MO320 TEST 3 Step

070717

1

1. $x^2 - 7x - 18 = 0$

18·1
9·2
6·3
possible

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

Set $x + 2 = 0$ OR $x - 9 = 0$

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

$x = -2$ OR $x = 9$

$\{-2, 9\}$

2. $2x^2 - 7x - 9 = 0$

2·1
9·1
3·3
possible

$(2x-9)(x+1) = 0$

Set $2x - 9 = 0$ OR $x + 1 = 0$

$2x - 9 + 9 = 0 + 9$ OR $x + 1 - 1 = 0 - 1$

$2x = 9$ OR $x = -1$

$\frac{2x}{2} = \frac{9}{2}$ OR

$x = \frac{9}{2}$

$\{\frac{9}{2}, -1\}$

(3) $15x^2 - 8x = 0$

$x(15x - 8) = 0$

Let $x = 0$ or $15x - 8 = 0$

$15x - 8 + 8 = 0 + 8$

$15x = 8$

$\frac{15x}{15} = \frac{8}{15}$

$x = \frac{8}{15}$

$\{0, \frac{8}{15}\}$

(4) $3x^2 + 21x + 36 = 0$

$3(x^2 + 7x + 12) = 0$

12.1
6.2
3.4
possible

$3(x + 3)(x + 4) = 0$

Let $3 = 0$ or $x + 3 = 0$ or $x + 4 = 0$

$x + 3 - 3 = 0 - 3$

OR $x + 4 - 4 = 0 - 4$

$x = -3$ OR $x = -4$

$\{-3, -4\}$

5. $10x^3+70x^2+120x=0$

$10x(x^2+7x+12)=0$

$10x(x+3)(x+4)=0$

let $10x=0$ OR $x+3=0$ OR $x+4=0$

$\frac{10x}{10}=\frac{0}{10}$ OR $x+3-3=0-3$ OR $x+4-4=0-4$

$x=0$ OR $x=-3$ OR $x=-4$

12.1, 6.2, 3, 4 Possible

3. $\{0,-3,-4\}$

6. $9x^3-16x=0$

$x(9x^2-16)=0$

$x((3x)^2-(4)^2)=0$

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

let $x=0$ OR $3x+4=0$ OR $3x-4=0$

OR $3x+4-4=0-4$ OR $3x-4+4=0+4$

$3x=-4$ OR $3x=4$

$\frac{3x}{3}=\frac{-4}{3}$ OR $\frac{3x}{3}=\frac{4}{3}$

$x=-\frac{4}{3}$ OR $x=\frac{4}{3}$

$\{-\frac{4}{3},\frac{4}{3}\}$

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

7. $\frac{2y}{4y+2} \cdot \frac{10y+5}{7} =$

$\frac{2y}{2(2y+1)} \cdot \frac{5(2y+1)}{7} =$

$\frac{5y}{7} =$

8. $\frac{x^2-y^2}{x+y} \div \frac{x}{x^2-xy} =$

$\frac{x^2-y^2}{x+y} \cdot \frac{x^2-xy}{x} =$

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

$(x-y)(x-y) =$ OR

$(x-y)^2 =$

9. $\frac{x^2-8x}{x-6} + \frac{12}{x-6} =$

$\frac{(x^2-8x)+(12)}{x-6} =$

$\frac{x^2-8x+12}{x-6} =$

12.1
6.2
3.4
possible

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

$x-2 =$

10. $13 \leq 4t+5 \leq 29$

$13-5 \leq 4t+5-5 \leq 29-5$

$8 \leq 4t \leq 24$

$\frac{8}{4} \leq \frac{4t}{4} \leq \frac{24}{4}$

$2 \leq t \leq 6$

2 6

$[2, 6]$

11. $|x+3| = 6$

formula (6)

$|x| = a$

$x = -a$ or $x = a$

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

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

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

12. $|x+18| < 9$

formula

$|x| < a$

$-a < x < a$

$-9 < x+18 < 9$

$-9-18 < x+18-18 < 9-18$

$-27 < x < -9$

$(-27, -9)$

13 $|x+3|>4$

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

let $x+3<-4$ or $x+3>4$

$x+3-3<-4-3$ or $x+3-3>4-3$

$x<-7$ or $x>1$

$(-\infty, -7) \cup (1, +\infty)$

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14 $\sqrt{16x^{10}} =$

$\sqrt[4]{4^2 x^{10}} =$

$4^1 x^5 =$

$4x^5 =$

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15. $256^{\frac{1}{4}} =$

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

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

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

$4^1 =$

$4 =$

16. $\sqrt{320k^7Q^8} =$

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

2	320
2	160
2	80
2	40
2	20
2	10
5	5
	1

$\sqrt{2^6 5^1 k^6 k^1 Q^8} =$

$2^3 k^3 Q^4 \sqrt{5^1 k^1} =$

$2 \cdot 2 \cdot 2\, k^3 Q^4 \sqrt{5k} =$

$8k^3Q^4\sqrt{5k} =$

17. $\sqrt[3]{512x^4y^5} =$

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

$\sqrt[3]{2^9 \cdot x^3 x^1 y^3 y^2} =$

$2^3 x^1 y^1 \sqrt[3]{x^1 y^2} =$

$2 \cdot 2 \cdot 2 \, xy \sqrt[3]{xy^2} =$

$8xy\sqrt[3]{xy^2} =$

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

(9)

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18. $\sqrt{x+4} = 8$

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

$x+4 = 64$

$x+4-4 = 64-4$

$x = 60$

19 $\frac{8+7i}{9-2i} =$

$\left(\frac{8+7i}{9-2i}\right)\left(\frac{9+2i}{9+2i}\right) =$

$\frac{72+16i+63i+14i^2}{81+18i-18i-4i^2} =$

$\frac{72+79i+14(-1)}{81-4(-1)} =$

formula

$i^2 = -1$

$\frac{72+79i-14}{81+4} =$

$\frac{58+79i}{85} =$

$\frac{58}{85} + \frac{79}{85}i =$

20 $(x-5)^2 = 36$

$\sqrt{(x-5)^2} = \pm\sqrt{36}$

$x-5 = \pm 6$

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

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

$x = -1$ OR $x = 11$

(21) $1x^2 + 24x + 144 = 0$ Sha Use Quadratic formula (11.

$a = 1$, $b = 24$, $c = 144$

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

$$x = \frac{-(24) \pm \sqrt{(24)^2 - 4(1)(144)}}{2(1)}$$

$$x = \frac{-24 \pm \sqrt{576 - 576}}{2}$$

$$x = \frac{-24 \pm \sqrt{0}}{2}$$

$$x = \frac{-24 \pm 0}{2}$$

$x = -12 \pm 0$

$x = -12 - 0$ or $x = -12 + 0$

$x = -12$ or $x = -12$

$\{-12, -12\}$

or

$\{-12\}$

Solve use Quad formula

22. $1x^2+18x+70=0$

12.

$a=1,\ b=18,\ c=70$

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

$$x=\frac{-(18)\pm\sqrt{(18)^2-4(1)(70)}}{2(1)}$$

$$x=\frac{-18\pm\sqrt{324-280}}{2}$$

$$x=\frac{-18\pm\sqrt{44}}{2}$$

$$x=\frac{-18\pm\sqrt{4\cdot 11}}{2}$$

$$x=\frac{-18\pm\sqrt{4}\sqrt{11}}{2}$$

$$x=\frac{-18\pm 2\sqrt{11}}{2}$$

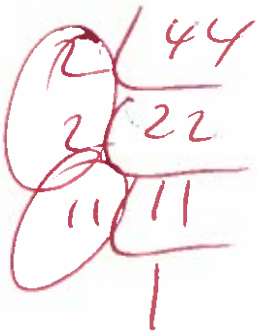
$$x=-9\pm 1\sqrt{11}$$

$$x=-9\pm\sqrt{11}$$

$x=-9-\sqrt{11}$ OR $x=-9+\sqrt{11}$

$\{-9-\sqrt{11},\ -9+\sqrt{11}\}$

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



23) Solve use Quadratic formula

13.

$1x^2 - 8x + 20 = 0$

$a = 1, \quad b = -8, \quad c = 20$

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

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(20)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{64 - 80}}{2}$$

$$x = \frac{8 \pm \sqrt{-16}}{2}$$

$$x = \frac{8 \pm 4i}{2}$$

$$x = 4 \pm 2i$$

$\{4-2i, \; 4+2i\}$

$x = 4 - 2i$ or $x = 4 + 2i$

(24) Solve use Quadratic formula

(14)

$2x^2 - 7x - 9 = 0$

$a = 2,\ b = -7,\ c = -9$

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

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(-9)}}{2(2)}$$

$$x = \frac{7 \pm \sqrt{49 + 72}}{4}$$

$$x = \frac{7 \pm \sqrt{121}}{4}$$

$$x = \frac{7 \pm 11}{4}$$

$$x = \frac{7 - 11}{4} \quad \text{OR} \quad x = \frac{7 + 11}{4}$$

$$x = \frac{-4}{4} \quad \text{OR} \quad x = \frac{18}{4}$$

$x = -1$ OR $x = \frac{\cancel{2}(9)}{\cancel{2}(2)}$

$x = \frac{9}{2}$

$\left\{-1, \frac{9}{2}\right\}$

25. Graph

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

x	f(x)
-2	0
0	-4
2	0

(5)

$f(-2) = (-2)^2 - 4$

$f(-2) = (-2)(-2) - 4$

$f(-2) = 4 - 4$

$f(-2) = 0$

$f(0) = (0)^2 - 4$

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

$f(0) = 0 - 4$

$f(0) = -4$

$f(2) = (2)^2 - 4$

$f(2) = (2)(2) - 4$

$f(4) = 4 - 4$

$f(4) = 0$