MO320 First 35Q Step

03-23-19
03-25-19

(1) $-7x \leq 21$

$\frac{-7x}{-7} \geq \frac{21}{-7}$

$x \geq -3$

$[-3, \infty)$

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

$h(-1) = 7(-1)^2 - 4$

$h(-1) = 7(-1)(-1) - 4$

$h(-1) = 7(1) - 4$

$h(-1) = 7 - 4$

$h(-1) = 3$

$h(0) = 7(0)^2 - 4$

$h(0) = 7(0)(0) - 4$

$h(0) = 7(0) - 4$

$h(0) = 0 - 4$

$h(0) = -4$

$h(5) = 7(5)^2 - 4$

$h(5) = 7(5)(5) - 4$

$h(5) = 7(25) - 4$

$h(5) = 175 - 4$

$h(5) = 171$

(3.) $4x+5y=33$

$5x-5y=-15$

$9x+0=18$

$9x=18$

$\frac{9x}{9}=\frac{18}{9}$

$x=2$

subst

$4x+5y=33$

$4(2)+5y=33$

$8+5y=33$

$-8 \quad -8$

$5y=25$

$\frac{5y}{5}=\frac{25}{5}$

$y=5$

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

④ $x+3y=-1$

$5x+2y=-18$

$\begin{pmatrix} x+3y=-1 \\ 5x+2y=-18 \end{pmatrix}\begin{pmatrix} -2 \\ 3 \end{pmatrix}$

$-2x-6y=2$

$15x+6y=-54$

$13x+0=-52$

$13x=-52$

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

$x=-4$

$x+3y=-1$

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

$-4+3y=-1$

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

$3y=3$

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

$y=1$

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

5. $(6x^2+11x+8) \div (x+1) =$

$$\frac{6x^2+11x+8}{x+1} =$$

Use synthetic division

$$\begin{array}{r|rrr} -1 & 6 & 11 & 8 \\ & & -6 & -5 \\ \hline & 6 & 5 & 3 \end{array}$$

rem

$$6x+5+\frac{3}{x+1}$$

⑥ $6x+12=$ factor

$6(x+2)=$

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⑦ $x^2-10x+9=$ factor Possibly

9, 1

3, 3

$(x-1)(x-9)=$

Check

foil $(x-1)(x-9)=$

$x^2-9x-1x+9=$

$x^2-10x+9=$

Good.

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(8) $3t - 40 + t^2 =$ Factor

$t^2 + 3t - 40 =$ rewrite

$(t-5)(t+8) =$

Possible
40.1
20.2
10.3
8.5

Check

foil $(t-5)(t+8) =$

$t^2 + 8t - 5t - 40 =$

$t^2 + 3t - 40 =$

Good

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(9) $8y^2 - 22y + 14 =$ Factor

Possible
4.1
2.2
7.1

$2(4y^2 - 11y + 7) =$

$2(4y-7)(y-1) =$

Check

$2(4y-7)(y-1) =$

$2(4y^2 - 4y - 7y + 7) =$

$2(4y^2 - 11y + 7) =$

$8y^2 - 22y + 14 =$

Good

(10) $9x^3 - 3x^2 - 30x =$

$3x(3x^2 - x - 10) =$

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

3.1

10.1
2.5

foil check

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

$3x(3x^2 - 6x + 5x - 10)$

$3x(3x^2 - 1x - 10)$

$9x^3 - 3x^2 - 30x$

Good

(11.) $81x^2 - 49y^2$

formula

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

$(9x)^2 - (7y)^2 =$

$(9x+7y)(9x-7y)$

(12) $(7x+8)(2x-7)=0$ Solve

let $7x+8=0$ or $2x-7=0$

$7x+8-8=0-8$ or $2x-7+7=0+7$

$7x=-8$ or $2x=7$

$\frac{7x}{7}=\frac{-8}{7}$ or $\frac{2x}{2}=\frac{7}{2}$

$x=-\frac{8}{7}$ or $x=\frac{7}{2}$

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(13) Solve

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

Possible
15, 1
3, 5

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

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

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

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

14. $x^3 - 12x^2 + 27x = 0$

Solve

Possible
27.1
9.3

$x(x^2 - 12x + 27) = 0$

$x(x-3)(x-9) = 0$

$x = 0$ or $x - 3 = 0$ or $x - 9 = 0$

$x - 3 + 3 = 0 + 3$ or $x - 9 + 9 = 0 + 9$

$x = 3$ or $x = 9$

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15. $6x^2 + x - 7 = 0$

Possible
6.1
2.3
7.1

$(6x + 7)(x - 1) = 0$

$6x + 7 = 0$ or $x - 1 = 0$

$6x + 7 - 7 = 0 - 7$ or $x - 1 + 1 = 0 + 1$

$6x = -7$ or $x = 1$

$\frac{6x}{6} = \frac{-7}{6}$

$x = \frac{-7}{6}$

check
$(6x+7)(x-1)$
$6x^2 - 6x + 7x - 7$
$6x^2 + x - 7$

16. $\frac{-9a+9b}{a-b} =$ Simplify

$\frac{-9(a-b)}{(a-b)} =$

$\frac{-9(a-b)}{(a-b)} =$

$-9 =$

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17. $\frac{x}{5x-40} \cdot \frac{x^2-8x}{9} =$

$\frac{x}{5(x-8)} \cdot \frac{x(x-8)}{9} =$

$\frac{x}{5(x-8)} \cdot \frac{x(x-8)}{9} =$

$\frac{x^2}{45} =$

18. $\frac{x^2+11x+24}{x-5} \div \frac{x^2-6x-27}{x-5} =$

Possibly
24.1
12.2
6.4
3.8
27.1
3.9

$\frac{x^2+11x+24}{x-5} \cdot \frac{x-5}{x^2-6x-27} =$ rewrite

$\frac{(x+3)(x+8)}{(x-5)} \cdot \frac{(x-5)}{(x+3)(x-9)} =$

$\frac{\cancel{(x+3)}(x+8)}{\cancel{(x-5)}} \cdot \frac{\cancel{(x-5)}}{\cancel{(x+3)}(x-9)} =$

$\frac{x+8}{x-9} =$

19. $\frac{4x}{2x-7} - \frac{14}{2x-7} =$

$\frac{(4x)-(14)}{2x-7} =$

$\frac{4x-14}{2x-7} =$

$\frac{2(2x-7)}{(2x-7)} =$

$\frac{2(2x-7)}{(2x-7)} =$

$2 =$

(20) $\frac{6}{4+y} + \frac{y+5}{4+y} =$

$\frac{(6)+(y+5)}{4+y} =$

$\frac{6+y+5}{4+y} =$

$\frac{y+11}{4+y} =$

(21.) $f(x) = -3x+4$ Graph

x	f(x)
0	4
1	1

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

$f(0) = 0+4$

$f(0) = 4$

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

$f(1) = -3+4$

$f(1) = 1$

(22) $|2x-1|=5$

formula
$|x|=a$
$x=-a$ or $x=a$

$2x-1=-5$ or $2x-1=5$

$2x-1+1=-5+1$ or $2x-1+1=5+1$

$2x=-4$ or $2x=6$

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

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

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(23) $|x-4|<8$

formula
$|x|<a$
$-a<x<a$

$-8<x-4<8$

$-8+4<x-4+4<8+4$

$-4<x<12$

$(-4, 12)$

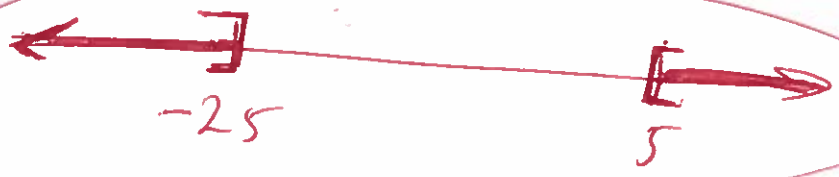
(24) $|x+10| \geq 15$

set

$x+10 \leq -15$ OR $x+10 \geq 15$

$x+10-10 \leq -15-10$ OR $x+10-10 \geq 15-10$

$x \leq -25$ OR $x \geq 5$



$(-\infty, -25] \cup [5, \infty)$

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(25) $\sqrt{16a^2b^{26}} =$

$\sqrt[2]{16a^2b^{26}} =$

$4a^{2/2}b^{\frac{26}{2}} =$

$4a^1b^{13} =$

$4ab^{13} =$

(26) $625^{\frac{3}{4}} =$

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

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

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

$5^{\frac{12}{4}} =$

$5^3 =$

$5 \cdot 5 \cdot 5 =$

$25 \cdot 5 =$

$125 =$

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

5 | 625
5 | 125
5 | 25
5 | 5
1

(27) $\sqrt{20} =$

$\sqrt{4 \cdot 5} =$

$\sqrt{4}\sqrt{5} =$

$2\sqrt{5} =$

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

2 | 20
2 | 10
5 | 5
1

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(28) $\sqrt{x-9} = 3$

$(\sqrt{x-9})^2 = (3)^2$

$x - 9 = 9$

$x - 9 + 9 = 9 + 9$

$x = 18$

Check

$\sqrt{x-9} = 3$

$\sqrt{18-9} = 3$

$\sqrt{9} = 3$

$3 = 3$

Good

29) $(5+6i)-(9-5i)=$

$5+6i-9+5i=$

$-4+11i=$

30) $(9+6i)(8+i)=$

$72+9i+48i+6i^2=$

$72+57i+6i^2=$

$72+57i+6(-1)=$

$72+57i-6=$

$66+57i=$

formula
$i^2=-1$

31. $\frac{8-7i}{8+i} =$

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

$\frac{64-8i-56i+7i^2}{64-8i+8i-i^2} =$

$\frac{64-64i+7i^2}{64-i^2} =$

formula $i^2 = -1$

$\frac{64-64i+7(-1)}{64-(-1)}$

$\frac{64-64i-7}{64+1} =$

$\frac{57-64i}{65} =$

$\frac{57}{65} - \frac{64}{65}i =$

(32) $(x+7)^2 = 36$

$\sqrt{(x+7)^2} = \pm\sqrt{36}$

$x+7 = \pm 6$

$x+7 = -6$ OR $x+7 = 6$

$x+7-7 = -6-7$ OR $x+7-7 = 6-7$

$x = -13$ OR $x = -1$

Check

$(x+7)^2 = 36$

$(-13+7)^2 = 36$

$(-6)^2 = 36$

$(-6)(-6) = 36$

$36 = 36$

Good

$(x+7)^2 = 36$

$(-1+7)^2 = 36$

$(6)^2 = 36$

$(6)(6) = 36$

$36 = 36$

Good

33. $m^2 - 5m + 4 = 0$

Nu Sol: 4.1 / 22

$(m-1)(m-4) = 0$

let $m - 1 = 0$ OR $m - 4 = 0$

$m - 1 + 1 = 0 + 1$ OR $m - 4 + 4 = 0 + 4$

$m = 1$ OR $m = 4$

use Quad form:

$1m^2 - 5m + 4 = 0$

$a = 1,\ b = -5,\ c = 4$

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

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

$$m = \frac{5 \pm \sqrt{25 - 16}}{2}$$

$$m = \frac{5 \pm \sqrt{9}}{2}$$

$$m = \frac{5 \pm 3}{2}$$

$m = \frac{5-3}{2}$ OR $m = \frac{5+3}{2}$

$m = \frac{2}{2}$ OR $m = \frac{8}{2}$

$m = 1$ OR $m = 4$

(34) $1x^2+4x+8=0$

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

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

$$x=\frac{-(4)\pm\sqrt{(4)^2-4(1)(8)}}{2(1)}$$

$$x=\frac{-4\pm\sqrt{16-32}}{2}$$

$$x=\frac{-4\pm\sqrt{-16}}{2}$$

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

$$x=-2\pm 2i$$

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

35.

Find Vertex

$f(x) = -2x^2 - 8x + 3$

$a = -2,\ b = -8,\ c = 3$

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

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

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

$\text{Vertex} = (-2,\ f(-2))$

$\text{Vertex} = (-2,\ -2(-2)^2 - 8(-2) + 3)$

$\text{Vertex} = (-2,\ -2(-2)(-2) - 8(-2) + 3)$

$\text{Vertex} = (-2,\ -2(4) - 8(-2) + 3)$

$\text{Vertex} = (-2,\ -8 + 16 + 3)$

$\text{Vertex} = (-2,\ 8 + 3)$

$= (-2,\ 11)$