1. Use Quadratic formula

M131439 Pract Step 1

[redacted]

101817

$5x^2 = 23x + 42$

$5x^2 - 23x - 42 = 0$

$a = 5, \quad b = -23, \quad c = -42$

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

$$x = \frac{-(-23) \pm \sqrt{(-23)^2 - 4(5)(-42)}}{2(5)}$$

$$x = \frac{23 \pm \sqrt{529 + 840}}{10}$$

$$x = \frac{23 \pm \sqrt{1369}}{10}$$

$$x = \frac{23 \pm 37}{10}$$

$$x = \frac{23 + 37}{10} \quad \text{or} \quad x = \frac{23 - 37}{10}$$

$$x = \frac{60}{10} \quad \text{OR} \quad x = \frac{-14}{10}$$

$$x = 6 \quad \text{or} \quad x = \frac{\cancel{2}(-7)}{\cancel{2}(5)}$$

$$\text{or} \quad x = \frac{-7}{5}$$

(2) use Quadratic formula

(2)

$1x^2+5x+6=0$

$a=1, b=5, c=6$

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

$$x=\frac{-(5)\pm\sqrt{(5)^2-4(1)(6)}}{2(1)}$$

$$x=\frac{-5\pm\sqrt{25-24}}{2}$$

$$x=\frac{-5\pm\sqrt{1}}{2}$$

$$x=\frac{-5\pm1}{2}$$

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

$x=\frac{-6}{2}$ or $x=\frac{-4}{2}$

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

3 use Quadratic formula

3.

$$1x^2 - 2x + 5 = 0$$

$a = 1,\ b = -2,\ c = 5$

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

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(5)}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{4 - 20}}{2}$$

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

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

$$x = 1 \pm 2i$$

$x = 1 - 2i$ OR $x = 1 + 2i$

(4) $\sqrt{x+7} = x-5$

(4)

$(\sqrt{x+7})^2 = (x-5)^2$

$x+7 = (x-5)(x-5)$

$x+7 = x^2-5x-5x+25$

$x+7 = x^2-10x+25$

$0 = x^2-10x+25-x-7$

$0 = x^2-11x+18$

$0 = (x-2)(x-9)$

Possible
18·1
2·9
6·3

set $x-2=0$ or $x-9=0$

$x-2+2=0+2$ or $x-9+9=0+9$

$\cancel{x=2}$ or $x=9$

ck

$\sqrt{x+7} = x-5$

$\sqrt{2+7} = (2)-5$

$\sqrt{9} = 2-5$

$3 \neq -3$

BAD

ck

$\sqrt{x+7} = x-5$

$\sqrt{9+7} = (9)-5$

$\sqrt{16} = 9-5$

$4 = 4$ ✓

Good

$\{9\}$

5. Graph

$$f(x)=\begin{cases} 4x & \text{if } x \le 0 \\ 3 & \text{if } x > 0 \end{cases}$$

$f(x)=4x$
$f(-1)=4(-1)$
$f(-1)=-4$

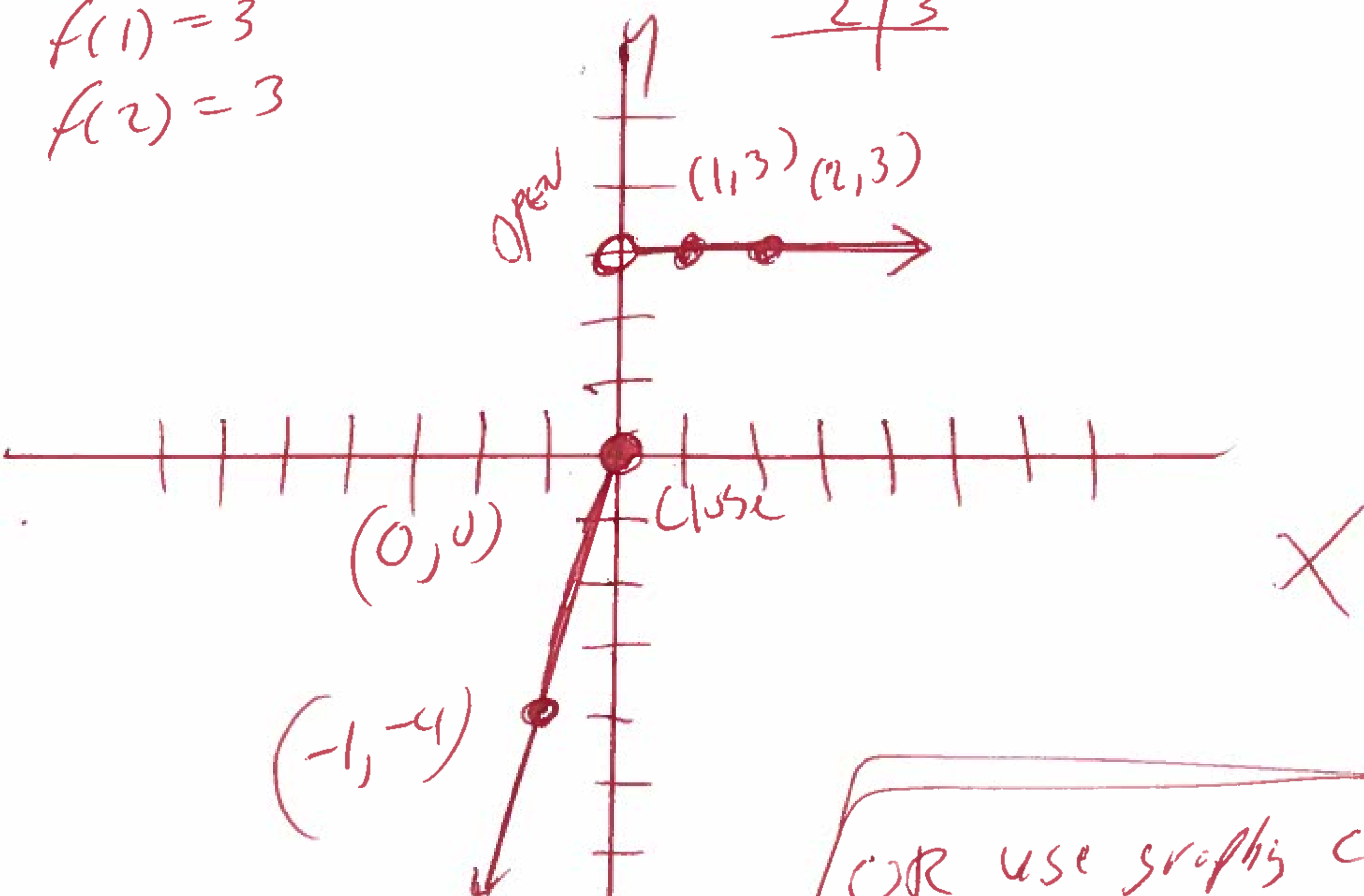
$f(0)=4(0)$
$f(0)=0$

x	y
-1	-4
0	0

Range $(-\infty,0)\cup\{3\}$

$f(x)=3$
$f(1)=3$
$f(2)=3$

x	y
1	3
2	3



OR use graphing cal
$y_1=4x \div (x\le 0)$ close
$y_2=3 \div (x>0)$ open

⑥ graph

$$f(x) = \begin{cases} x+4 & \text{if } x<3 \\ x-4 & \text{if } x \geq 3 \end{cases}$$

6

$f(x) = x+4$

$f(1) = (1)+4$

$f(1) = 1+4$

$f(1) = 5$

x	$f(x)$
1	5
2	6

$f(2) = (2)+4$

$f(2) = 2+4$

$f(2) = 6$

OR use graphing Cal

$y_1 = x+4 \div (x<3)$ open

$y_2 = x-4 \div (x \geq 3)$ closed

Range ↗ $(-\infty, \infty$

$f(x) = x-4$

$f(3) = (3)-4$

$f(3) = 3-4$

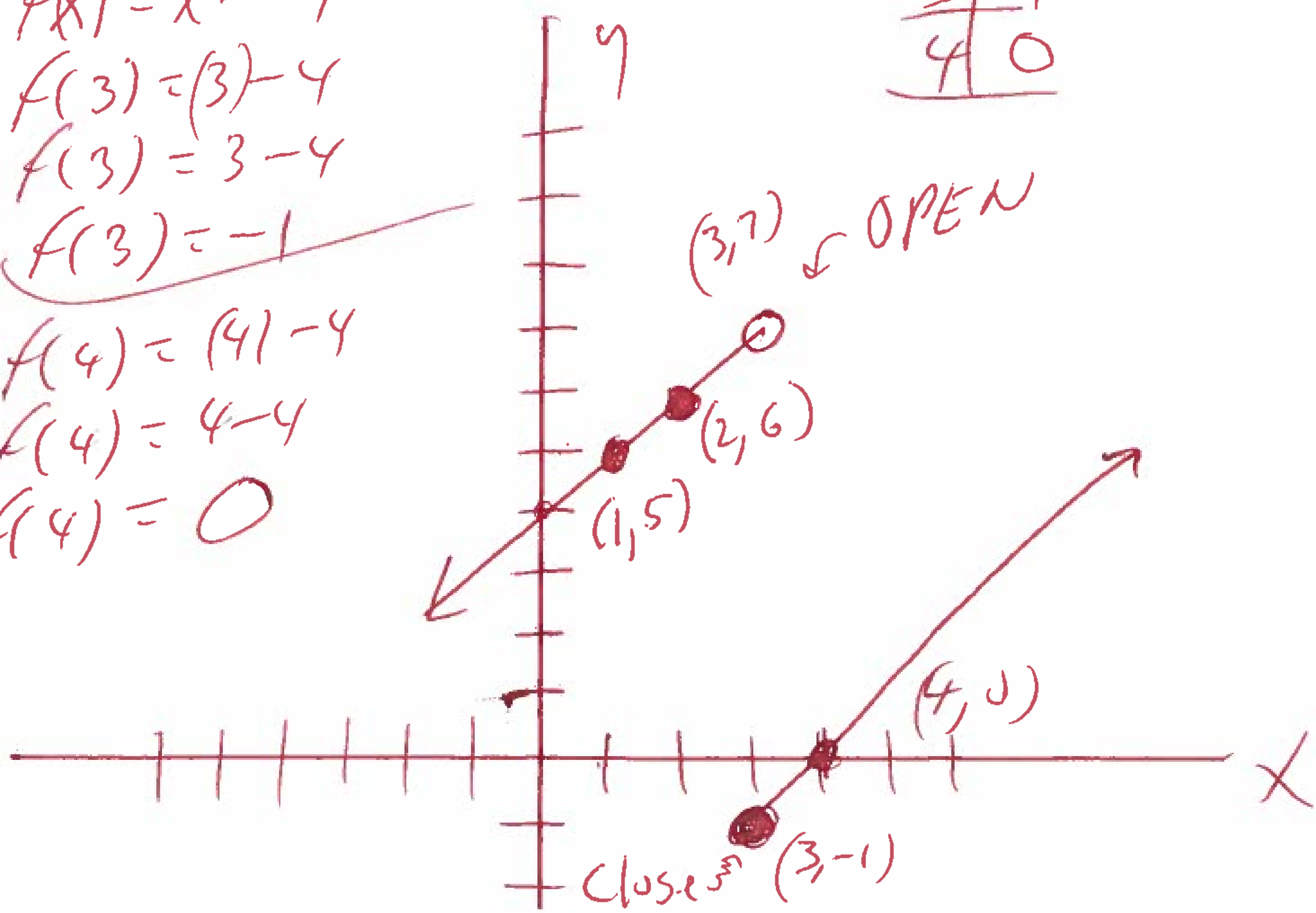
$f(3) = -1$

x	$f(x)$
3	-1
4	0

$f(4) = (4)-4$

$f(4) = 4-4$

$f(4) = 0$



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

(7)

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

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

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

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

$$\frac{\cancel{x^2} + 2xh + h^2 \cancel{- 2x} - 2h \cancel{+ 4} \cancel{- x^2} \cancel{+ 2x} \cancel{- 4}}{h} =$$

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

$$2x + h - 2 =$$

8 Find the domain

8

$f(x) = \sqrt{40-5x}$

set $40-5x \geq 0$

$\cancel{40} - 5x - \cancel{40} \geq 0 - 40$

$-5x \geq -40$

$\frac{-5x}{-5} \leq \frac{-40}{-5}$ divide by -5 and turn the alligator around

$x \leq 8$

$(-\infty, 8]$

9) $f(x) = 2x^2 - 18x + 36$ and $g(x) = x - 6$

9

$(f+g)(x) =$

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

$(2x^2 - 18x + 36) + (x - 6) =$

$2x^2 - 18x + 36 + x - 6 =$

$2x^2 - 17x + 30 =$ domain $(-\infty, \infty)$

$(f-g)(x) =$

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

$(2x^2 - 18x + 36) - (x - 6) =$

$2x^2 - 18x + 36 - x + 6 =$

$2x^2 - 19x + 42 =$ domain $(-\infty, \infty)$

$(fg)(x) =$

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

$(2x^2 - 18x + 36)(x - 6) =$

$2x^3 - 12x^2 - 18x^2 + 108x + 36x - 216 =$

$2x^3 - 30x^2 + 144x - 216 =$ domain $(-\infty, \infty)$

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

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

$\frac{2x^2 - 18x + 36}{x - 6} =$

$\frac{2(x^2 - 9x + 18)}{x - 6} =$

$\frac{2(x-3)\cancel{(x-6)}}{\cancel{(x-6)}} =$

$2(x - 3) =$

$2x - 6 =$

domain $(-\infty, 6) \cup (6, \infty)$

or $\{x \mid x \neq 6\}$

(10) $f(x) = 4 - x$ and $g(x) = 3x^2 + x + 6$

10

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

$f(g(x)) =$

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

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

$4 - 3x^2 - x - 6 =$

$-3x^2 - x - 2 =$

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

$g(f(x)) =$

$g(4 - x) =$

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

$3(4-x)(4-x) + (4-x) + 6 =$

$3(16 - 4x - 4x + x^2) + (4-x) + 6 =$

$3(16 - 8x + x^2) + (4-x) + 6 =$

$48 - 24x + 3x^2 + 4 - x + 6 =$

$3x^2 - 25x + 58 =$

$(f \circ g)(x) = -3x^2 - x - 2$

$(f \circ g)(3) = -3(3)^2 - (3) - 2$

$(f \circ g)(3) = -3(3)(3) - (3) - 2$

$(f \circ g)(3) = -27 - 3 - 2$

$(f \circ g)(3) = -30 - 2$

$(f \circ g)(3) = -32$

$(g \circ f)(x) = 3x^2 - 25x + 58$

$(g \circ f)(3) = 3(3)^2 - 25(3) + 58$

$(g \circ f)(3) = 3(3)(3) - 25(3) + 58$

$(g \circ f)(3) = 27 - 75 + 58$

$(g \circ f)(3) = -48 + 58$

$(g \circ f)(3) = 10$

11. Find the distance between the pair of points.

11.

$(5, 9)$ and $(2, 5)$

$x_1 \; y_1 \qquad x_2 \; y_2$

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

$$d = \sqrt{((5) - (2))^2 + ((9) - (5))^2}$$

$$d = \sqrt{(5-2)^2 + (9-5)^2}$$

$$d = \sqrt{(3)^2 + (4)^2}$$

$$d = \sqrt{9 + 16}$$

$$d = \sqrt{25}$$

$$d = 5$$

(12.) Find the midpoint $(8, 2)$ and $(6, 10)$

$x_1 \quad y_1 \qquad x_2 \quad y_2$

12

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

$$\text{midpoint} = \left(\frac{(8) + (6)}{2}, \frac{(2) + (10)}{2} \right)$$

$$\text{midpoint} = \left(\frac{8+6}{2}, \frac{2+10}{2} \right)$$

$$\text{midpoint} = \left(\frac{14}{2}, \frac{12}{2} \right)$$

$$\text{midpoint} = (7, 6)$$

13.) graph

13.

$$x^2+y^2+6x+4y-12=0$$

$$x^2+6x+y^2+4y=12$$

$$x^2+6x+\left(\tfrac{1}{2}(6)\right)^2+y^2+4y+\left(\tfrac{1}{2}(4)\right)^2=12+\left(\tfrac{1}{2}(6)\right)^2+\left(\tfrac{1}{2}(4)\right)^2$$

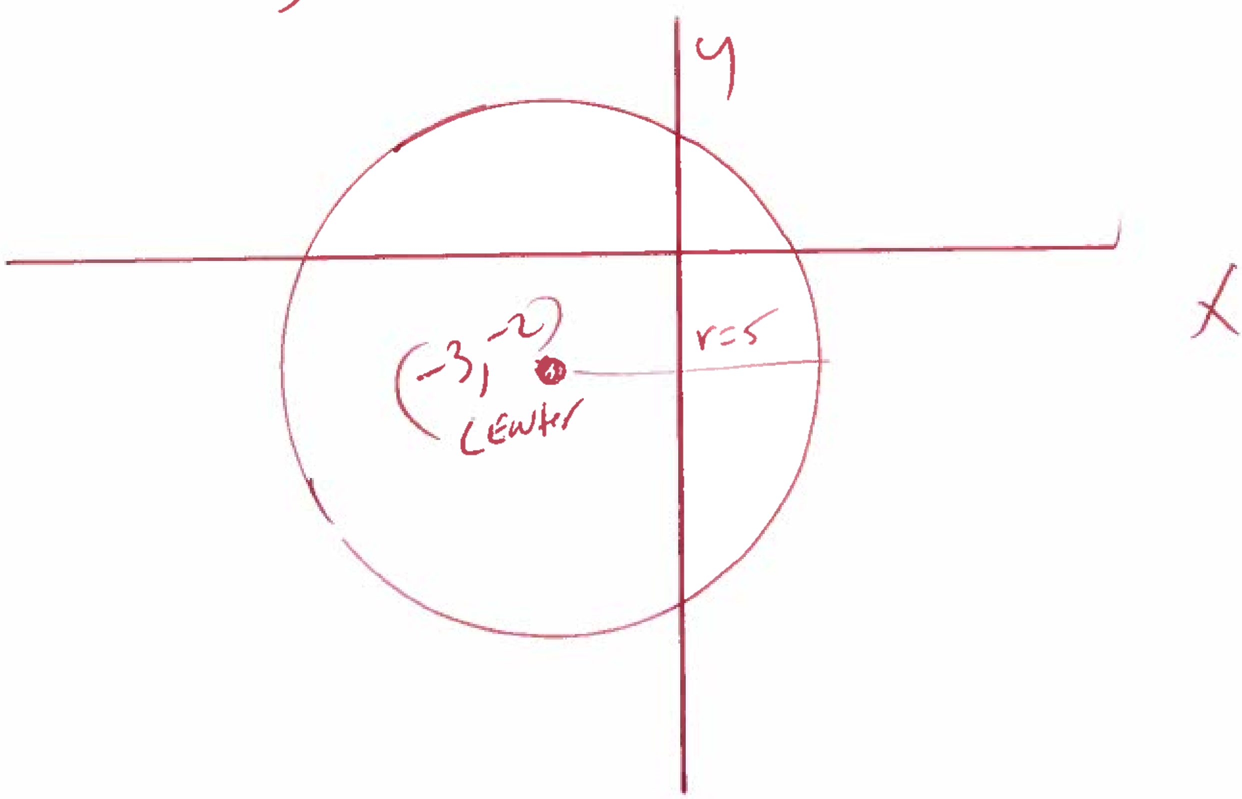
$$x^2+6x+(3)^2+y^2+4y+(2)^2=12+(3)^2+(2)^2$$

$$\underbrace{x^2+6x+9}_{\text{always}}+y^2+4y+4=12+9+4$$

$$(x+3)(x+3)+(y+2)(y+2)=25$$

$$(x+3)^2+(y+2)^2=25$$

CENTER $=(-3,-2)$ Radius $=\sqrt{25}=5$



14. graph

14.

$f(x) = x^2 + 3x - 4$

use a graphing calculator

$y_1 = x^2 + 3x - 4$

$a = 1,\ b = 3,\ c = -4$

Domain $(-\infty, \infty)$

Range $[-6.25, \infty)$

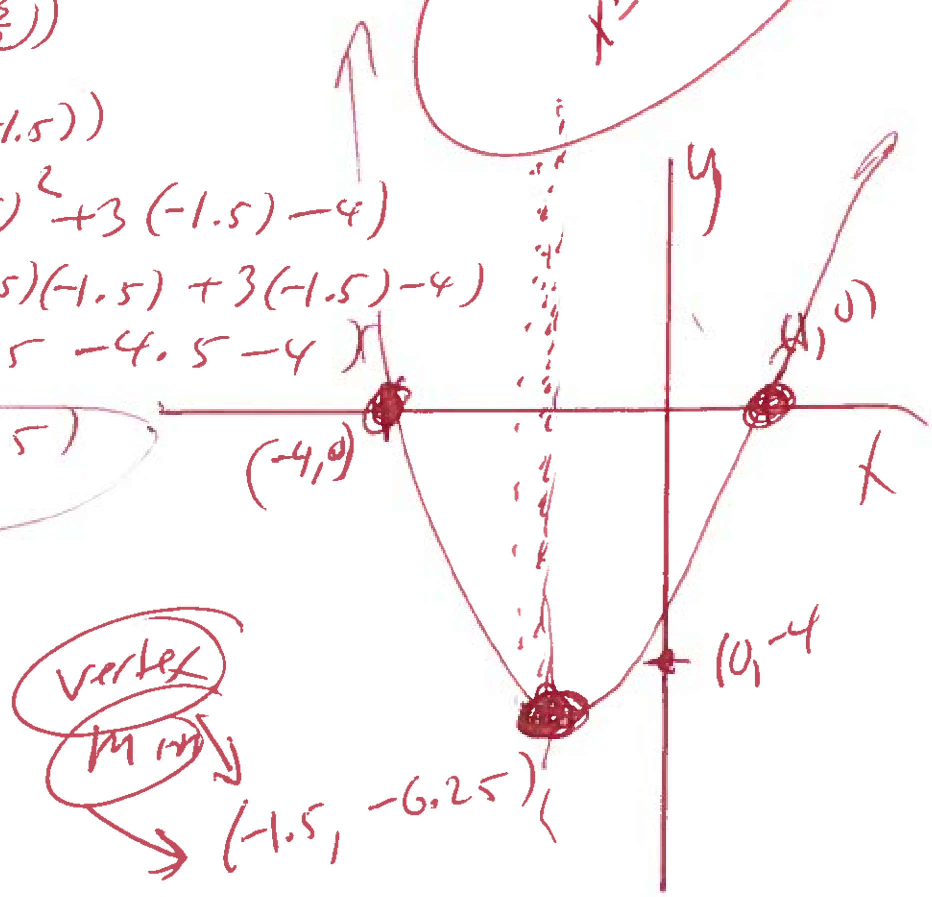
x-intercepts $(-4, 0)$ $(1, 0)$

y-intercept $(0, -4)$

axis $x = -1.5$

$$\text{vertex} = \left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$$
$$= \left(\frac{-(3)}{2(1)}, f\left(\frac{-(3)}{2(1)}\right)\right)$$
$$= \left(\frac{-3}{2}, f\left(\frac{-3}{2}\right)\right)$$
$$= (-1.5, f(-1.5))$$
$$= (-1.5, (-1.5)^2 + 3(-1.5) - 4)$$
$$= (-1.5), (-1.5)(-1.5) + 3(-1.5) - 4)$$
$$= (-1.5, 2.25 - 4.5 - 4)$$

Vertex $= (-1.5, -6.25)$



(15.) graph

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

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

use a graphing calculator

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

$a = -1, \; b = 2, \; c = 8$

x-intercepts $(-2, 0)$ and $(4, 0)$

y intercept $(0, 8)$

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

vertex $= \left(\frac{-(2)}{2(-1)}, f\left(\frac{-(2)}{2(-1)}\right)\right)$

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

vertex $= (1, f(1))$

vertex $= (1, -(1)^2 + 2(1) + 8)$

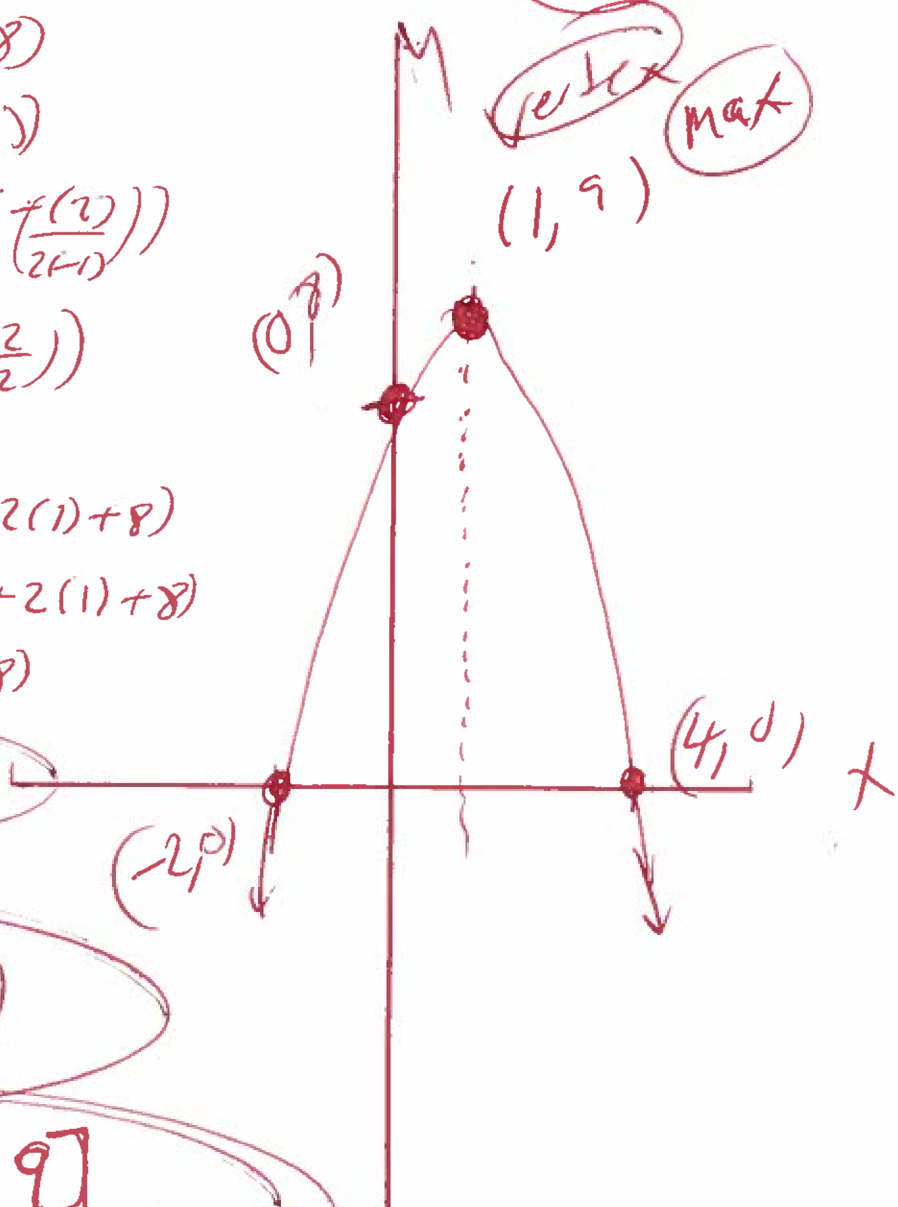
vertex $= (1, -(1)(1) + 2(1) + 8)$

vertex $= (1, -1 + 2 + 8)$

vertex $= (1, 9)$

(15.)

axis $x = 1$



Domain $(-\infty, \infty)$

Range $(-\infty, 9]$

16. Solve $1x^3+2x^2-5x-6=0$ given that 2 is a zero

16

Yes

$$
\begin{array}{r|rrrr}
2 & 1 & 2 & -5 & -6 \\
  &   & 2 & 8 & 6 \\
\hline
  & 1 & 4 & 3 & 0
\end{array}
$$

rem

use synthetic division

$x^2+4x+3=0$

$(x+1)(x+3)=0$

so that $x+1=0$ OR $x+3=0$

$x+1-1=0-1$ OR $x+\cancel{3}-\cancel{3}=0-3$

$x=-1$ or $x=-3$

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

17.

$1x^3-2x^2-9x+18=0$

$\frac{\text{Last}}{\text{First}}=\frac{\pm 18}{\pm 1}$

17

possible rational roots

$\pm 18, \pm 9, \pm 6, \pm 3, \pm 2, \pm 1$

yes

use synthetic division

$$\begin{array}{c|cccc} 2 & 1 & -2 & -9 & 18 \\ & & 2 & 0 & -18 \\ \hline & 1 & 0 & -9 & 0 \end{array}$$

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

$x^2-9=0$

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

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

formula

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

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

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

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

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

(18.) Solve

$6x^3+37x^2-34x+7=0$

(18.)

possible rational roots

$\pm \frac{\text{Last}}{\text{First}} = \frac{\pm(7)}{(6)} = \frac{\pm 7, \pm 1}{\pm 6, \pm 3, \pm 2, \pm 1}$

$\frac{\pm 1}{1}, \frac{\pm 7}{1}, \pm\frac{1}{2}, \pm\frac{7}{2}, \pm\frac{1}{3}, \pm\frac{7}{3}, \pm\frac{1}{6}, \pm\frac{7}{6}$

use synthetic division

$$\begin{array}{r|rrrr} -7 & 6 & 37 & -34 & 7 \\ & & -42 & 35 & -7 \\ \hline & 6 & -5 & 1 & 0 \end{array}$$

0 rem

$6x^2-5x+1=0$ possible 6, 1 / 2, 3 — 1, 1

$(2x-1)(3x-1)=0$ factor

set $2x-1=0$ OR $3x-1=0$

$2x-\cancel{1}+\cancel{1}=0+1$ OR $3x-\cancel{1}+\cancel{1}=0+1$

$2x=1$ OR $3x=1$

$\frac{2x}{2}=\frac{1}{2}$ OR $\frac{3x}{3}=\frac{1}{3}$

$x=1/2$ $x=1/3$

$\left\{-7, \frac{1}{2}, \frac{1}{3}\right\}$

(19) Find the vertical asymptote(s)

19.

$$f(x) = \frac{x-7}{x^2-12x+35}$$

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

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

hole at $x-7=0$

$x\cancel{-7+7} = 0+7$

$x=7$

set $x-5=0$

$x\cancel{-5+5} = 0+5$

$x=5$

Vertical asymptote $x=5$

hole at $x=7$

20. Find the horizontal asymptote

$$f(x) = \frac{16x}{9x^2+7}$$

$$\lim_{x \to \infty} \frac{16x}{9x^2} =$$

$$\lim_{x \to \infty} \frac{16}{9x} =$$

$$\lim_{x \to \infty} \frac{16}{9x} = 0$$

horizontal asymptote

$y = 0$

20

21. Find the horizontal asymptote

21.

$$g(x) = \frac{36x^2}{9x^2+1}$$

$$y = HA = \frac{36x^2}{9x^2}$$

$$y = HA = \frac{36}{9}$$ simplify

$$y = HA = 4$$ simplify

~~horizontal~~ asymptote

$$y = 4$$

22. Find the domain

$f(x) = \log(7-x)$

set $7 - x > 0$

$\cancel{7} - x - \cancel{7} > 0 - 7$

$-x > -7$

$\frac{-x}{-1} < \frac{-7}{-1}$

Turn the alligator around since you divide by a negative

$x < 7$

$(-\infty, 7)$

formula 22

Domain

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

set $Ax + B \geq 0$ only

23 Expand

23

$$\log_b\left(\frac{x^3y}{z^2}\right) =$$

$$\log_b(x^3y) - \log_b(z^2) =$$

$$\log_b(x^3) + \log_b(y) - \log_b(z^2) =$$

$$3\log_b(x) + \log_b(y) - 2\log_b(z) =$$

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

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

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

24. expand

24

$$\ln\left(\frac{x^8\sqrt{x^2+4}}{(x+4)^5}\right) =$$

$$\ln\left(x^8\sqrt{x^2+4}\right) - \ln(x+4)^5 =$$

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

$$\ln(x^8) + \ln(x^2+4)^{1/2} - \ln(x+4)^5 =$$

$$8\ln(x) + \frac{1}{2}\ln(x^2+4) - 5\ln(x+4) =$$

formulas

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

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

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

25.

$$4^{x+8} = 32^{x-4}$$

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

$$\cancel{2}^{2x+16} = \cancel{2}^{5x-20}$$

$$2x+16 = 5x-20$$

$$2x+\cancel{16}-\cancel{16} = 5x-20-16$$

$$2x = 5x-36$$

$$2x-5x = \cancel{5x}-36-\cancel{5x}$$

$$-3x = -36$$

$$\frac{-\cancel{3}x}{-\cancel{3}} = \frac{-36}{-3}$$

$$x = 12$$

25

formula

If $\cancel{b}^x = \cancel{b}^y$

then $x = y$

26

$$2e^{2x} = 580$$

$$\frac{\cancel{2}e^{2x}}{\cancel{2}} = \frac{580}{2}$$

$$e^{2x} = 290$$

$$\ln(e^{2x}) = \ln(290)$$

$$2x\ln(e) = \ln(290)$$

$$2x(1) = \ln(290)$$

$$2x = \ln(290)$$

$$\frac{2x}{2} = \frac{\ln(290)}{2}$$

$$x = \frac{\ln(290)}{2}$$

or

$$x = 2.834940461$$

or

$$x = 2.83$$

Round

26

Formula

$\ln(e) = 1$

27. $7^{x-3} = 426$

$\ln(7^{x-3}) = \ln(426)$

$(x-3)\ln(7) = \ln(426)$

$$\frac{(x-3)\cancel{\ln(7)}}{\cancel{\ln(7)}} = \frac{\ln(426)}{\ln(7)}$$

$$x-3 = \frac{\ln(426)}{\ln(7)}$$

$$x\cancel{-3}\cancel{+3} = \frac{\ln(426)}{\ln(7)} + 3$$

$$x = \frac{\ln(426)}{\ln(7)} + 3$$

OR

$x = 6.111366344$

OR

$x \cong 6.11$ Round

27.

formula

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

(28) $\log_8(x) + \log_8(7x-1) = 1$

Formula

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

(28)

$\log_8 (x)(7x-1) = 1$

$8^1 = (x)(7x-1)$

possible

$7 \cdot 1$

$8 \cdot 1$
$2 \cdot 4$

$8 = 7x^2 - x$

$0 = 7x^2 - x - 8$

$0 = (7x-8)(x+1)$

set $7x - 8 = 0$ or $x + 1 = 0$

$7x - \cancel{8} + \cancel{8} = 0 + 8$ OR $x + \cancel{1} - \cancel{1} = 0 - 1$

$7x = 8$ OR $\cancel{x = -1}$

$\frac{7x}{7} = \frac{8}{7}$

$x = 8/7$ Good

ck

$\log_8\left(\frac{8}{7}\right) + \log_8\left(\cancel{7}\left(\frac{8}{\cancel{7}}\right) - 1\right) = 1$

$\log_8\left(\frac{8}{7}\right) + \log_8(8-1) = 1$

$\log_8\left(\frac{8}{7}\right) + \log_8(7) = 1$

Good Good Good

$\cancel{\log_8(-1) + \log_8(7(-1)-1) = 1}$

BAD

$\left\{\frac{8}{7}\right\}$

(29) $\log_5(x+119)+\log_5(x-1)=4$

$\log_5(x+119)(x-1)=4$

(29)

formula

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

$5^4=(x+119)(x-1)$

$625=x^2-x+119x-119$

$625=x^2+118x-119$

$0=x^2+118x-119-625$

$0=x^2+118-744$

$0=(x-6)(x+124)$

set $x-6=0$ or $x+124=0$

$x-6+6=0+6$ or $x+124-124=0-124$

$x=6$ ✓ or $\cancel{x=-124}$

Good BAD

ck $\log_5(6+119)+\log_5(6-1)=4$

$\log_5(125)+\log_5(5)=4$

Good Good Good

ck $\log_5(-124+119)+\log_5(-124-1)=4$

$\log_5(-5)+\log_5(-125)=4$

BAD BAD

$\{6\}$

30 $\log_4(x+10) - \log_4(x-5) = 2$

$\log_4\left(\frac{x+10}{x-5}\right) = 2$

formula 30

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

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

$16 = \frac{x+10}{x-5}$

$\frac{16}{1} = \frac{x+10}{x-5}$

$16(x-5) = 1(x+10)$ cross mult

$16x - 80 = 1x + 10$

$16x - \cancel{80} + \cancel{80} = 1x + 10 + 80$

$16x = 1x + 90$

$16x - 1x = 1x + 90 - 1x$

$15x = 90$

$\frac{15x}{15} = \frac{90}{15}$

ck $x = 6$ Good

$\log_4(6+10) - \log_4(6-5) = 2$

$\log_4(16) - \log_4(1) = 2$

Good — Good

$\{6\}$

31. $\log(x) + \log(x+2) = \log(15)$

$\cancel{\log}(x)(x+2) = \cancel{\log}(15)$

formula

31.

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

$x(x+2) = 15$

$x^2 + 2x = 15$

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

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

set $x - 3 = 0$ OR $x + 5 = 0$

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

$x = 3$ OR $\cancel{x = -5}$ BAD

Ck

$\log(3) + \log(3+2) = \log(15)$

$\log(3) + \log(5) = \log(15)$ ✓

Good - Good - Good

Ck

$\log(-5) + \log(-5+2) = \log(15)$

$\log(-5) + \log(-3) = \log(15)$

~~BAD~~ ~~BAD~~

$\{3\}$

32

$A = P\left(1+\frac{r}{n}\right)^{nt}$ ← Compound Interest formula

32

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

$$18000 = 14000\left(1+\frac{.07}{4}\right)^{4t}$$

$$\frac{18000}{14000} = \frac{\cancel{14000}\left(1+\frac{.07}{4}\right)^{4t}}{\cancel{14000}}$$

$$\frac{18000}{14000} = \left(1+\frac{.07}{4}\right)^{4t}$$

$$\frac{18000}{14000} = (1+.0175)^{4t}$$

$$\frac{18000}{14000} = (1.0175)^{4t}$$

$$\ln\left(\frac{18000}{14000}\right) = \ln(1.0175)^{4t}$$

$$\ln\left(\frac{18000}{14000}\right) = 4t\ln(1.0175)$$

$$\frac{\ln\left(\frac{18000}{14000}\right)}{(4\ln(1.0175))} = \frac{\cancel{4}t\,\cancel{\ln(1.0175)}}{(\cancel{4\ln(1.0175)})}$$

$$3.62152959 = t$$

OR

$$3.6 = t$$

round

33

$$A = Pe^{rt}$$

$$19000 = 9500e^{.11t}$$

$$\frac{19000}{9500} = \frac{\cancel{9500}e^{.11t}}{\cancel{9500}}$$

$$2 = e^{.11t}$$

$$\ln(2) = \ln(e^{.11t})$$

$$\ln(2) = .11t\ln(e)$$

$$\ln(2) = .11t(1)$$

$$\ln(2) = .11t$$

$$\frac{\ln(2)}{.11} = \frac{\cancel{.11}t}{\cancel{.11}}$$

$$\frac{\ln(2)}{.11} = t$$

$$6.301338005 = t$$

OR

Round

$$6.3 = t$$

33

formula

$\ln(e) = 1$

34.

Solve

$$x+y+6z=14$$
$$x+y+2z=6$$
$$x-2y+5z=15$$

34.

use a graphing calculator

2ND, matrix, Edit, [A], enter, 3 X 4

$$[A]=\begin{bmatrix} 1 & 1 & 6 & 14 \\ 1 & 1 & 2 & 6 \\ 1 & -2 & 5 & 15 \end{bmatrix}$$

2ND Quit

2ND, matrix, math, rref( ), enter

rref([A]) =

2ND matrix

rref([A]) =

$$\begin{array}{cc} \begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 2 \end{bmatrix} & \begin{matrix} x \\ y \\ z \end{matrix} \end{array}$$

$$(x, y, z) = (3, -1, 2)$$

35.

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

35.

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

$130 =$

OR use graphing calculator

Math, summation

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

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

graphic boxes

$130 =$

(36) Expand use graphing calculator (Math, PRB, nCr) 36

$(7x+y)^3$

${}_3C_0(7x)^3(y)^0 + {}_3C_1(7x)^2(y)^1 + {}_3C_2(7x)^1(y)^2 + {}_3C_3(7x)^0(y)^3 =$

$(1)(7x)^3(1) + (3)(7x)^2(y) + (3)(7x)(y)^2 + (1)(1)(y)^3 =$

$(1)(7^3x^3)(1) + (3)(7^2x^2)(y) + (3)(7x)(y^2) + (1)(1)(y^3) =$

$(1)(7\cdot7\cdot7x^3)(1) + (3)(7\cdot7x^2)(y) + (3)(7x)(y^2) + (1)(1)(y^3) =$

$(1)(343x^3)(1) + (3)(49x^2)(y) + (3)(7x)(y^2) + (1)(1)(y^3) =$

$343x^3 + 147x^2y + 21xy^2 + y^3$

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

37

$(5x-3)^3$

37

${}_3C_0(5x)^3(-3)^0 + {}_3C_1(5x)^2(-3)^1 + {}_3C_2(5x)^1(-3)^2 + {}_3C_3(5x)^0(-3)^3 =$

$(1)(5^3x^3)(1) + (3)(5^2x^2)(-3) + (3)(5x)(9) + (1)(1)(-27) =$

$(1)(125x^3)(1) + (3)(25x^2)(-3) + (3)(5x)(9) + (1)(1)(-27)$

$125x^3 - 225x^2 + 135x - 27$

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

38. Find the 1st three terms 28

$(x+4)^9$

$${}_9C_0(x)^9(4)^0 + {}_9C_1(x)^8(4)^1 + {}_9C_2(x)^7(4)^2 =$$

$$(1)(x^9)(1)+(9)(x^8)(4)+(36)(x^7)(16)=$$

$$x^9+36x^8+576x^7=$$

Use Graphing Calculator

9, Math, Prb, nCr, enter, 0, enter = 1

9, Math, Prb, nCr, enter, 1, enter = 9

9, Math, Prb, nCr, enter, 2, enter = 36

39 Write the 1st three terms 39

$(x-3y)^7 =$

${}_7C_0 (x)^7(-3y)^0 + {}_7C_1 (x)^6(-3y)^1 + {}_7C_2 (x)^5(-3y)^2 =$

$(1)(x^7)(1) + (7)(x^6)(-3y) + (21)(x^5)(-3y)(-3y) =$

$(1)(x^7)(1) + (7)(x^6)(-3y) + (21)(x^5)(9y^2) =$

$x^7 - 21x^6 + 189x^5y^2 =$

use graphing calculator

7, Math, Prb, nCr, enter, 0, enter = 1

7, Math, Prb, nCr, enter, 1, enter = 9

7, Math, Prb, nCr, enter, 2, enter = 36