M0320 Brick 334 Step
03-07-19

(1) $-7x \le 35$

$\frac{-7x}{-7} \ge \frac{35}{-7}$ divide by a negative turn alligator around

$x \ge -5$

$[5, \infty)$

(2) $h(x) = 5x^2 + 1$

$h(-3) = 5(-3)^2 + 1$

$h(-3) = 5(-3)(-3) + 1$

$h(-3) = 5(9) + 1$

$h(-3) = 45 + 1$

$h(-3) = 46$

$h(0) = 5(0)^2 + 1$

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

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

$h(0) = 0 + 1$

$h(0) = 1$

$h(5) = 5(5)^2 + 1$

$h(5) = 5(5)(5) + 1$

$h(5) = 5(25) + 1$

$h(5) = 125 + 1$

$h(5) = 126$

3. $2x+3y=-1$

$3x-3y=6$

$5x+0=5$

$5x=5$

$\frac{5x}{5}=\frac{5}{5}$

$x=1$ Subs

$2(1)+3y=-1$

$2+3y=-1$

$2+3y-2=-1-2$

$3y=-3$

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

$y=-1$

$(x, y)=(1, -1)$

(4) $x+3y=5$

$5x+2y=-14$

$\begin{matrix} x+3y=5 \\ 5x+2y=-14 \end{matrix}\begin{pmatrix} -2 \\ 3 \end{pmatrix}$ Mult

$-2x-6y=-10$

$15x+6y=-42$

$13x+0=-52$

$13x=-52$

$\frac{13x}{13}=\frac{-52}{13}$

$x=-4$

Subst

$x+3y=5$

$(-4)+3y=5$

$-4+3y=5$

$-4+3y+4=5+4$

$3y=9$

$\frac{3y}{3}=\frac{9}{3}$

$y=3$

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

5. $(6x^2+13x+10) \div (x+1) =$

$$\frac{6x^2+13x+10}{x+1} =$$

Could use Synthetic division

-1 | 6 13 10

-6 -7

6 7 3 rem

$$6x+7+\frac{3}{x+1}$$

6. Factor GCF

$3x+12 =$

$3(x+4) =$

7. Factor

$x^2 - 11x + 30$

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

Possible
30.1
15.2
10.3
6.5

Check

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

$x^2 - 6x - 5x + 30 =$

$x^2 - 11x + 30 =$

Good

8. $6t - 55 + t^2 =$

$t^2 + 6t - 55 =$ rewrite

$(t-5)(t+11) =$

Possible
55.1
5.11

Check

$(t-5)(t+11) =$

$t^2 + 11t - 5t - 55 =$

$t^2 + 6t - 55 =$

Good

9. factor

$12x^3 - 15x^2 - 18x =$

$3x(4x^2 - 5x - 6) =$

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

4·1
2·2

6·1
2·3

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10. factor

formula

$a^2 - b^2 =$

$(a+b)(a-b)$

$100x^2 - 81y^2 =$

$(10x)^2 - (9y)^2 =$

$(10x+9y)(10x-9y) =$

11. Solve

$(8x+9)(3x-5)=0$

Let $8x+9=0$ OR $3x-5=0$

$8x+9-9=0-9$ OR $3x-5+5=0+5$

$8x=-9$ OR $3x=5$

$\frac{8x}{8}=\frac{-9}{8}$ OR $\frac{3x}{3}=\frac{5}{3}$

$x=-\frac{9}{8}$ OR $x=\frac{5}{3}$

12. Solve

$x^2+2x-35=0$

$(x-5)(x+7)=0$

Possible
3.5, 1
7.5

Let $x-5=0$ OR $x+7=0$

$x-5+5=0+5$ OR $x+7-7=0-7$

$x=5$ OR $x=-7$

(13) Solve

$x^3 - 10x^2 + 21x = 0$

Possible
21, 1
3, 7

$x(x^2 - 10x + 21) = 0$

$x(x-3)(x-7) = 0$

Let $x = 0$ OR $x - 3 = 0$ OR $x - 7 = 0$

OR $x - 3 + 3 = 0 + 3$ OR $x - 7 + 7 = 0 + 7$

$x = 3$ or $x = 7$

(19) Solve

$5x^2 - 9x - 18 = 0$

Possible
5, 7
18, 1
9, 2
6, 3

$(5x + 6)(x - 3) = 0$

Let $5x + 6 = 0$ OR $x - 3 = 0$

$5x + 6 - 6 = 0 - 6$ OR $x - 3 + 3 = 0 + 3$

$5x = -6$ OR $x = 3$

$\frac{5x}{5} = \frac{-6}{5}$

$x = \frac{-6}{5}$

(15) $\frac{-3x-3y}{x+y} =$ Simplify

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

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

$-3 =$

(16) $\frac{x}{5x-40} \cdot \frac{x^2-8x}{5} =$ Simplify

$\frac{x}{5(x-8)} \cdot \frac{x(x-8)}{5} =$

$\frac{x}{5(x-8)} \cdot \frac{x(x-8)}{5} =$

$\frac{x^2}{25} =$

(17) $\frac{x^2+10x+9}{x-8} \div \frac{x^2-2x-3}{x-8} =$ Simplify

$\frac{x^2+10x+9}{x-8} \cdot \frac{x-8}{x^2-2x-3} =$ rewrite

$\frac{(x+1)(x+9)}{(x-8)} \cdot \frac{(x-8)}{(x+1)(x-3)} =$

$\frac{\cancel{(x+1)}(x+9)}{\cancel{(x-8)}} \cdot \frac{\cancel{(x-8)}}{\cancel{(x+1)}(x-3)} =$

$\frac{x+9}{x-3} =$

(18) $\frac{7}{3+y} + \frac{y+2}{3+y} =$

$\frac{(7)+(y+2)}{3+y} =$

$\frac{7+y+2}{3+y} =$

$\frac{y+9}{3+y} =$

(19) $f(x) = -2x + 3$

$f(0) = -2(0) + 3$

$f(0) = 0 + 3$

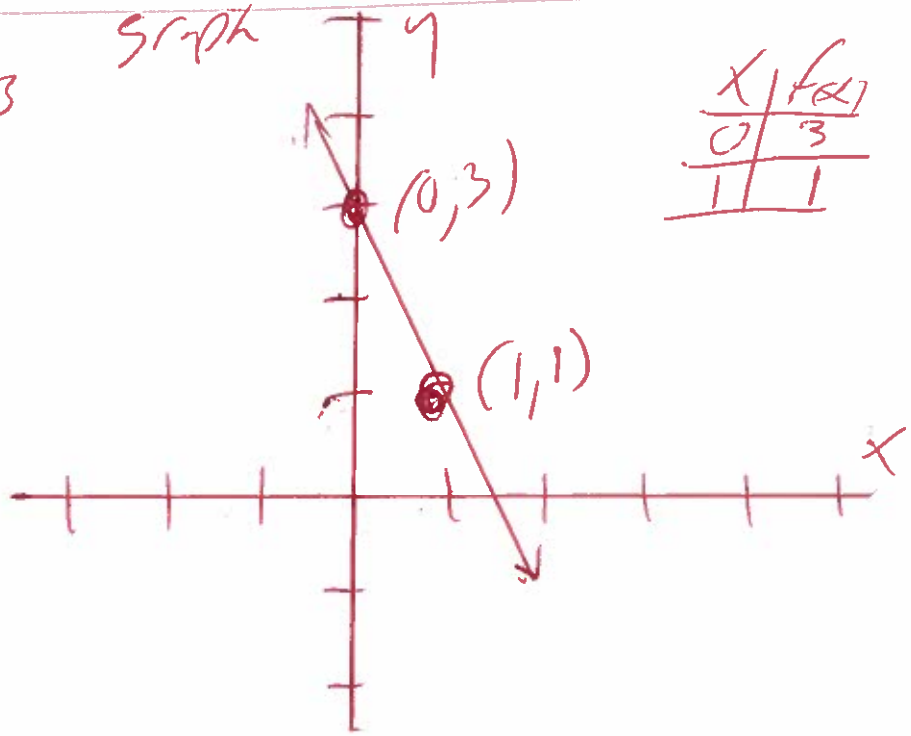
$f(0) = 3$

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

$f(1) = -2 + 3$

$f(1) = 1$

Graph



x	f(x)
0	3
1	1

Solve

(20.) $|2x - 1| = 15$

Formula
$|x| = a$
$x = -a$ or $x = a$

$2x - 1 = -15$ or $2x - 1 = 15$

$2x - 1 + 1 = -15 + 1$ or $2x - 1 + 1 = 15 + 1$

$2x = -14$ or $2x = 16$

$\frac{2x}{2} = \frac{-14}{2}$ or $\frac{2x}{2} = \frac{16}{2}$

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

Solve

(21.) $|x-9|<7$

Formula
$|x|<a$
$-a<x<a$

$-7<x-9<7$

$-7+9<x-9+9<7+9$

$2<x<16$

$(2, 16)$

Solve

(22.) $|x+4|\geq 13$

Formula
$|x|>a$
$x<-a$ or $x>a$

set

$x+4\leq -13$ or $x+4\geq 13$

$x+4-4\leq -13-4$ or $x+4-4\geq 13-4$

$x\leq -17$ or $x\geq 9$

$(-\infty, -17] \cup [9, \infty)$

(23) $\sqrt{25a^{10}b^{36}} =$

$\sqrt[2]{25a^{10}b^{36}} =$

$5a^{\frac{10}{2}}b^{\frac{36}{2}} =$

$5a^5b^{18} =$

(29) $81^{\frac{5}{4}} =$

Primes 2, 3, 5, 7, 11, 13, ...

3 | 81
3 | 27
3 | 9
3 | 3
1

$(3^4)^{\frac{5}{4}} =$

$(3^{\frac{4}{1}})^{\frac{5}{4}} =$

$3^{(\frac{4}{1})(\frac{5}{4})} =$

$3^{\frac{20}{4}} =$

$3^5 =$

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 =$

$9 \cdot 3 \cdot 3 \cdot 3 =$

$27 \cdot 3 \cdot 3 =$

$81 \cdot 3 =$

$243 =$

Simplify

(25) $\sqrt{150} =$

$\sqrt{25 \cdot 6} =$

$\sqrt{25}\sqrt{6} =$

$5\sqrt{6} =$

Primes 2, 3, 5, 7, 11, 13 ...

2 | 150
3 | 75
5 | 25
5 | 5
1

Solve

(26) $\sqrt{x-13} = 5$

$(\sqrt{x-13})^2 = (5)^2$

$x - 13 = 25$

$x - 13 + 13 = 25 + 13$

$x = 38$ Check

$\sqrt{x-13} = 5$

$\sqrt{38-13} = 5$

$\sqrt{25} = 5$

$5 = 5$

Good

(27) $(8+9i)-(9-3i)=$

$8+9i-9+3i=$

$-1+12i=$

(28) $(2+7i)(7+i)=$

$14+2i+49i+7i^2=$

$14+51i+7i^2=$

$14+51i+7(-1)=$

$14+51i-7=$

$7+51i=$

Formula

$i^2=-1$

29) $\frac{7-8i}{7+i} =$

$\left(\frac{7-8i}{7+i}\right)\left(\frac{7-i}{7-i}\right) =$ Mult

$\frac{49 - 7i - 56i + 8i^2}{49 - 7i + 7i - i^2} =$

formula $i^2 = -1$

$\frac{49 - 63i + 8i^2}{49 - i^2} =$

$\frac{49 - 63i + 8(-1)}{49 - (-1)} =$

$\frac{49 - 63i - 8}{49 + 1} =$

$\frac{41 - 63i}{50} =$

$\frac{41}{50} - \frac{63}{50}i =$

30. $(x+4)^2 = 16$

$\sqrt{(x+4)^2} = \pm\sqrt{16}$

$x+4 = \pm 4$

$x+4 = -4$ OR $x+4 = 4$

$x+4-4 = -4-4$ OR $x+4-4 = 4-4$

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

Check

$(x+4)^2 = 16$

$(-8+4)^2 = 16$

$(-4)^2 = 16$

$(-4)(-4) = 16$

$16 = 16$

Good

$(x+4)^2 = 16$

$(0+4)^2 = 16$

$(4)^2 = 16$

$(4)(4) = 16$

$16 = 16$

Good

(31) $m^2+3m+2=0$

Possible 1 or 2

$(m+1)(m+2)=0$

LA $m+1=0$ OR $m+2=0$

$m+1-1=0-1$ OR $m+2-2=0-2$

$m=-1$ OR $m=-2$

Use Quad formula

$1m^2+3m+2=0$

$a=1,\ b=3,\ c=2$

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

$$m=\frac{-(3)\pm\sqrt{(3)^2-4(1)(2)}}{2(1)}$$

$$m=\frac{-3\pm\sqrt{9-8}}{2}$$

$$m=\frac{-3\pm\sqrt{1}}{2}$$

$$m=\frac{-3\pm1}{2}$$

$m=\frac{-3+1}{2}$ OR $m=\frac{-3-1}{2}$

$m=\frac{-2}{2}$ OR $m=\frac{-4}{2}$

$m=-1$ OR $m=-2$

(32.) use Quad form

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

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

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

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

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

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

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

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

$$x = -1 \pm 5i$$

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

example

$\sqrt{-1} = i$

$\sqrt{-9} = 3i$

$\sqrt{-16} = 4i$

$\sqrt{-25} = 5i$

$\sqrt{-100} = 10i$

(33) find vertex

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

$a = -4, \quad b = -8, \quad c = 1$

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

$\text{Vertex} = \left(\frac{-(-8)}{2(-4)}, \; f\left(\frac{-(-8)}{2(-4)}\right)\right)$

$\text{Vertex} = \left(\frac{8}{-8}, \; f\left(\frac{8}{-8}\right)\right)$

$\text{Vertex} = (-1, \; f(-1))$

$\text{Vertex} = (-1, \; -4(-1)^2 - 8(-1) + 1)$

$\text{Vertex} = (-1, \; -4(-1)(-1) - 8(-1) + 1)$

$\text{Vertex} = (-1, \; -4(1) - 8(-1) + 1)$

$\text{Vertex} = (-1, \; -4 + 8 + 1)$

$\text{Vertex} = (-1, \; 4 + 1)$

$= (-1, \; 5)$ Vertex