M032O TEST 4 step
05/2/17

1.

① $x^2+2x-80=0$

$(x-8)(x+10)=0$

Let $x-8=0$ OR $x+10=0$

$x-8+8=0+8$ OR $x+10-10=0-10$

$x=8$ OR $x=-10$

80.1
40.2
20.4
10.8
possible

② $x^2-7x-18=0$

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

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

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

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

18.1
9.2
3.6
possible

③ $x^2-x=72$

$x^2-x-72=0$

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

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

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

$x=-8$ OR $x=9$

72.1
36.2
18.4
8.9
possible

(4) $2x^2 - 7x - 9 = 0$

2.1 (9.1, 3.3) possibly

2.

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

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

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

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

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

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

(5.) $15x^2 - 8x = 0$

$x(15x - 8) = 0$

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

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

$15x = 8$

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

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

(6.) $3x^2 + 21x + 36 = 0$

12.1, 6.2, 3.4 possibly

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

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

Let $3 \neq 0$ OR $x + 3 = 0$ OR $x + 4 = 0$

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

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

7. $10x^3+70x^2+120x=0$

12+1
6+7 possible
3+4

3

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

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

Set $10x=0$ 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 $x=-4$

8. $9x^3-16x=0$

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

formula

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

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

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

Set $x=0$ 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 $x=\frac{4}{3}$

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

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

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

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

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

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

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

$(x-y)^2 =$

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

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

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

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

$x-2 =$

12. $13 \le 4t + 5 \le 29$

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

$8 \le 4t \le 24$

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

$2 \le t \le 6$

$[2, 6]$

13. $|x+3| = 6$

Formula
$|x| = a$
$x = -a$ OR $x = a$

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

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

$x = -9$ OR $x = 3$

14. $|x+18| < 9$

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

$-9 < x + 18 < 9$

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

$-27 < x < -9$

$(-27, -9)$

15. $|x+3|>4$

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

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

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

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

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

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

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

$4^1 x^5 =$

$4x^5 =$

17. $256^{1/4} =$

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

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

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

$4^1 =$

$4 =$

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

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

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

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

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

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

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

(1)

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

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

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

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

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

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

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

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

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

$x + 4 = 64$

$x + 4 - 4 = 64 - 4$

$x = 60$

21. $(6+3i)-(-2+i)=$

$6+3i+2-i=$

$8+2i=$

22. $(5+3i)(5-3i)=$

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

$25-9i^2=$

$25-9(-1)=$

$25+9=$

$34=$

OR

$34+0i=$

formula $i^2=-1$

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

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

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

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

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

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

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

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

formula $i^2=-1$

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

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

$x-5 = \pm 6$

$x-5 = -6$ or $x-5 = 6$

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

$x = -1$ or $x = 11$

(25) Solve by using the Quadratic formula

$x^2 - 2x - 48 = 0$

$a=1,\ b=-2,\ c=-48$

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

$$x = \frac{-(-2) \pm \sqrt{(-2)^2-4(1)(-48)}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{4+192}}{2}$$

$$x = \frac{2 \pm \sqrt{196}}{2}$$

$$x = \frac{2 \pm 14}{2}$$

$x = 1 \pm 7$

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

$x = -6$ or $x = 8$

(26) Solve using the Quadratic formula

(10)

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

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

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

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

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

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

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

$x = -12 \pm 0$

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

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

27. Solve using the Quadratic formula

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

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

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

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

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

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

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

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

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

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

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

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

Primes: 2, 3, 5, 7, 11

2 | 44
2 | 22
11 | 11
1

11

28. Solve using the Quadratic formula

(12)

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

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

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

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

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

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

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

$$x = 4 \pm 2i$$

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

Formula

$\sqrt{-1} = i$

29. Solve using the Quadratic formula

13.

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

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

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

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

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

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

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

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

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

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

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

(36) graph

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

$f(-1) = (-1)^2 - 4$

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

$f(-1) = 1 - 4$

$f(-1) = -3$

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

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

$f(0) = 0 - 4$

$f(0) = -4$

$f(1) = (1)^2 - 4$

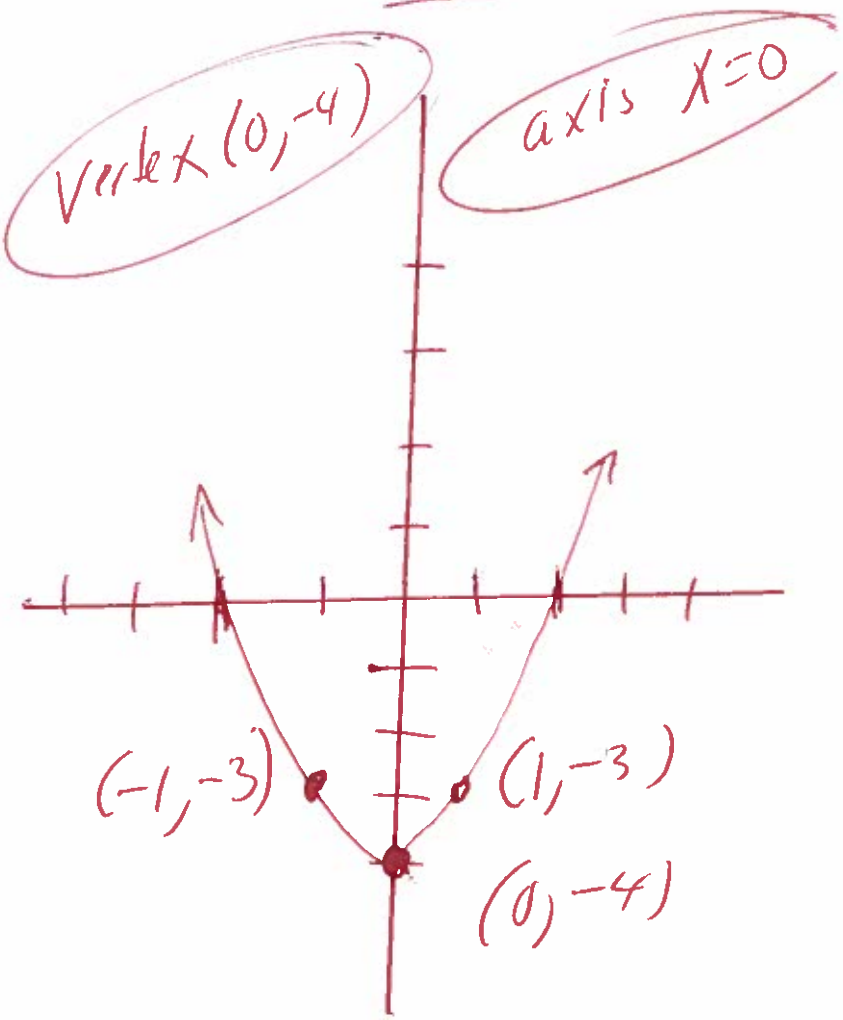
$f(1) = (1)(1) - 4$

$f(1) = 1 - 4$

$f(1) = -3$

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

(14)



(31) graph $f(x) = (x+5)^2$

x	f(x)
−6	1
−5	0
−4	1

(15)

$f(-6) = (-6+5)^2$

$f(-6) = (-1)^2$

$f(-6) = (-1)(-1)$

$f(-6) = 1$

$f(-5) = (-5+5)^2$

$f(-5) = (0)^2$

$f(-5) = (0)(0)$

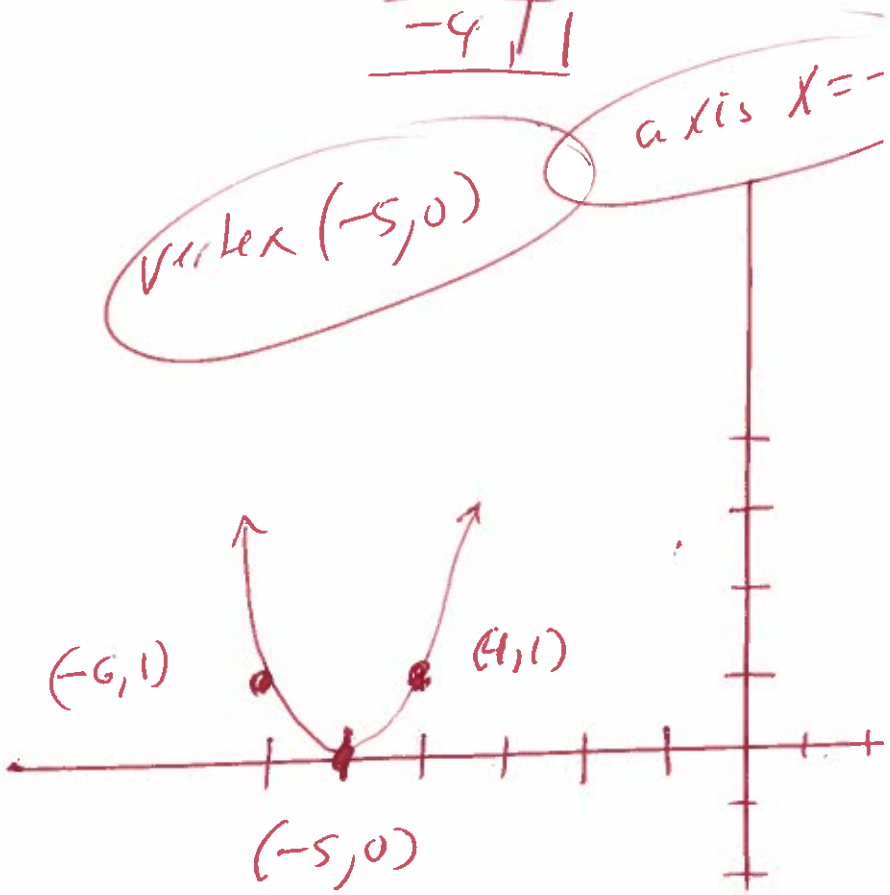
$f(-5) = 0$

$f(-4) = (-4+5)^2$

$f(-4) = (1)^2$

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

$f(-4) = 1$



(32.) graph $f(x) = (x-6)^2 - 3$

x	f(x)
5	-2
6	-3
7	-2

16.

$f(5) = (5-6)^2 - 3$

$f(5) = (-1)^2 - 3$

$f(5) = (-1)(-1) - 3$

$f(5) = 1 - 3$

$f(5) = -2$

$f(6) = (6-6)^2 - 3$

$f(6) = (0)^2 - 3$

$f(6) = (0)(0) - 3$

$f(6) = 0 - 3$

$f(6) = -3$

$f(7) = (7-6)^2 - 3$

$f(7) = (1)^2 - 3$

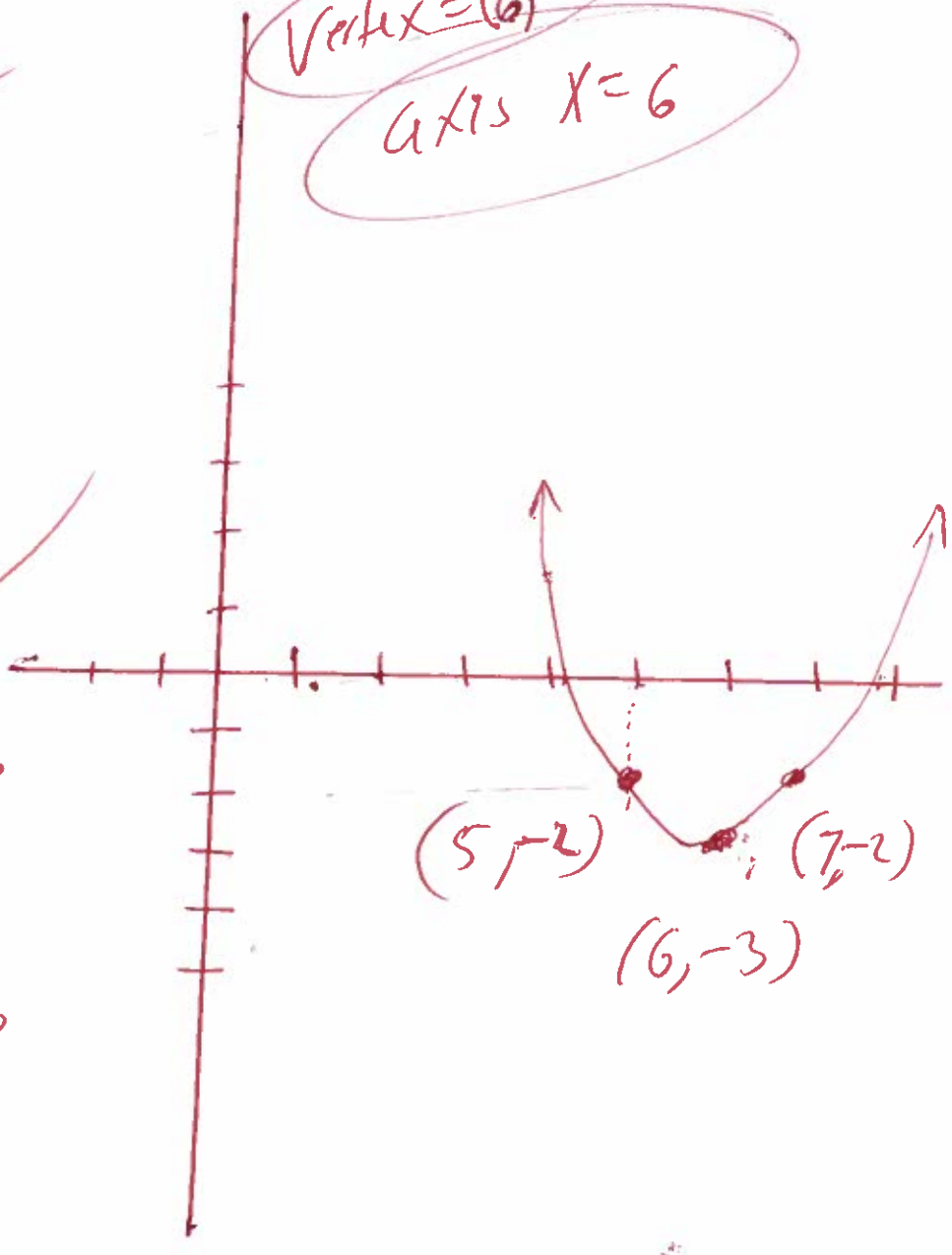
$f(7) = (1)(1) - 3$

$f(7) = 1 - 3$

$f(7) = -2$

Vertex = (6, -3)

axis $x = 6$



33) Graph

$f(x) = -x^2 - 5$

$f(-1) = -(-1)^2 - 5$

$f(-1) = -(-1)(-1) - 5$

$f(-1) = -(1) - 5$

$f(-1) = -1 - 5$

$f(-1) = -6$

$f(0) = -(0)^2 - 5$

$f(0) = -(0)(0) - 5$

$f(0) = -(0) - 5$

$f(0) = 0 - 5$

$f(0) = -5$

$f(1) = -(1)^2 - 5$

$f(1) = -(1)(1) - 5$

$f(1) = -(1) - 5$

$f(1) = -1 - 5$

$f(1) = -6$

x	f(x)
-1	-6
0	-5
1	-6

17.