Math 0320 TEST #2
Step
070717

MO320 TEST 2 Step

① $13 \leq 4t + 5 \leq 29$

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

$8 \leq 4t \leq 24$

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

$2 \leq t \leq 6$

$[2, 6]$

② $|x+3| = 6$

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

Let $x+3 = -6$ or $x+3 = 6$

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

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

$\{-9, 3\}$

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

(2)

(3) $|x+18| < 9$

$-9 < x+18 < 9$

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

$-27 < x < -9$

$(-27, -9)$

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

(4) $|x+3| > 4$

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

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

$x < -7$ OR $x > 1$

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

5. $\sqrt{16x^{10}} =$

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

$4^1x^5 =$

$4x^5 =$

6. $f(x) = \sqrt{2x+7}$ find $f(37)$.

$f(37) = \sqrt{2(37)+7}$

$f(37) = \sqrt{74+7}$

$f(37) = \sqrt{81}$

$f(37) = 9$

7. graph $f(x) = \sqrt{x} - 4$

x	f(x)
0	-4
1	-3
4	-2
9	-1

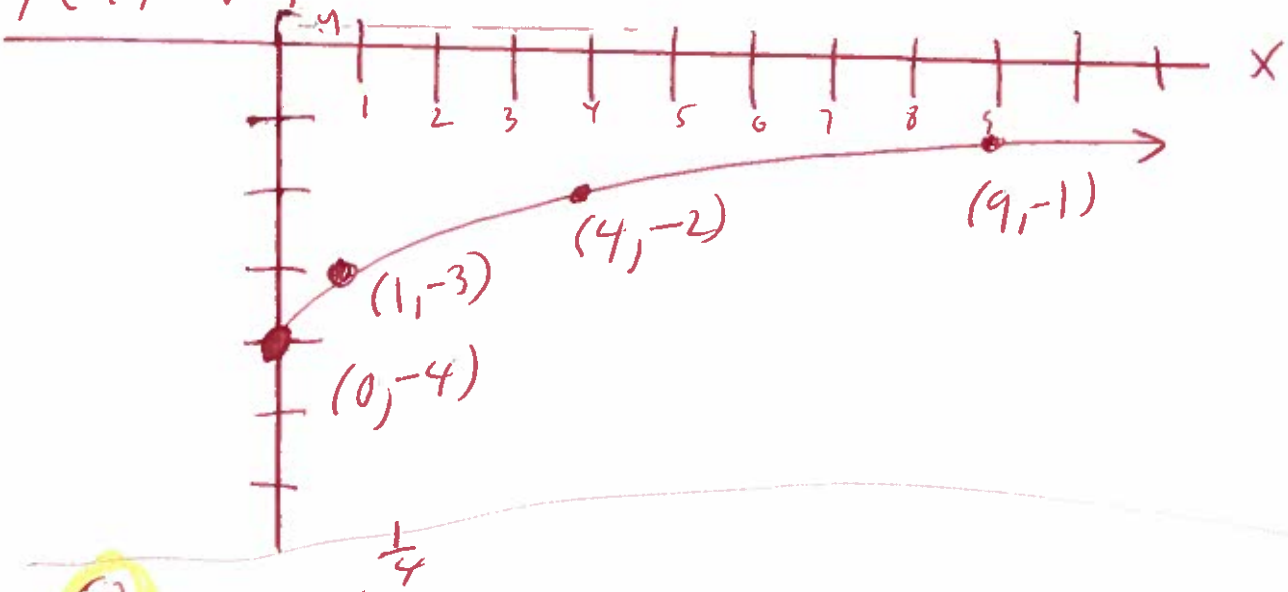
(4)

$f(0) = \sqrt{0} - 4 = 0 - 4 = -4$ ✓

$f(1) = \sqrt{1} - 4 = 1 - 4 = -3$ ✓

$f(4) = \sqrt{4} - 4 = 2 - 4 = -2$ ✓

$f(9) = \sqrt{9} - 4 = 3 - 4 = -1$ ✓



8. $256^{\frac{1}{4}} =$

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

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

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

$4^1 =$

$4 =$

(9) $\sqrt{20} =$ Primes 2, 3, 5, 7, 11, ... (5.)

$\sqrt{4 \cdot 5} =$

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

$2\sqrt{5} =$

2	20
2	10
5	5
	1

$20 = 2 \cdot 2 \cdot 5$

(10.) $\sqrt{320k^7Q^8} =$ Primes 2, 3, 5, 7, 11, ...

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

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

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

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

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

(11) $\sqrt[3]{512x^4y^5} =$

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

(6)

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

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

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

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

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

(12) distance $(-4, 2)$ and $(-12, -4)$.
x_1, y_1 x_2, y_2

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

$d = \sqrt{((-4)-(-12))^2 + ((2)-(-4))^2}$

$d = \sqrt{(-4+12)^2 + (2+4)^2}$

$d = \sqrt{(8)^2 + (6)^2}$

$d = \sqrt{64 + 36}$

$d = \sqrt{100}$

$\boxed{d = 10}$

13. Find midpoint $(4, -8)$ and $(0, 4)$.
$x_1 \quad y_1 \qquad x_2 \quad y_2$ (1)

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

$$\text{midpoint} = \left(\frac{(4)+(0)}{2}, \frac{(-8)+(4)}{2}\right)$$

$$\text{midpoint} = \left(\frac{4+0}{2}, \frac{-8+4}{2}\right)$$

$$\text{midpoint} = \left(\frac{4}{2}, -\frac{4}{2}\right)$$

$$\text{midpoint} = (2, -2)$$

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

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

$$x+4 = 64$$

$$x+4-4 = 64-4$$

$$x = 60$$

15. $\sqrt{20x+20} = x+6$

$(\sqrt{20x+20})^2 = (x+6)^2$

$20x+20 = (x+6)(x+6)$

$20x+20 = x^2+6x+6x+36$

$20x+20 = x^2+12x+36$

$0 = x^2+12x+36-20x-20$

$0 = x^2-8x+16$

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

Let $x-4=0$ OR $x-4=0$

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

$x=4$ OR $x=4$

Ck $\sqrt{20x+20} = x+6$

$\sqrt{20(4)+20} = (4)+6$

$\sqrt{80+20} = 4+6$

$\sqrt{100} = 10$

$10 = 10$ ✓

$\{4\}$

16. $(6+6i)-(-9+i) =$

$6+6i+9-i =$

$6+6i+9-1i =$

$15+5i =$

17. $(5+3i)(5-3i) =$

$25 - 15i + 15i - 9i^2 =$

$25 - 9i^2 =$

$25 - 9(-1) =$

$25 + 9 =$

$34 =$ or $34 + 0i =$

formula (9)

$i^2 = -1$

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

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

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

$\frac{72 + 79i + 14i^2}{81 - 4i^2} =$

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

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

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

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

19. $(x-5)^2 = 36$

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

$x-5 = \pm 6$

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

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

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

20. Use Quadratic formula

$1x^2 + 24x + 144 = 0$

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

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

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

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

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

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

$x = -12 \pm 0$

$x = -12+0$ OR $x = -12-0$

$x = -12$ OR $x = -12$

$\{-12\}$

21. Solve use Quadratic formula

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

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

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

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

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

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

$$x=\frac{-18\pm\sqrt{4\cdot11}}{2}$$

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

$$x=\frac{-18\pm2\sqrt{11}}{2}$$

$$x=-9\pm1\sqrt{11}$$

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

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

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

2	44
2	22
11	11
	1

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

(22) Solve use Quadratic formula

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

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

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

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

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

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

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

$$x = 4 \pm 2i$$

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

formula

$\sqrt{-1} = i$

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

23 Soln use Quadratic formula

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

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

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

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

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

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

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

$x = \frac{7-11}{4}$ or $x = \frac{7+11}{4}$

$x = \frac{-4}{4}$ or $x = \frac{18}{4}$

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

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

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

(24) Solve use the Quadratic formula. (14)

$7x^2 = -12x - 3$

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

$a = 7,\ b = 12,\ c = 3$

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

$$x = \frac{-(12) \pm \sqrt{(12)^2 - 4(7)(3)}}{2(7)}$$

$$x = \frac{-12 \pm \sqrt{144 - 84}}{14}$$

$$x = \frac{-12 \pm \sqrt{60}}{14}$$

$$x = \frac{-12 \pm \sqrt{4 \cdot 15}}{14}$$

$$x = \frac{-12 \pm \sqrt{4}\sqrt{15}}{14}$$

$$x = \frac{-12 \pm 2\sqrt{15}}{14}$$

$$x = \frac{2(-6 \pm 1\sqrt{15})}{2(7)}$$

$$x = \frac{-6 \pm \sqrt{15}}{7}$$

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

2 | 60
2 | 30
3 | 15
5 | 5
1

$x = \frac{-6 - \sqrt{15}}{7}$ or $x = \frac{-6 + \sqrt{15}}{7}$

$\left\{ \frac{-6 - \sqrt{15}}{7},\ \frac{-6 + \sqrt{15}}{7} \right\}$

25. graph $f(x) = x^2 - 4$

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

(15)

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

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

$f(-2) = 4 - 4$

$f(-2) = 0$

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

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

$f(0) = 0 - 4$

$f(0) = -4$

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

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

$f(2) = 4 - 4$

$f(2) = 0$