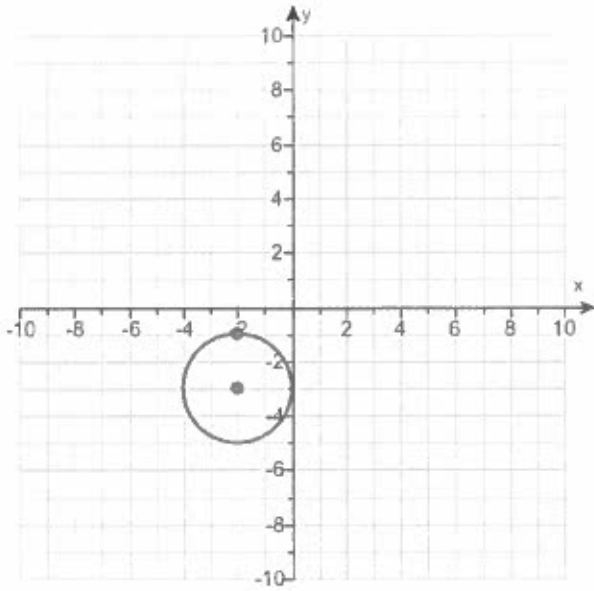
7. $(-\infty, 9]$

8. $4x + 8$
 $4x + 17$
 12
 21

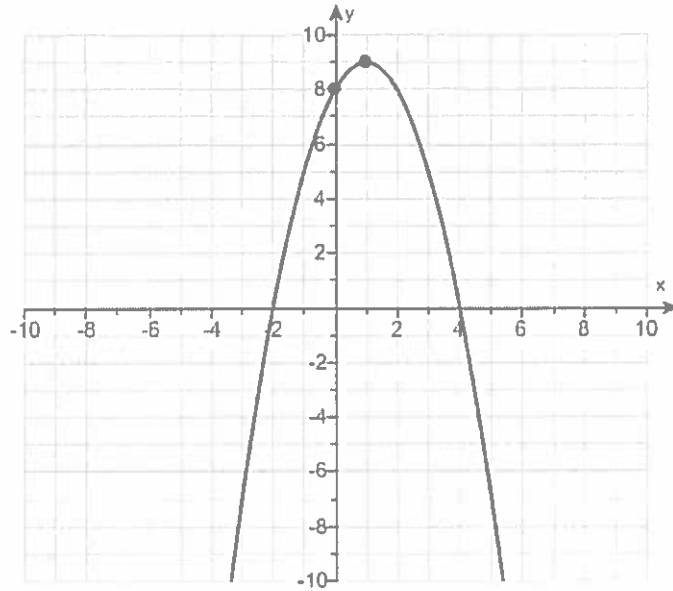
9. 10

10. (6,4)

11. $(x+2)^2 + (y+3)^2 = 4$



12.



$x = 1$

$(-\infty, \infty)$

$(-\infty, 9]$

13. (1) maximum

12

3

 $(-\infty, \infty)$ $(-\infty, 12]$

14. 1, -1, 3, -3, 45, -45, 5, -5, 15, -15, 9, -9

5

5, 3, -3

15. A. The vertical asymptote(s) is(are) . There are no holes.16. A. The horizontal asymptote is . (Type an equation.)17. $8 \ln x + \frac{1}{2} \ln(x^2 + 2) - 3 \ln(x + 2)$

18. 21

19. A. The solution set is . (Simplify your answer. Use a comma to separate answers as needed.)20. A. The solution set is . (Simplify your answer. Use a comma to separate answers as needed.)

21. 9.9

22. A.

There is one solution. The solution set is . (Simplify your answers.)23. $\frac{1}{4}$ $\frac{4}{9}$ $\frac{3}{5}$ $\frac{8}{11}$

24. 85

25. $64x^3 - 96x^2 + 48x - 8$

$$\textcircled{1} \quad 2x^2 - 7x = 4$$

$$2x^2 - 7x - 4 = 0$$

$$a=2, \quad b=-7, \quad c=-4$$

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

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(-4)}}{2(2)}$$

$$x = \frac{7 \pm \sqrt{49 + 32}}{4}$$

$$x = \frac{7 \pm \sqrt{81}}{4}$$

$$x = \frac{7 \pm 9}{4}$$

$$x = \frac{7+9}{4}$$

OR

$$x = \frac{7-9}{4}$$

$$x = \frac{16}{4}$$

OR

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

$$\textcircled{x = 4}$$

OR

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

$$\textcircled{x = -\frac{1}{2}}$$

Use
Quadratic
formula

rewrite

$$(2) \sqrt{6x+55} = x+8$$

$$(\sqrt{6x+55})^2 = (x+8)^2$$

$$6x+55 = (x+8)(x+8)$$

$$6x+55 = x^2 + 8x + 8x + 64$$

$$6x+55 = x^2 + 16x + 64$$

$$0 = x^2 + 16x + 64 - 6x - 55$$

$$0 = x^2 + 10x + 9$$

$$0 = (x+1)(x+9)$$

$$x+1=0 \quad \text{OR} \quad x+9=0$$

$$x+1-1=0-1 \quad \text{OR} \quad x+9-9=0-9$$

$$x = -1$$

OR

$$x = -9$$

Check

$$\sqrt{6x+55} = x+8$$

$$\sqrt{6(-1)+55} = (-1)+8$$

$$\sqrt{-6+55} = -1+8$$

$$\sqrt{49} = 7$$

$$7 = 7$$

Good

$$\sqrt{6(-9)+55} = (-9)+8$$

$$\sqrt{-54+55} = -9+8$$

$$\sqrt{1} = -1$$

$$1 \neq -1$$

BAD

Answer

$$x = -1$$

③ $f(x) = 2x^3 - 3x^2 - 12x + 1$

window

$$x - \min = -5$$

$$x - \max = 5$$

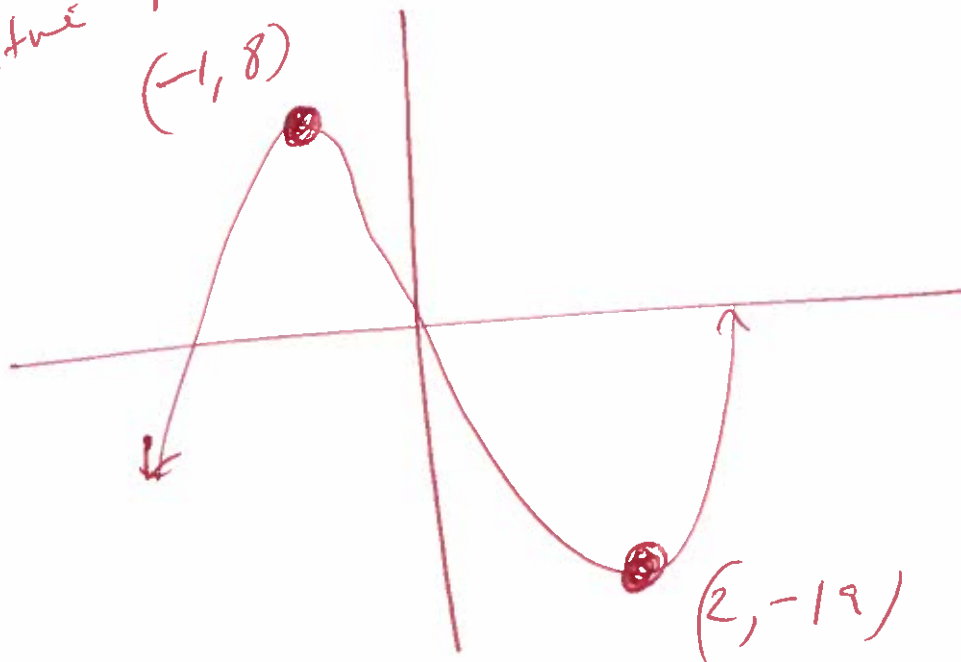
$$y - \min = -24$$

$$y - \max = 24$$

Use a graphing
calculator

$y_1 = 2x^3 - 3x^2 - 12x + 1$

relative
max
 $(-1, 8)$



$(2, -19)$
relative min

④ Graph

$$f(x) = \begin{cases} x+1 & \text{if } x < 2 \\ x-1 & \text{if } x \geq 2 \end{cases}$$

Window

$$x\text{-min} = -12$$

$$x\text{-max} = 12$$

$$y\text{min} = -10$$

$$y\text{max} = 10$$

Use a graphing
calculator

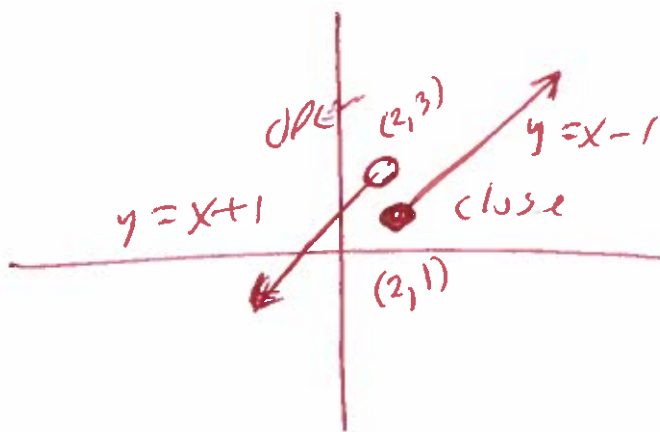
2ND MATH

$$y_1 = x + 1 \quad \circ \quad (x < 2)$$

OPEN circle

2ND MATH

$$y_2 = x \overset{\text{TRIG}}{\text{---}} | \quad \circ \quad (x \geq 2) \quad \text{Close Circle}$$



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

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

$$\frac{(x+h)^2 - 5(x+h) + 2 - (x^2 - 5x + 2)}{h} =$$

$$\frac{(x+h)(x+h) - 5x - 5h + 2 - x^2 + 5x - 2}{h} =$$

$$\frac{x^2 + xh + xh + h^2 - 5x - 5h + 2 - x^2 + 5x - 2}{h} =$$

$$\frac{\cancel{x^2} + 2xh + h^2 - \cancel{5x} - 5h + 2 - \cancel{x^2} + \cancel{5x} - 2}{h} =$$

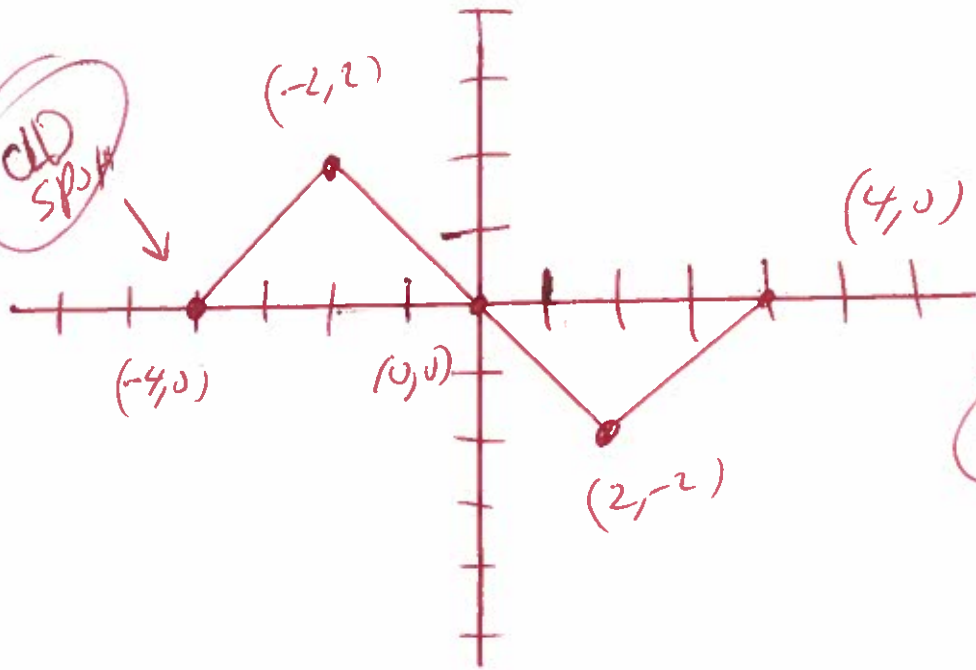
$$\frac{2xh + h^2 - 5h}{h} =$$

$$\frac{2xh}{h} + \frac{h^2}{h} - \frac{5h}{h} =$$

$$2x + h - 5 =$$

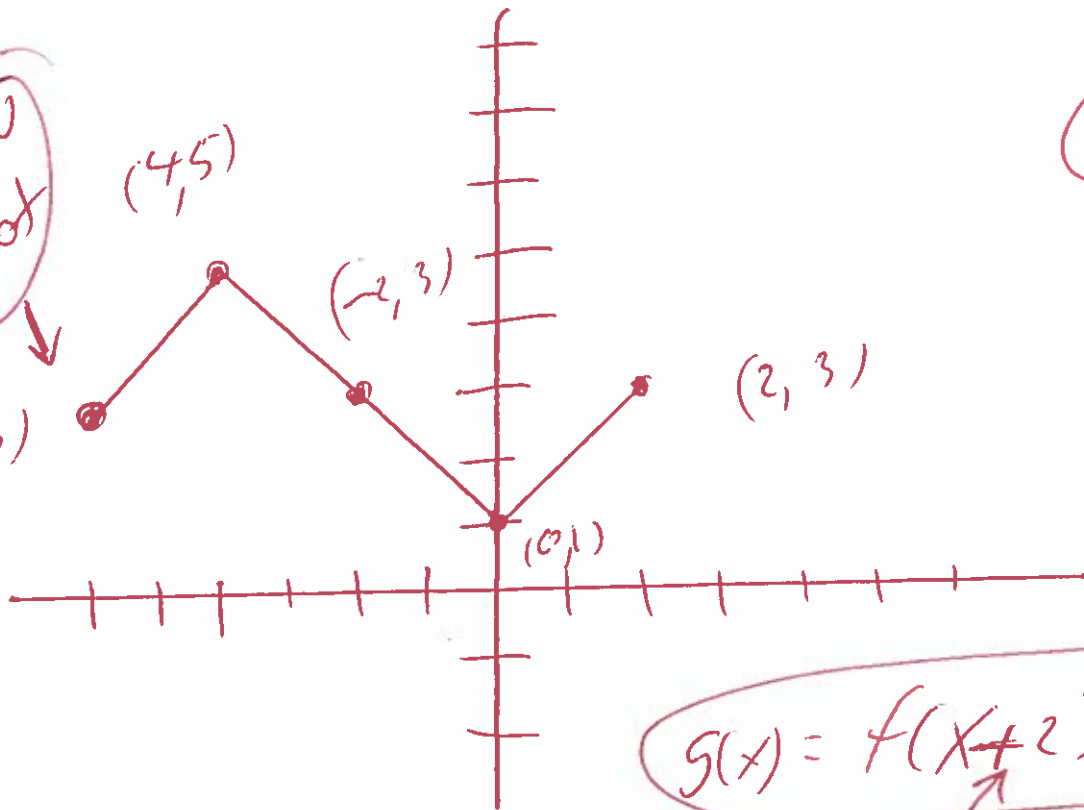
#6

old spot



$y = f(x)$
old

New spot



New

$$g(x) = f(x+2) + 3$$

Shift -2 left
opposite

Shift up
3

7. Find the domain

$$f(x) = \sqrt{36 - 4x}$$

formula
 $f(x) = \sqrt{Ax+B}$
at $Ax+B \geq 0$

$$\text{at } 36 - 4x \geq 0$$

$$\cancel{36} - 4x - \cancel{36} \geq 0 - 36$$

$$-4x \geq -36$$

$$\frac{-4x}{-4} \leq \frac{-36}{-4}$$

divide by a negative
turn all signs around

$$x \leq 9$$



$$(-\infty, 9]$$

$$\textcircled{8} \quad f(x) = x + 3 \quad \text{and} \quad g(x) = 4x + 5$$

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

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

$$f(4x + 5) =$$

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

$$4x + 5 + 3 =$$

$$4x + 8$$

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

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

$$g(x + 3) =$$

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

$$4x + 12 + 5$$

$$4x + 17 =$$

$$(f \circ g)(x) = 4x + 8$$

$$(f \circ g)(1) = 4(1) + 8$$

$$(f \circ g)(1) = 4 + 8$$

$$(f \circ g)(1) = 12$$

$$(g \circ f)(x) = 4x + 17$$

$$(g \circ f)(1) = 4(1) + 17$$

$$(g \circ f)(1) = 4 + 17$$

$$(g \circ f)(1) = 21$$

⑨ find distance
 $(1, 9)$ and $(7, 17)$
 $x_1 \quad y_1 \quad x_2 \quad y_2$

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$d = \sqrt{(1 - 7)^2 + (9 - 17)^2}$$

$$d = \sqrt{(1 - 7)^2 + (9 - 17)^2}$$

$$d = \sqrt{(-6)^2 + (-8)^2}$$

$$d = \sqrt{36 + 64}$$

$$d = \sqrt{100}$$

$$d = 10$$

⑩ Find midpoint

$$\begin{array}{cc} (8, 2) & \text{and} & (4, 6) \\ x_1 & y_1 & x_2 & y_2 \end{array}$$

$$\text{Mid point} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\text{Mid point} = \left(\frac{(8) + (4)}{2}, \frac{(2) + (6)}{2} \right)$$

$$\text{Mid point} = \left(\frac{8+4}{2}, \frac{2+6}{2} \right)$$

$$\text{Mid point} = \left(\frac{12}{2}, \frac{8}{2} \right)$$

$$\text{Mid point} = (6, 4)$$

11) graph

Complete the square

$$x^2 + y^2 + 4x + 6y + 9 = 0$$

$$x^2 + 4x + y^2 + 6y = -9$$

$$x^2 + 4x + \left(\frac{1}{2}(4)\right)^2 + y^2 + 6y + \left(\frac{1}{2}(6)\right)^2 = -9 + \left(\frac{1}{2}(4)\right)^2 + \left(\frac{1}{2}(6)\right)^2$$

$$x^2 + 4x + (2)^2 + y^2 + 6y + (3)^2 = -9 + (2)^2 + (3)^2$$

$$x^2 + 4x + 4 + y^2 + 6y + 9 = -9 + 4 + 9$$

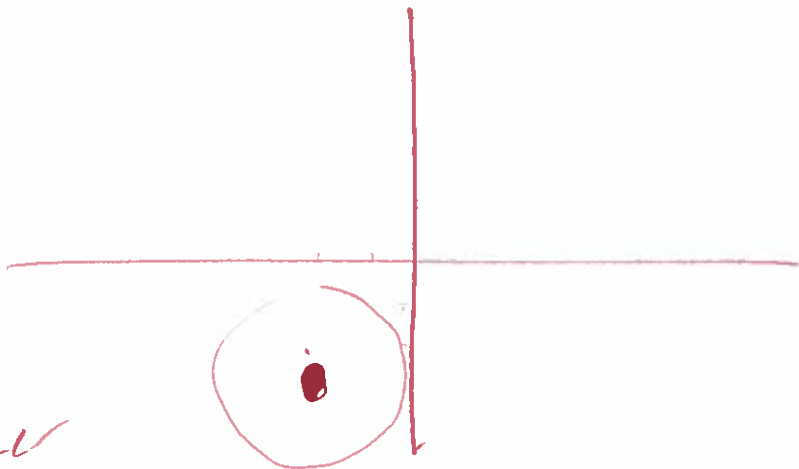
$$(x+2)(x+2) + (y+3)(y+3) = 4$$

$$(x+2)^2 + (y+3)^2 = 4$$

Center = $(-2, -3)$

Radius = $\sqrt{4} = 2$

Center
 $(-2, -3)$



12. graph

$$f(x) = 2x - x^2 + 8$$

windows

$$x\text{-min} = -12$$

$$x\text{-max} = 12$$

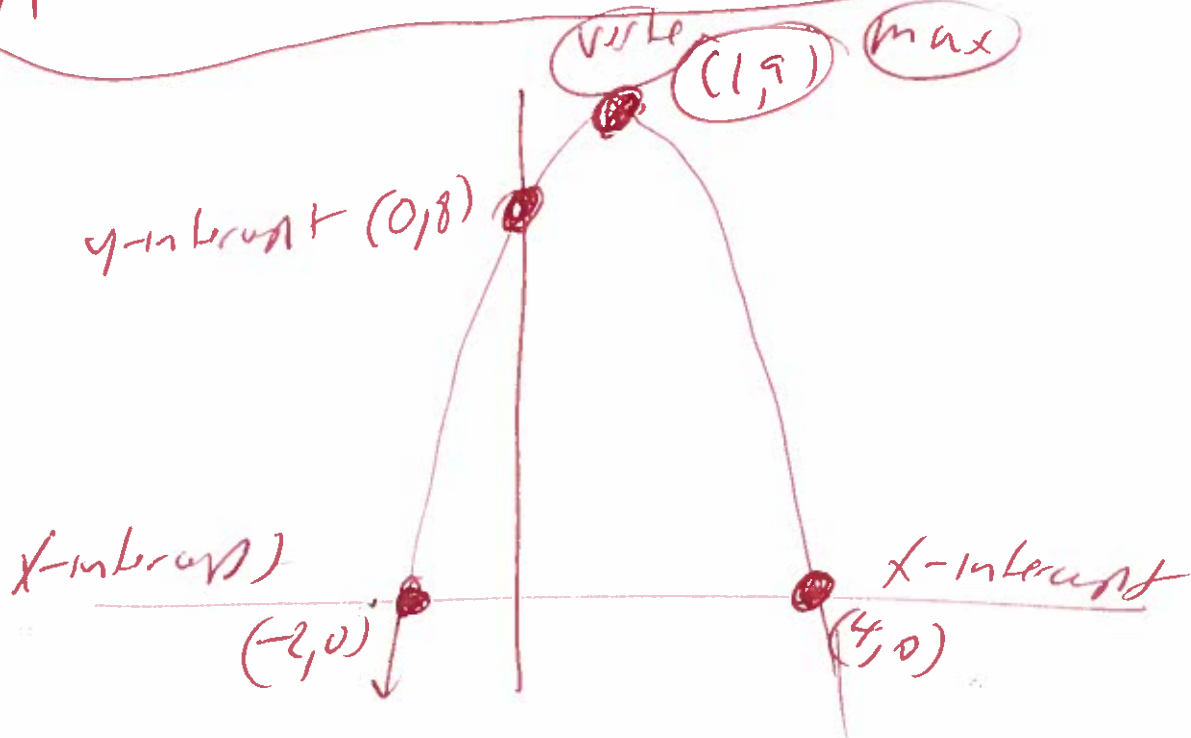
$$y\text{-min} = -10$$

$$y\text{-max} = 10$$

use graphing calculator.

BIG

$$y_1 = 2x - x^2 + 8$$



13 $f(x) = -2x^2 + 12x - 6$
 $a = -2$ $b = 12$ $c = -6$
find vertex = max

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

$$\text{Vertex} = \left(-\frac{(12)}{2(-2)}, f\left(\frac{(12)}{2(-2)}\right)\right)$$

$$\text{Vertex} = \left(\frac{-12}{-4}, f\left(\frac{-12}{-4}\right)\right)$$

$$\text{Vertex} = (3, f(3))$$

$$\text{Vertex} = (3, -2(3)^2 + 12(3) - 6)$$

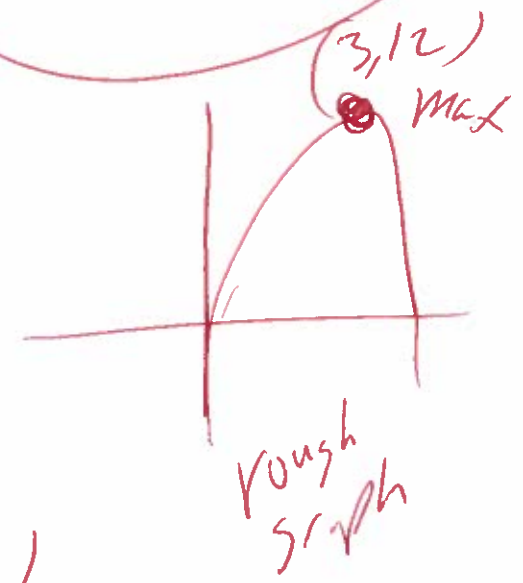
$$\text{Vertex} = (3, -2(3)(3) + 12(3) - 6)$$

$$\text{Vertex} = (3, -18 + 36 - 6)$$

$$\text{Vertex} = (3, 12)$$

Max \nearrow

Graph opens down \downarrow



$$(14) \quad 1x^3 - 5x^2 - 9x + 45 = 0$$

Possible
rational
roots

Last
first

± 45
 ± 1

$\pm 45, \pm 15, \pm 9, \pm 5, \pm 1$
 ± 1

Use Synthetic Division try $x=3$

3	1	-5	-9	45	
		3	-6	-45	
	1	-2	-15	0	rem

Possible
 $\pm 1, \pm 3, \pm 5, \pm 9, \pm 45$
 ± 15

$$x^2 - 2x - 15 = 0$$

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

$$x + 3 = 0 \quad \text{OR} \quad x - 5 = 0$$

$$x + 3 - 3 = 0 - 3 \quad \text{OR} \quad x - 5 + 5 = 0 + 5$$

$$\boxed{x = -3} \quad \text{OR} \quad \boxed{x = 5}$$

Answer

$$3, -3, 5$$

(15) Find the vertical asymptotes

$$h(x) = \frac{x+3}{x(x-9)}$$

$$\text{wt } x(x-9) = 0$$

$$x = 0$$

OR

$$x-9 = 0$$

$$x-9+9 = 0+9$$

$$x = 9$$

Vertical asymptotes

$$x = 0$$

OR

$$x = 9$$

16) find the horizontal asymptote

$$g(x) = \frac{16x^2}{4x^2 + 9}$$

$$\lim_{x \rightarrow \infty} \frac{16x^2}{4x^2 + 9} =$$

$$\lim_{x \rightarrow \infty} \left(\frac{16x^2}{4x^2 + 9} \right) \frac{\frac{1}{x^2}}{\frac{1}{x^2}} =$$

$$\lim_{x \rightarrow \infty} \frac{\frac{16x^2}{x^2}}{\frac{4x^2}{x^2} + \frac{9}{x^2}} =$$

$$\lim_{x \rightarrow \infty} \frac{16}{4 + \frac{9}{x^2}} =$$

$$\frac{16}{4 + 0} =$$

$$\frac{16}{4} =$$

$$4 =$$

the horizontal asymptote

$$y = 4$$

formula

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

17 expand

$$\ln \left(\frac{x^8 \sqrt{x^2+2}}{(x+2)^3} \right) =$$

$$\ln(x^8 \sqrt{x^2+2}) - \ln(x+2)^3 =$$

$$\ln(x^8) + \ln \sqrt{x^2+2} - \ln(x+2)^3 =$$

$$\ln(x^8) + \ln(x^2+2)^{\frac{1}{2}} - \ln(x+2)^3 =$$

$$8 \ln(x) + \frac{1}{2} \ln(x^2+2) - 3 \ln(x+2) =$$

formulas

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

$$\ln(AB) = \ln(A) + \ln(B)$$

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

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$$25^{x+5} = 625^{x-8}$$

Solve

$$(5^2)^{x+5} = (5^4)^{x-8}$$

$$5^{2x+10} = 5^{4x-32}$$

mult powers

$$2x+10 = 4x-32$$

$$2x+10-10 = 4x-32+10$$

$$2x = 4x - 42$$

$$2x-4x = 4x-42-4x$$

$$-2x = -42$$

$$\frac{-2x}{-2} = \frac{-42}{-2}$$

$$x = 21$$

$$(19) \log_2(x+2) - \log_2(x-5) = 3$$

Solve

$$\log_2\left(\frac{x+2}{x-5}\right) = 3$$

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

Rewrite

$$8 = \frac{x+2}{x-5}$$

$$\frac{8}{1} = \frac{x+2}{x-5}$$

$$8(x-5) = 1(x+2) \quad \text{cross mult}$$

$$8x - 40 = 1x + 2$$

$$8x - 40 + 40 = 1x + 2 + 40$$

$$8x = 1x + 42$$

$$8x - 1x = 1x + 42 - 1x$$

$$7x = 42$$

Check

$$\frac{7x}{7} = \frac{42}{7}$$

$$x = 6$$

$$\log_2(6+2) - \log_2(6-5) = 3$$

$$\log_2(8) - \log_2(1) = 3$$

Good Good

answer

$$x = 6$$

$$(20) \log(x) + \log(x-5) = \log(36) \quad \text{Solve}$$

$$\log(x)(x-5) = \log(36)$$

$$x(x-5) = 36$$

$$x^2 - 5x = 36$$

$$x^2 - 5x - 36 = 0 \quad \text{rewrite}$$

$$(x+4)(x-9) = 0$$

$$\text{or } x+4=0 \quad \text{OR} \quad x-9=0$$

$$x+4-4=0-4, \quad \text{OR} \quad x-9+9=0+9$$

$$\cancel{x=-4} \quad \text{OR} \quad x=9$$

check

$$\log(x) + \log(x-5) = \log(36)$$

$$\log(-4) + \log(-4-5) = \log(36)$$

$$\log(-4) + \log(-9) = \log(36)$$

BAD

BAD

$$\log(9) + \log(9-5) = \log(36)$$

$$\log(9) + \log(4) = \log(36)$$

Good

Good

Good

answer

$$x=9$$

$$(21) A = Pe^{rt}$$

$$A = 14000$$

$$P = 7000$$

$$r = 7\% = .07$$

$$t = ?$$

$$14000 = 7000e^{.07t}$$

$$\frac{14000}{7000} = \frac{7000e^{.07t}}{7000}$$

$$2 = e^{.07t}$$

$$\ln(2) = \ln(e^{.07t})$$

$$\ln(2) = .07t \ln(e)$$

$$\ln(2) = .07t(1)$$

$$\ln(2) = .07t$$

$$\frac{\ln(2)}{.07} = \frac{.07t}{.07}$$

$$9.902102579 = t$$

Round

$$9.9 \approx t$$

formulas

$$\ln(e) = 1$$

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

$$N \ln(A) =$$

(22)

Solve

$$x + y + 5z = -32$$

$$x + y + 7z = -42$$

$$x - 7y + 6z = -21$$

Use a
graphing
calculator

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

$$[A] = \begin{bmatrix} 1 & 1 & 5 & -32 \\ 1 & 1 & 7 & -42 \\ 1 & -7 & 6 & -21 \end{bmatrix}$$

2ND, Matrix, Math, ↓, rref(),
2ND matrix

$$\text{rref}([A]) \rightarrow$$

$$\begin{bmatrix} 1 & 0 & 0 & -5 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & -5 \end{bmatrix}$$

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

(23) find the first four terms in the sequence

$$a_n = \frac{2n}{n+7}$$

$$a_1 = \frac{2(1)}{1+7} = \frac{2}{8} = \frac{2(1)}{2(4)} = \frac{1}{4}$$

$$a_2 = \frac{2(2)}{2+7} = \frac{4}{9}$$

$$a_3 = \frac{2(3)}{3+7} = \frac{6}{10} = \frac{2(3)}{2(5)} = \frac{3}{5}$$

$$a_4 = \frac{2(4)}{4+7} = \frac{8}{11}$$

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$$\sum_{k=1}^5 k(k+2) =$$

$$1(1+2) + 2(2+2) + 3(3+2) + 4(4+2) + 5(5+2) =$$

$$1(3) + 2(4) + 3(5) + 4(6) + 5(7) =$$

$$3 + 8 + 15 + 24 + 35 =$$

$$85 =$$

OR use graphing calculator

Math, ↓, Summation Σ

$$\begin{array}{l} \square \\ \hline \Sigma \end{array} \square$$
$$\square = \square$$

$$(25) (4x-2)^3$$

3 Use the binomial theorem to expand ~~formula~~

$$\binom{3}{3_0} (4x)^3 (-2)^0 + \binom{3}{3_1} (4x)^2 (-2)^1 + \binom{3}{3_2} (4x)^1 (-2)^2 + \binom{3}{3_3} (4x)^0 (-2)^3 =$$

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

$$(1)(64x^3)(1) + (3)(16x^2)(-2) + (3)(4x)(4) + (1)(1)(-8) =$$

$$64x^3 - 96x^2 + 48x - 8 =$$

Use graphing calculator

$$3, \text{ math, Prb, nCr, 0, enter} = 1$$

$$3, \text{ math Prb, nCr, 1, enter} = 3$$

$$3, \text{ math Prb, nCr, 2, enter} = 3$$

$$3, \text{ math Prb, nCr, 3, enter} = 1$$