% equation:

is → equals

of → multiplication

What → Variable

!!

Cost before * % tip = tip

Cost before + tip = Cost after

اللهمّ يا من لا يصعب عليه
شيء أعِنّي على الدراسة
وبارك لي في وقتي
وجهدي، وقوّتي

$x+ax-b=0$	$x-ax-b=0$
$(x+a)(x-b)$	$(x-a)(x+b)$
$x+ax+b=0$	$x-ax+b=0$
$(x+a)(x+b)$	$(x-a)(x-b)$

and ∩ Intersection → الجزء المشترك فقط

or ∪ Union → كل المساحة المظللة

Interval notation → [ ], ( ) → $[2,\infty)$

Inequality statement → $\leq, \geq, <, >$ → $x \geq 2$

Quadratic formula

$$x = \frac{-b \pm \sqrt{(b)^2-4(a)(c)}}{2(a)}$$

Key words

$<$	$>$	$\leq$	$\geq$
• Less than • lower than • fewer than	• greater than • more than • exceed	• less than or equal to • no more than • not to exceed • at most	• greater than or equal to • no less than • at least

x is between a and b :

$a < x < b$

smaller num ↙ ↘ bigger num

Exponent Rules/Laws

Product Rule	$a^m \times a^n = a^{m+n}$
Quotient Rule	$a^m \div a^n = a^{m-n}$
Power of a Power Rule	$(a^m)^n = a^{mn}$
Power of a Product Rule	$(ab)^m = a^m b^m$
Power of a Quotient Rule	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$
Zero Exponent Rule	$a^0 = 1$
Negative Exponent Rule	$a^{-m} = \frac{1}{a^m}$
Fractional Exponent Rule	$a^{\frac{m}{n}} = \sqrt[n]{a^m}$

Rational Exponents
(Fractional Exponents)

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

$$a^{\frac{m}{n}} = \left(\sqrt[n]{a}\right)^m \text{ or } \sqrt[n]{(a^m)}$$

even: $-*^2 = +*^2$

odd: $-*^3 = -*^3$

Solve: $-3(3x-8)=3x$

$-9x+24=3x$

$24=3x+9x$

$24=12x$

$2=x$

$\therefore x=2$

Solve: $-5(x-2)-20=-10$

$-5x+10-20=-10$

$-5x-10=-10$

$-5x=-10+10$

$-5x=0$

$x=0$

$\therefore x=0$

Solve for h: $f=12gh$

$f=12gh$

$\frac{f}{12g}=h$

$\therefore h=\frac{f}{12g}$

Solve for r: $A=P+Prt$

$A-P=Prt$

$\frac{A-P}{Pt}=r$

$\therefore r=\frac{A-P}{Pt}$

Solve, round amount to one decimal place.

* The number 40 is 80% of what number?

$40=80\%\cdot x$

$40=(0.8)x$

$x=\frac{40}{0.8}$

$\therefore x=50$

is → =

of → multiplication

What → x

* The number 276 is what percent of 460?

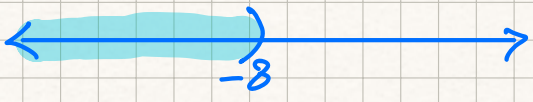
$276=x\%\cdot 460$

$x=\left(\frac{276}{460}\right)100$

$x=60\%$

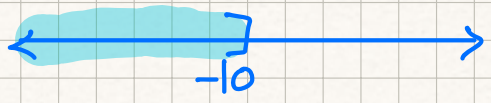
Graph, then write the statement.

* $(-\infty, -8)$ → Interval notation



$X < -8$ → Inequality statement

* $X \leq -10$ → Inequality statement



$(-\infty, -10]$ → Interval notation

* $5X - 3 \leq 7X - 3X$

$5X - 3 \leq 4X$

$5X - 4X \leq 3$

$X \leq 3$

$(-\infty, 3]$

Find the domain and the range:

$\{(-6, -9), (0, -3), (-4, -2), (-2, -4)\}$

the domain is $\{-6, 0, -4, -2\}$

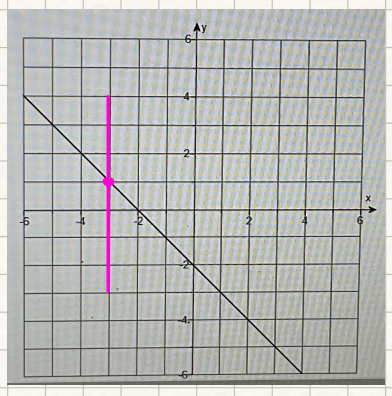
the range is $\{-9, -3, -2, -4\}$

$\{(10, 2), (1, 2), (2, 2)\}$

the domain is $\{10, 1, 2\}$

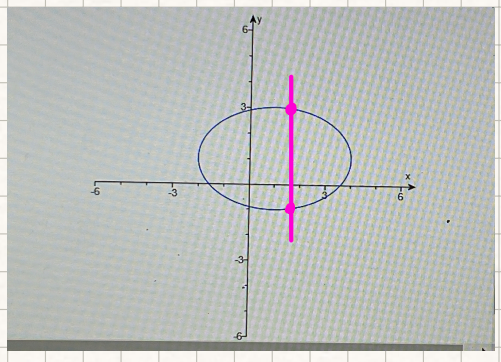
the range is $\{2\}$

Determine whether the graph is a graph of a function.



yes, VL crosses one point.

Determine whether the graph is a graph of a function.



No, VL crosses more than one point.

Find the domain: $h(x) = \frac{1}{x+8}$, in interval notation.

$x + 8 \neq 0$

$x \neq -8$

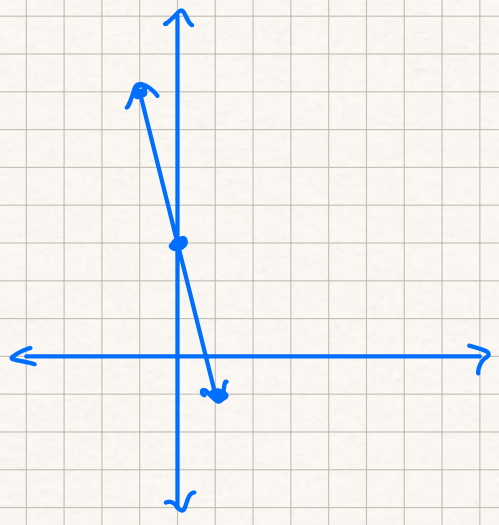
نوجد اصفار المقام.

$(-\infty, -8) \cup (-8, \infty)$ → interval notation.

Find three ordered pair solutions by completing the table. Then use the ordered pairs to graph the equation.

$y = -4x + 3$

x	y
-1	7
0	3
1	-1



$y = -4(-1) + 3 = 7$

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

$y = -4(1) + 3 = -1$

Find three ordered pair solutions by completing the table. Then use the ordered pairs to graph the equation.

$5x + 9y = 0$

$9y = -5x$

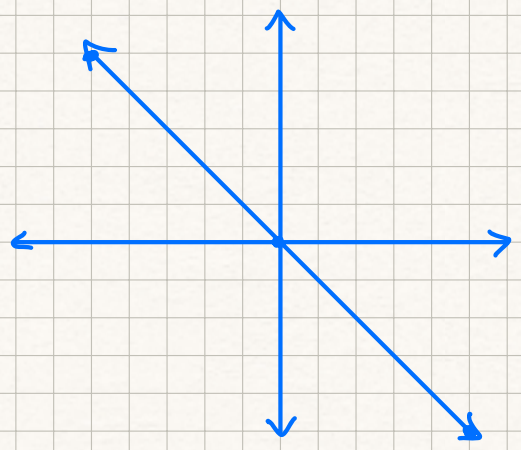
$y = \frac{-5}{9}x$

$y = \frac{-5}{9}(-9) = 5$

$y = \frac{-5}{9}(0) = 0$

$y = -\frac{5}{9}(9) = -5$

x	y
-9	5
0	0
9	-5



Simplify: $(4m^7)^3 \rightarrow 4^3 \cdot m^{7 \cdot 3}$

$= 64\, m^{21}$

$\left(\frac{mp}{n}\right)^{12} \rightarrow \frac{m^{12}p^{12}}{n^{12}}$

Find the degree, determine whether it is a monomial, binomial or none.

$2x + 9$

1, Binomial.

$7m^4 - 2m^3 + 8m - 6$

4, None of these.

Find $p(6)$, $p(x) = x^2 + x + 4$, $Q(x) = 8x^2 - 4$

$p(6) = 6^2 + 6 + 4$

$= 46$

Simplify: $(6x-6)+(-6x^2-6x-11)$

$6x-6-6x^2-6x-11$

$-6x^2-17$

* $(4x^2+9)-(2x^2-5)$

$4x^2+9-2x^2+5$

$2x^2+14$

* $-2a^2(3a^2-2a+3)$

$-6a^4+4a^3-6a^2$

* $(x+3)(x+7)$

$x^2+7x+3x+21$

$x^2+10x+21$

* $(6a-5)^2$

$(6a-5)(6a-5)$

$36a^2-30a-30a+25$

$36a^2-60a+25$

* $(4x-1)(4x+1)$

$16x^2+4x-4x-1$

$16x^2-1$

* $\frac{1}{p^{-18}} = p^{18}$

* $\frac{p^{-6}}{q^{-4}} = \frac{q^4}{p^6}$

* $\frac{z^{-3}}{z^{-8}} = \frac{z^8}{z^3} = z^5$

* $\frac{5x^7}{x^5} = 5x^2$

Factor: $8x+16 = 8(x+2)$

* $40y^6+5y^2 = 5y^2(8y^4+1)$

* $x^2-13x+42$

$(x-7)(x-6)$

* $x^2-3x-40$

$(x-8)(x+5)$

* $x^2+11x+7$

prime → Can not be factoring

* $3x^3-21x^2+36x$

$3x(x^2-7x+12)$

$3x(x-3)(x-4)$

* $49x^2-56x+16$ → perfect square trinomial

$7x$ $7x$ 4 4

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

* $81x^2-1$

$(9x-1)(9x+1)$

Solve : $x(x+9)=0$

Solve ← يعني لازم نطلع قيم x .

$\therefore x = 0, -9$

* $9x(x-6)=0$

$9x=0 \rightarrow x=0$

$x-6=0 \rightarrow x=6$

$x = 0, 6$

* $(7x+9)(3x-8)=0$

$7x+9=0 \rightarrow 7x=-9 \rightarrow x = -9/7$

$3x-8=0 \rightarrow 3x=8 \rightarrow x = 8/3$

$x = -9/7, 8/3$

* $x^2+3x-28=0$

$(x+7)(x-4)$

$x=-7, 4$

* $x^2-3x=40$

$x^2-3x-40=0$

$(x-8)(x+5)$

$x=8, -5$

Find the domain: $f(x)=\frac{7x}{9-x}$

$9-x \neq 0 \rightarrow 9 \neq x$

* نطلع اصفار المقام .

$\therefore \{x \mid x \text{ is a real number and } x \neq 9\}$

$f(x)=\frac{2x}{3x-1}$

$3x-1 \neq 0 \rightarrow 3x \neq 1 \rightarrow x \neq 1/3$

$\therefore \{x \mid x \text{ is a real number and } x \neq 1/3\}$

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

$x^2-25 \rightarrow (x-5)(x+5) \neq 0$

$x-5 \neq 0$ or $x+5 \neq 0$

$x \neq 5$ or $x \neq -5$

$\therefore \{x \mid x \text{ is a real number and } x \neq 5, -5\}$

Simplify: $\frac{15x}{3} \cdot \frac{x^7}{5x^5}$

$= \frac{\cancel{5}x}{\cancel{5}} \cdot x^2 = x^3$

$\frac{x}{11x-44} \cdot \frac{x^2-4x}{5} = \frac{x}{11(x-4)} \cdot \frac{x(x-4)}{5} = \frac{x}{11} \cdot \frac{x}{5} = \frac{x^2}{55}$

$\frac{x^2-64}{x^2-6x-16} \cdot \frac{x+2}{x} = \frac{(x-8)(x+8)}{(x-8)(x+2)} \cdot \frac{x+2}{x} = \frac{x+8}{x}$

$\frac{7y^6}{2y^7} \div \frac{21y^2}{4y^5} = \frac{7y^6}{2y^7} \times \frac{4y^5}{21y^2} \quad \frac{y^4}{1} \cdot \frac{2y^{-2}}{3} = \frac{2y^4}{3y^2} = \frac{2}{3}y^2$

$\frac{x^2+9x+20}{x-2} \div \frac{x^2+3x-4}{x-2} = \frac{x^2+9x+20}{x-2} \cdot \frac{x-2}{x^2+3x-4} = \frac{(x+5)(x+4)}{x-2} \cdot \frac{x-2}{(x+4)(x-1)} = \frac{x+5}{x-1}$

$\frac{5a}{a^2+7a-8} - \frac{5}{a^2+7a-8} = \frac{5a}{(a+8)(a-1)} - \frac{5}{(a+8)(a-1)} = \frac{5a-5}{(a+8)(a-1)} = \frac{5(a-1)}{(a+8)(a-1)}$

$\therefore \frac{5}{a+8}$

$$\frac{-5x^2}{x+2} - \frac{4-6x^2}{x+2} = \frac{-5x^2-4+6x^2}{x+2} = \frac{x^2-4}{x+2} = \frac{(x-2)(x+2)}{x+2}$$

$\therefore x-2$

$$\frac{6x+5}{x-1} - \frac{2x+9}{x-1} = \frac{6x+5-2x-9}{x-1} = \frac{4x-4}{x-1} = \frac{4(x-1)}{x-1} = 4$$

$$\sqrt[4]{a^{28}b^{20}} = a^{\frac{28}{4}} b^{\frac{20}{4}} = a^7 \cdot b^5$$

$$(7x+3)^{\frac{5}{6}} = \sqrt[6]{(7x+3)^5}$$

Use quadratic formula.

$$x = \frac{-b \pm \sqrt{(b)^2-4(a)(c)}}{2(a)}$$ ← use

★ $x^2+12x+36=0$

$a=1 \quad b=12 \quad c=36$

$$x = \frac{-12 \pm \sqrt{(12)^2-4(1)(36)}}{2(1)}$$

$$= \frac{-12 \pm \sqrt{144-144}}{2} = \frac{-12}{2} = -6$$

★ $3m^2-7m=5 \rightarrow 3m^2-7m-5=0$

$a=3 \quad b=-7 \quad c=-5$

$$x = \frac{7 \pm \sqrt{(-7)^2-4(3)(-5)}}{2(3)} = \frac{7 \pm \sqrt{49+60}}{6} = \frac{7 \pm \sqrt{109}}{6}$$