Intermediate Algebra – Chapter 8
Lesson 1, Day 1

Name _____

Solve the equation using square roots.

1. $X^2 = 144$

$\sqrt{x^2} = \pm\sqrt{144}$

$\boxed{X = \pm 12}$

2. $A^2 = 81$

$\sqrt{a^2} = \pm\sqrt{81}$

$\boxed{a = \pm 9}$

3. $(z - 6)^2 = 25$

$\sqrt{(z-6)^2} = \pm\sqrt{25}$

$z - 6 = \pm 5$

$+6 \quad +6$

$z = 5 + 6$ or $z = -5 + 6$

$\boxed{z = 11}$ $\boxed{z = 1}$

4. $(p - 4)^2 = 49$

$\sqrt{(p-4)^2} = \pm\sqrt{49}$

$p - 4 = \pm 7$

$+4 \quad +4$

$p = 7 + 4$ $p = -7 + 4$

$\boxed{p = 11}$ $\boxed{p = -3}$

5. $4(x - 1)^2 + 2 = 10$

$-2 \quad -2$

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

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

$x - 1 = \pm\sqrt{2}$

$+1 \quad +1$

$\boxed{x = \pm\sqrt{2}}$

6. $2(x + 2)^2 - 5 = 8$

$+5 \quad +5$

$\sqrt{\frac{2(x+2)^2}{2}} = \pm\sqrt{\frac{13}{2}}$

$x + 2 = \pm\sqrt{\frac{13}{2}}$

$x + 2 = \pm\frac{\sqrt{13}\sqrt{2}}{\sqrt{2}\sqrt{2}}$

$x + 2 = \pm\frac{\sqrt{26}}{2}$

$x + 2 = \pm\frac{\sqrt{26}}{2}$

$-2 \quad -2$

$\boxed{x = -2 \pm \frac{\sqrt{26}}{2}}$

7. $\frac{1}{2}r^2 - 10 = \frac{3}{2}r^2$

$-\frac{1}{2}r^2 \quad -\frac{1}{2}r^2$

$\pm\sqrt{-10} = \pm\sqrt{r^2}$

$r = \pm\sqrt{-10}$

$\boxed{r = \pm i\sqrt{10}}$

8. $\frac{1}{5}x^2 + 2 = \frac{3}{5}x^2$

$-\frac{1}{5}x^2 \quad -\frac{1}{5}x^2$

$\left(\frac{5}{2}\right)2 = \frac{2}{5}x^2\left(\frac{5}{2}\right)$

$\sqrt{5} = \sqrt{x^2}$

$\boxed{\pm\sqrt{5} = x}$

Describe and correct the error in solving the equation.

9.

$2(x + 1)^2 + 3 = 21$
$2(x + 1)^2 = 18$
$(x + 1)^2 = 9$
$x + 1 = 3$
$x = 2$

take $\sqrt{\ }$ not 2

$\sqrt{(x+1)^2} = \sqrt{9}$

$x + 1 = \pm 3$

$-1 \quad -1$

$x = 3 - 1$ $x = -3 - 1$

$\boxed{x = 2}$ $\boxed{x = -4}$

10.

$-2x^2 - 8 = 0$
$-2x^2 = 8$
$x^2 = -4$
$x = \pm 2$

$-\sqrt{\ }$

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

$x = \pm\sqrt{-4}$

$\boxed{x = \pm 2i}$

Intermediate Algebra – Chapter 8
Lesson 1, Day 2

Name _____

Solve the equation by factoring.

1. $0 = x^2 + 6x + 9$

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

$x+3=0$

$\boxed{x=-3}$

2. $0 = z^2 - 10z + 25$

$0=(z-5)(z-5)$

$z-5=0$

$\boxed{z=5}$

3. $x^2 - 8x = -12$

$+12 \quad +12$

$x^2-8x+12=0$

$(x-6)(x-2)=0$

$x-6=0 \quad x-2=0$

$\boxed{x=6} \quad \boxed{x=2}$

4. $X^2 - 11x = -30$

$+30 \quad +30$

$x^2-11x+30=0$

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

$x-5=0 \quad x-6=0$

$\boxed{x=5} \quad \boxed{x=6}$

5. $n^2 - 6n = 0$

$n(n-6)=0$

$\boxed{n=0} \quad n-6=0$

$\boxed{n=6}$

6. $A^2 - 49 = 0$

$(a-7)(a+7)=0$

$a-7=0 \quad a+7=0$

$\boxed{a=7} \quad \boxed{a=-7}$

7. $2w^2 - 16w = 12w - 48$

$-12w \quad -12w \quad +48$

$2w^2-28w+48=0$

$2(w^2-14w+24)=0$

$2(w-12)(w-2)=0$

$2\neq0 \quad w-12=0 \quad w-2=0$

$\boxed{w=12} \quad \boxed{w=2}$

8. $-y + 28 + y^2 = 2y + 2y^2$

$-2y \quad -2y^2 \quad -2y \quad -2y$

$-y^2-3y+28=0$

$y^2+3y-28=0$

$(y+7)(y-4)=0$

$\boxed{y=-7} \quad y-4=0$

$\boxed{y=4}$

Find the value of x.

9. Area of rectangle = 36

$x(x+5)=36$

$x^2+5x=36$

$-36 \quad -36$

$x^2+5x-36=0$

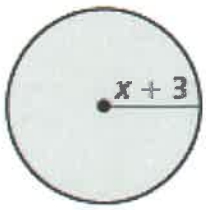
$(x+9)(x-4)=0$

$x+9=0 \quad x-4=0$

$\boxed{x=-9} \quad \boxed{x=4}$

can't have − length

10. Area of circle = 25π



$\frac{\pi(x+3)^2}{\pi}=\frac{25\pi}{\pi}$

$(x+3)^2=25$

$(x+3)(x+3)=25$

$x^2+3x+3x+9=25$

$x^2+6x+9=25$

$-25 \quad -25$

$x^2+6x-16=0$

$(x+8)(x-2)=0$

$x+8=0$

$\boxed{x=-8}$

can't have − length

$x-2=0$

$\boxed{x=2}$

Intermediate Algebra – Chapter 8
Lesson 1, Day 2

Solve the equation using any method.

11. $U^2 = -9u$

$+9u \quad +9u$

$u^2+9u=0$

$u(u+9)=0$

$\boxed{u=0}$ $\quad u+9=0$

$\boxed{u=-9}$

12. $\frac{t^2}{20} + 8 = 15$

$-8 \quad -8$

$(20)\frac{t^2}{20} = 7(20)$

$\sqrt{t^2} = \sqrt{140}$

$\boxed{t = \pm\sqrt{140}}$

13. $-(x+9)^2 = 64$

$\frac{-(x+9)^2}{-1} = \frac{64}{-1}$

$\sqrt{(x+9)^2} = \pm\sqrt{-64}$

$x+9 = \pm 8i$

$-9 \quad -9$

$\boxed{x = -9 \pm 8i}$

14. $-2(x+2)^2 = 5$

$\frac{-2(x+2)^2}{-2} = \frac{5}{-2}$

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

$x+2 = \pm\sqrt{-\frac{5}{2}}$

$x+2 = \pm i\frac{\sqrt{5}\sqrt{2}}{\sqrt{2}\sqrt{2}}$

$x+2 = \pm i\frac{\sqrt{10}}{2}$

$x+2 = \pm i\frac{\sqrt{10}}{2}$

$-2 \quad -2$

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

15. $7(x-4)^2 - 18 = 10$

$+18 \quad +18$

$\frac{7(x-4)^2}{7} = \frac{28}{7}$

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

$x-4 = \pm 2$

$+4 \quad +4$

$x = 2+4$ $\quad x = -2+4$

$\boxed{x=6}$ $\quad \boxed{x=2}$

16. $T^2 + 8t + 16 = 0$

$(t+4)(t+4)=0$

$t+4=0$

$\boxed{t=-4}$

Find the zero(s) of the function.

17. $G(x) = x^2 + 6x + 8$

$x^2+6x+8=0$

$(x+4)(x+2)=0$

$x+4=0$ $\quad x+2=0$

$\boxed{x=-4}$ $\quad \boxed{x=-2}$

18. $F(X) = x^2 - 8x + 16$

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

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

$x-4=0$

$\boxed{x=4}$

19. $h(x) = x^2 + 7x - 30$

$x^2+7x-30=0$

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

$x+10=0$ $\quad x-3=0$

$\boxed{x=-10}$ $\quad \boxed{x=3}$

20. $G(x) = x^2 + 11x$

$x^2+11x=0$

$x(x+11)=0$

$\boxed{x=0}$ $\quad x+11=0$

$\boxed{x=-11}$

Intermediate Algebra – Chapter 8
Lesson 1, Day 2

21. $f(x) = 2x^2 - 2x - 12$

$2x^2 - 2x - 12 = 0$

$2(x^2 - x - 6) = 0$

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

$2 \neq 0$ $\quad x-3=0$ $\quad x+2=0$

$\boxed{x=3}$ $\quad \boxed{x=-2}$

22. $F(x) = 4x^2 - 12x + 9$

$4x^2 - 12x + 9 = 0$

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

$2x - 3 = 0$

$\frac{2x}{2} = \frac{3}{2}$

$\boxed{x = \frac{3}{2}}$

23. $g(x) = x^2 + 22x + 121$

$x^2 + 22x + 121 = 0$

$(x+11)(x+11) = 0$

$x + 11 = 0$

$\boxed{x = -11}$

24. $H(x) = x^2 + 19x + 84$

$x^2 + 19x + 84 = 0$

$(x+7)(x+12) = 0$

$x+7=0$ $\quad x+12=0$

$\boxed{x=-7}$ $\quad \boxed{x=-12}$

Intermediate Algebra – Chapter 8
Lesson 3, Day 1
Name _____

Solve the equation using the Quadratic Formula. If possible, use a graphing calculator to check your solution(s).

1. $x^2 - 4x + 3 = 0$

$a=1 \quad b=-4 \quad c=3$

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

$\frac{4\pm\sqrt{16-12}}{2} \Rightarrow \frac{4\pm\sqrt{4}}{2}$

$\frac{4\pm 2}{2} \Rightarrow \frac{4+2}{2} \quad \frac{4-2}{2}$

$\frac{6}{2} \quad \frac{2}{2}$

$\boxed{3} \quad \boxed{1}$

2. $3x^2 + 6x + 3 = 0$

$a=3 \quad b=6 \quad c=3$

$\frac{-6\pm\sqrt{(6)^2-4(3)(3)}}{2(3)} \Rightarrow \frac{-6\pm\sqrt{36-36}}{6}$

$\frac{-6\pm\sqrt{0}}{6} = \frac{-6}{6} = \boxed{-1}$

3. $x^2 + 6x + 15 = 0$

$a=1 \quad b=6 \quad c=15$

$\frac{-6\pm\sqrt{(6)^2-4(1)(15)}}{2(1)} \Rightarrow \frac{-6\pm\sqrt{36-60}}{2}$

$\frac{-6\pm\sqrt{-24}}{2} \Rightarrow \frac{-6\pm i\sqrt{4}\sqrt{6}}{2}$

$\frac{-6\pm 2i\sqrt{6}}{2} \Rightarrow \boxed{-3\pm i\sqrt{6}}$

4. $6x^2 - 2x + 1 = 0$

$a=6 \quad b=-2 \quad c=1$

$\frac{-(-2)\pm\sqrt{(-2)^2-4(6)(1)}}{2(6)} \Rightarrow \frac{2\pm\sqrt{4-24}}{12}$

$\frac{2\pm\sqrt{-20}}{12} \Rightarrow \frac{2\pm i\sqrt{4}\sqrt{5}}{12} \Rightarrow \frac{2\pm 2i\sqrt{5}}{12}$

$\boxed{\frac{1\pm i\sqrt{5}}{6}}$

5. $x^2 - 14x = -49$

$+49 \quad +49$

$x^2-14x+49$

$a=1 \quad b=-14 \quad c=49$

$\frac{-(-14)\pm\sqrt{(-14)^2-4(1)(49)}}{2(1)} \Rightarrow \frac{14\pm\sqrt{196-196}}{2}$

$\frac{14\pm\sqrt{0}}{2} \Rightarrow \frac{14}{2} \Rightarrow \boxed{7}$

6. $2x^2 + 4x = 30$

$-30 \quad -30$

$2x^2+4x-30=0$

$a=2 \quad b=4 \quad c=-30$

$\frac{-4\pm\sqrt{(4)^2-4(2)(-30)}}{2(2)} \Rightarrow \frac{-4\pm\sqrt{16+240}}{4}$

$\frac{-4\pm\sqrt{256}}{4} \Rightarrow \frac{-4\pm 16}{4} \Rightarrow \frac{-4+16}{4} \quad \frac{-4-16}{4}$

$\frac{12}{4} \quad \frac{-20}{4}$

$\boxed{3} \quad \boxed{-5}$

7. $3x^2 + 5 = -2x$

$+2x \quad +2x$

$3x^2+2x+5=0$

$a=3 \quad b=2 \quad c=5$

$\frac{-2\pm\sqrt{(2)^2-4(3)(5)}}{2(3)} \Rightarrow \frac{-2\pm\sqrt{4-60}}{6}$

$\frac{-2\pm\sqrt{-56}}{6} \Rightarrow \frac{-2\pm i\sqrt{4}\sqrt{14}}{6}$

$\frac{-2\pm 2i\sqrt{14}}{6} \Rightarrow \boxed{\frac{-1\pm i\sqrt{14}}{3}}$

8. $-3x = 2x^2 - 4$

$-2x^2+4 \quad -2x^2+4$

$-2x^2-3x+4=0$

$a=-2 \quad b=-3 \quad c=4$

$\frac{-(-3)\pm\sqrt{(-3)^2-4(-2)(4)}}{2(-2)} \Rightarrow \frac{3\pm\sqrt{9+32}}{-4}$

$\boxed{\frac{3\pm\sqrt{41}}{-4}}$

Intermediate Algebra – Chapter 8
Lesson 3, Day 1

9. $-10x = -25 - x^2$
$+25 \quad +x^2 \quad +25 \quad +x^2$
$x^2 - 10x + 25 = 0$
$a=1 \quad b=-10 \quad c=25$
$\frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(25)}}{2(1)} \Rightarrow \frac{10 \pm \sqrt{100-100}}{2}$
$\frac{10 \pm \sqrt{0}}{2} \Rightarrow \frac{10}{2} \Rightarrow \boxed{5}$

10. $-5x^2 - 6 = -4x$
$+4x \quad +4x$
$-5x^2 + 4x - 6 = 0$
$a=-5 \quad b=4 \quad c=-6$
$\frac{-4 \pm \sqrt{(4)^2 - 4(-5)(-6)}}{2(-5)} \Rightarrow \frac{-4 \pm \sqrt{16-120}}{-10}$
$\frac{-4 \pm \sqrt{-104}}{-10} \Rightarrow \frac{-4 \pm i\sqrt{4}\sqrt{26}}{-10} \Rightarrow \frac{-4 \pm 2i\sqrt{26}}{-10}$
$\boxed{\frac{-2 \pm i\sqrt{26}}{5}}$

11. $-4x^2 + 3x = -5$
$+5 \quad +5$
$-4x^2 + 3x + 5 = 0$
$a=-4 \quad b=3 \quad c=5$
$\frac{-3 \pm \sqrt{3^2 - 4(-4)(5)}}{2(-4)} \Rightarrow \frac{-3 \pm \sqrt{9+80}}{-8}$
$\boxed{\frac{-3 \pm \sqrt{89}}{-8}}$

12. $x^2 + 121 = -22x$
$+22x \quad +22x$
$x^2 + 22x + 121 = 0$
$a=1 \quad b=22 \quad c=121$
$\frac{-22 \pm \sqrt{(22)^2 - 4(1)(121)}}{2(1)} \Rightarrow \frac{-22 \pm \sqrt{484-484}}{2}$
$\frac{-22 \pm \sqrt{0}}{2} \Rightarrow \frac{-22}{2} \Rightarrow \boxed{-11}$

13. $-z^2 = -12z + 6$
$+12z - 6 \quad +12z - 6$
$-z^2 + 12z - 6 = 0$
$a=-1 \quad b=12 \quad c=-6$
$\frac{-12 \pm \sqrt{(12)^2 - 4(-1)(-6)}}{2(-1)} \Rightarrow \frac{-12 \pm \sqrt{144-24}}{-2}$
$\frac{-12 \pm \sqrt{120}}{-2} \Rightarrow \frac{-12 \pm \sqrt{4}\sqrt{30}}{-2}$
$\frac{-12 \pm 2\sqrt{30}}{-2}$
$\boxed{6 \pm \sqrt{30}}$

14. $-7w + 6 = -4w^2$
$+4w^2 \quad +4w^2$
$4w^2 - 7w + 6 = 0$
$a=4 \quad b=-7 \quad c=6$
$\frac{-(-7) \pm \sqrt{(-7)^2 - 4(4)(6)}}{2(4)}$
$\frac{7 \pm \sqrt{49-96}}{8} \Rightarrow \frac{7 \pm \sqrt{-47}}{8}$
$\boxed{\frac{7 \pm i\sqrt{47}}{8}}$

Intermediate Algebra – Chapter 8
Lesson 4, Day 1
Name _____

Graph the function. Label the vertex and axis of symmetry.

1. $F(x) = (x - 3)^2$

V: (3,0)
AofS: x=3

$f(2) = (2-3)^2$
$(-1)^2 = 1$
(2,1)
$f(1) = (1-3)^2$
$(-2)^2 = 4$
(1,4)

2. $H(x) = (x + 4)^2$

V: (-4,0)
AofS: x=-4

$f(-3) = (-3+4)^2$
$(1)^2 = 1$
(-3,1)
$f(-2) = (-2+4)^2$
$(2)^2 = 4$
(-2,4)

3. $g(x) = (x + 3)^2 + 5$

V: (-3,5)
AofS: x=-3

$f(-2) = (-2+3)^2+5$
$(1)^2+5$
$1+5 = 6$ (-2,6)
$f(-1) = (-1+3)^2+5$
$(2)^2+5$
$4+5 = 9$ (-1,9)

4. $Y = (x - 7)^2 - 1$

V: (7,-1)
AofS: x=7

$f(6) = (6-7)^2-1$
$(-1)^2-1$
$1-1=0$ (6,0)
$f(5) = (5-7)^2-1$
$(-2)^2-1$
$4-1=3$ (5,3)

5. $y = -4(x - 2)^2 + 4$

V: (2,4)
AofS: x=2

$f(1) = -4(1-2)^2+4$
$-4(-1)^2+4$
$-4(1)+4$
$-4+4=0$ (1,0)
$f(0) = -4(0-2)^2+4$
$-4(-2)^2+4$
$-4(4)+4$
$-16+4=-12$ (0,-12)

6. $G(x) = 2(x + 1)^2 - 3$

V: (-1,-3)
AofS: x=-1

$f(0) = 2(0+1)^2-3$
$2(1)^2-3$
$2(1)-3$
$2-3=-1$ (0,-1)
$f(1) = 2(1+1)^2-3$
$2(2)^2-3$
$2(4)-3$
$8-3=5$ (1,5)

7. $f(x) = -2(x - 1)^2 + 1$

V: (1,1)
AofS x=1

$f(0) = -2(0-1)^2+1$
$-2(-1)^2+1$
$-2(1)+1$
$-2+1=-1$ (0,-1)
$f(-1) = -2(-1-1)^2+1$
$-2(-2)^2+1$
$-2(4)+1$
$-8+1=-7$ (-1,-7)

8. $H(x) = 4(x + 4)^2 + 6$

V: (-4,6)
AofS x=-4

$f(-3) = 4(-3+4)^2+6$
$4(1)^2+6$
$4(1)+6$
$4+6=10$ (-3,10)
$f(-2) = 4(-2+4)^2+6$
$4(2)^2+6$
$4(4)+6$
$16+6=22$ (-2,22)

9. $y = -1/4(x + 2)^2 + 1$

V: (-2,1)
AofS x=-2

$f(-1) = -\frac{1}{4}(-1+2)^2+1$
$-\frac{1}{4}(1)^2+1$
$-\frac{1}{4}(1)+1$
$-\frac{1}{4}+\frac{4}{4} = \frac{3}{4}$ $(-1,\frac{3}{4})$
$f(0) = -\frac{1}{4}(0+2)^2+1$
$-\frac{1}{4}(2)^2+1$
$-\frac{1}{4}(4)+1$
$-1+1=0$
(0,0)

10. $Y = \frac{1}{2}(x - 3)^2 + 2$

V: (3,2)
AofS: x=3

$f(2) = \frac{1}{2}(2-3)^2+2$
$\frac{1}{2}(-1)^2+2$
$\frac{1}{2}(1)+2$
$\frac{1}{2}+\frac{4}{2} = \frac{5}{2}$ $(2,\frac{5}{2})$
$f(1) = \frac{1}{2}(1-3)^2+2$
$\frac{1}{2}(-2)^2+2$
$\frac{1}{2}(4)+2$
$2+2=4$ (1,4)

11. $f(x) = 0.4(x - 1)^2$

V: (1,0)
AofS: x=1

$f(0) = 0.4(0-1)^2$
$0.4(-1)^2$
$0.4(1)$
0.4 (0,0.4)
$f(-1) = 0.4(-1-1)^2$
$0.4(-2)^2$
$0.4(4)$
1.6 (-1,1.6)

12. $G(x) = 0.75x^2 - 5$

$x = \frac{-0}{2(.75)} = 0$
$f(0) = 0.75(0)^2-5$
$= 0-5$
-5
V: (0,-5)
AofS: x=0

$f(1) = 0.75(1)^2-5$
$0.75(1)-5$
$0.75-5$
-4.25 (1,-4.25)
$f(2) = 0.75(2)^2-5$
$0.75(4)-5$
$3-5$
-2 (2,-2)

Intermediate Algebra – Chapter 8
Lesson 4, Day 1

Use the axis of symmetry to match the equation with its graph.

13. $Y = 2(x - 3)^2 + 1$

C

14. $Y = (x + 4)^2 - 2$

D

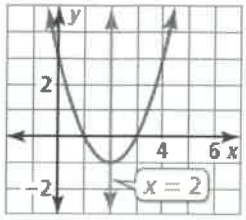
15. $y = \frac{1}{2}(x + 1)^2 + 3$

B

16. $y = (x - 2)^2 - 1$

A

A)



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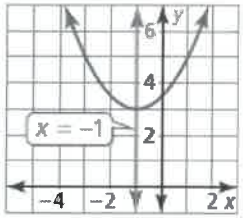

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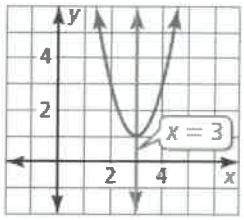

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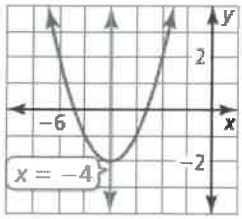


Graph the function. Label the vertex and axis of symmetry.

17. $y = x^2 + 2x + 1$

$x = -\frac{b}{2a}$ $\frac{-2}{2(1)} = \frac{-2}{2} = -1$

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

$f(0) = (0)^2 + 2(0) + 1$
$= 0 + 0 + 1$
$= 1$ $(0,1)$

$f(1) = (1)^2 + 2(1) + 1$
$1 + 2 + 1$
4 $(1,4)$

V: $(-1,0)$ AoS $x = -1$

18. $Y = 3x^2 - 6x + 4$

$-\frac{-6}{2(3)} = -\frac{-6}{6} = 1$

$f(1) = 3(1)^2 - 6(1) + 4$
$3(1) - 6 + 4$
$3 - 6 + 4$
$-3 + 4 = 1$

V: $(1,1)$ AoS $(x = 1$

$f(0) = 3(0)^2 - 6(0) + 4$
$3(0) - 0 + 4$
$0 - 0 + 4$ $(0,4)$
4

$f(-1) = 3(-1)^2 - 6(-1) + 4$
$3(1) + 6 + 4$
$3 + 6 + 4$
13 $(-1,13)$

19. $y = -4x^2 + 8x + 2$

$\frac{-8}{2(-4)} = \frac{-8}{-8} = 1$

$f(1) = -4(1)^2 + 8(1) + 2$
$-4 + 8 + 2$
$4 + 2$
6

V: $(1,6)$ AoS $= x = 1$

$f(0) = 2$

$f(-1) = -4(-1)^2 + 8(-1) + 2$
$-4(1) - 8 + 2$
$-4 - 8 + 2$
$-12 + 2$
-10 $(-1,-10)$

20. $F(x) = -x^2 - 6x + 3$

$-\frac{-6}{2(-1)} = -\frac{6}{2} = -3$

$f(-3) = -(-3)^2 - 6(-3) + 3$
$-(9) + 18 + 3$
$9 + 3$
12

V $(-3,12)$
AoS $x = -3$

$f(0) = 3$
$(0,3)$

$f(-2) = -(-2)^2 - 6(-2) + 3$
$-(4) + 12 + 3$
$8 + 3$
$(-2,11)$

21. $g(x) = -x^2 - 1$

$\frac{-0}{2(-1)} = 0$

$f(0) = -1$

V $(0,-1)$

AoS $x = 0$

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

$f(2) - (2)^2 - 1$
$-4 - 1$
-5 $(2,-5)$

22. $F(x) = 6x^2 - 5$

$\frac{-0}{2(6)} = 0$

$f(0) = -5$

V: $(0,-5)$

AoS $x = 0$

$f(1) = 6(1)^2 - 5$
$= 6(1) - 5$
$= 6 - 5$
1
$(1,1)$

$f(2) = 6(2)^2 - 5$
$6(4) - 5$
$24 - 5$
19
$(2,19)$

23. $g(x) = -1.5x^2 + 3x + 2$

$\frac{-3}{2(-1.5)} = \frac{-3}{-3} = 1$

$f(1) = -\frac{3}{2}(1)^2 + 3(1) + 2$
$-\frac{3}{2}(1) + 3 + 2$
$-\frac{3}{2} + \frac{6}{2} + \frac{4}{2}$
$\frac{3}{2} + \frac{4}{2} = \frac{7}{2}$

V: $(1, \frac{7}{2})$
AoS $x = 1$
$f(0) = 2$
$(0,2)$

$f(-1) = -\frac{3}{2}(-1)^2 + 3(-1) + 2$
$-\frac{3}{2}(1) - 3 + 2$
$-\frac{3}{2} - \frac{6}{2} + \frac{4}{2}$
$-\frac{9}{2} + \frac{4}{2}$
$-\frac{5}{2}$
$(-1, -\frac{5}{2})$

24. $F(x) = 0.5x^2 + x - 3$

$-\frac{1}{2(\frac{1}{2})} = -\frac{1}{1} = -1$

$f(-1) = \frac{1}{2}(-1)^2 + (-1) - 3$
$\frac{1}{2}(1) - 1 - 3$
$\frac{1}{2} - \frac{2}{2} - \frac{6}{2}$
$-\frac{1}{2} - \frac{6}{2}$
$-\frac{7}{2}$

V: $(-1, -\frac{7}{2})$
AoS $x = -1$
$f(0) = -3$
$(0,-3)$

$f(1) = \frac{1}{2}(1)^2 + 1 - 3$
$\frac{1}{2}(1) + 1 - 3$
$\frac{1}{2} + \frac{2}{2} - \frac{6}{2}$
$\frac{3}{2} - \frac{6}{2}$
$-\frac{3}{2}$
$(1, -\frac{3}{2})$

25. $y = 3/2x^2 - 3x + 6$

$-\frac{-3}{2(\frac{3}{2})} = \frac{3}{3} = 1$

$f(1) = \frac{3}{2}(1)^2 - 3(1) + 6$
$\frac{3}{2}(1) - 3 + 6$
$\frac{3}{2} - \frac{6}{2} + \frac{12}{2}$
$-\frac{3}{2} + \frac{12}{2}$
$\frac{9}{2}$

V: $(1, -\frac{9}{2})$
AoS: $x = 1$
$f(0) = 6$
$(0,6)$

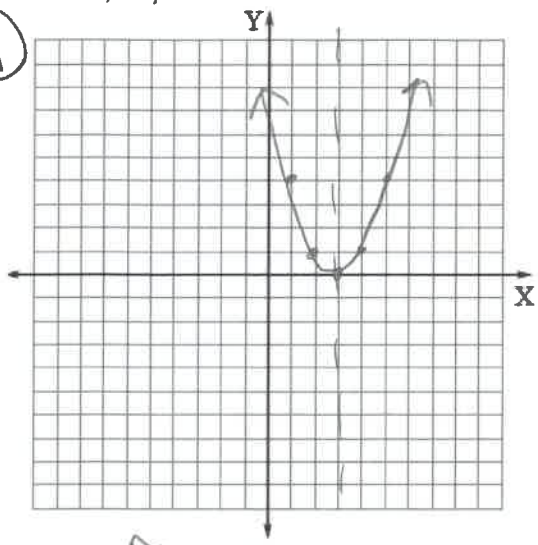
$f(-1) = \frac{3}{2}(-1)^2 - 3(-1) + 6$
$\frac{3}{2}(1) + 3 + 6$
$\frac{3}{2} + \frac{6}{2} + \frac{12}{2}$
$\frac{21}{2}$
$(-1, \frac{21}{2})$

26. $Y = -5/2x^2 - 4x - 1$

Typo, Don't worry about doing this one :)

Intermediate Algebra – Chapter 8
Lesson 4, Day 1

1



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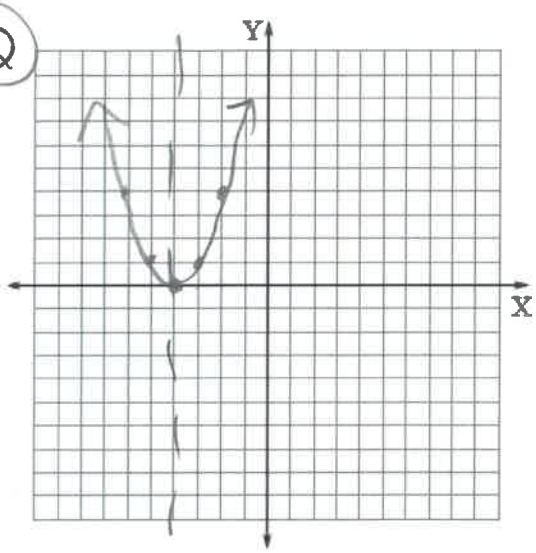

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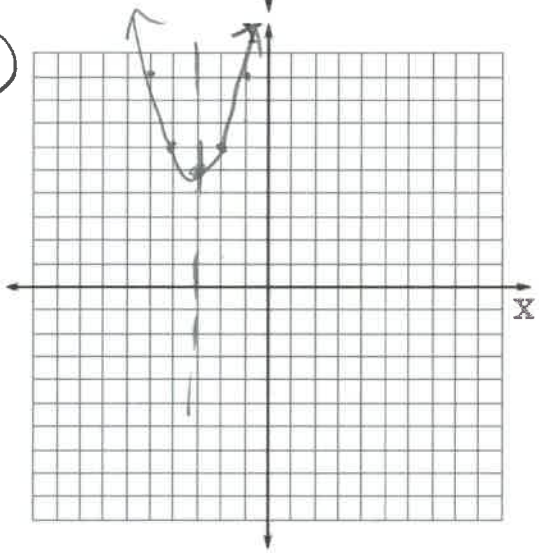

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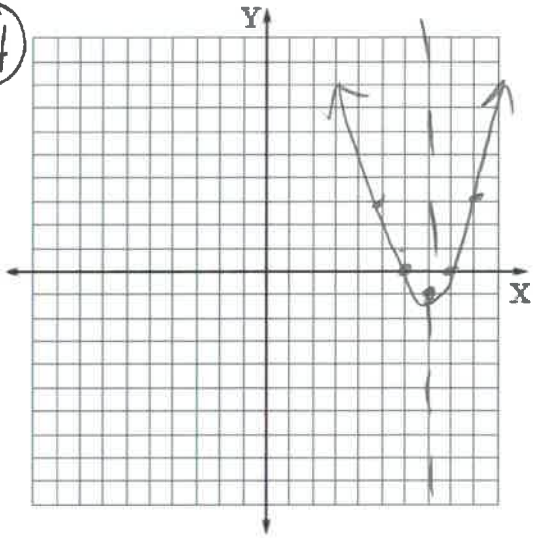

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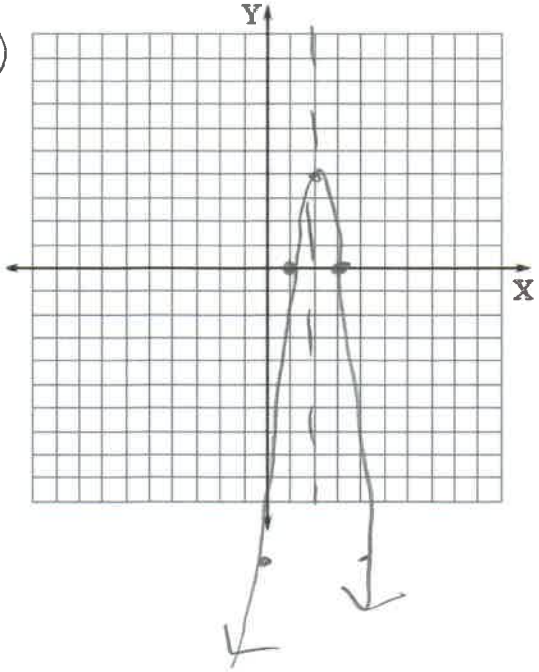

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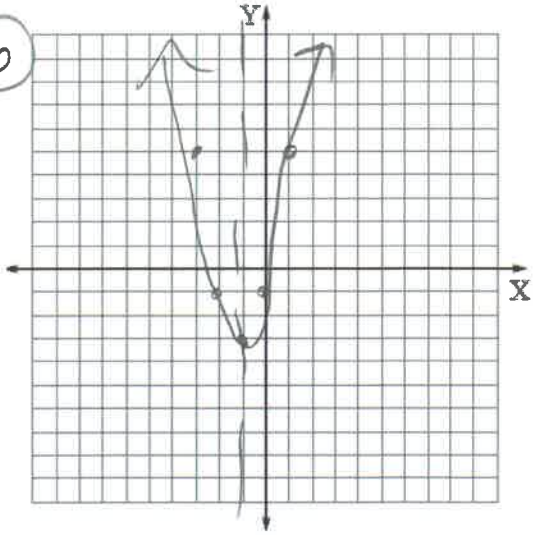

Intermediate Algebra – Chapter 8
Lesson 4, Day 1

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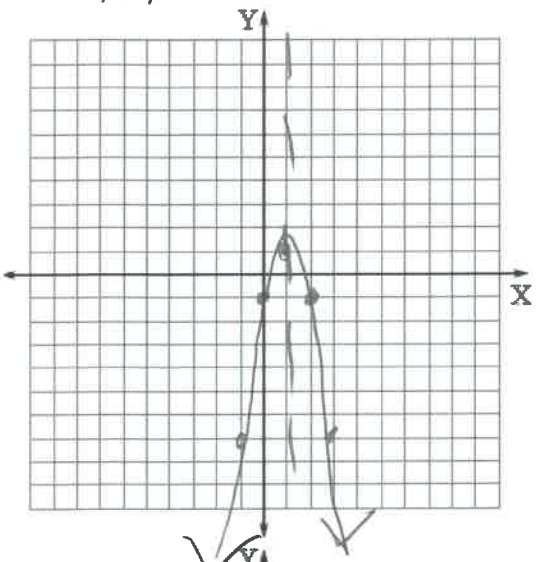

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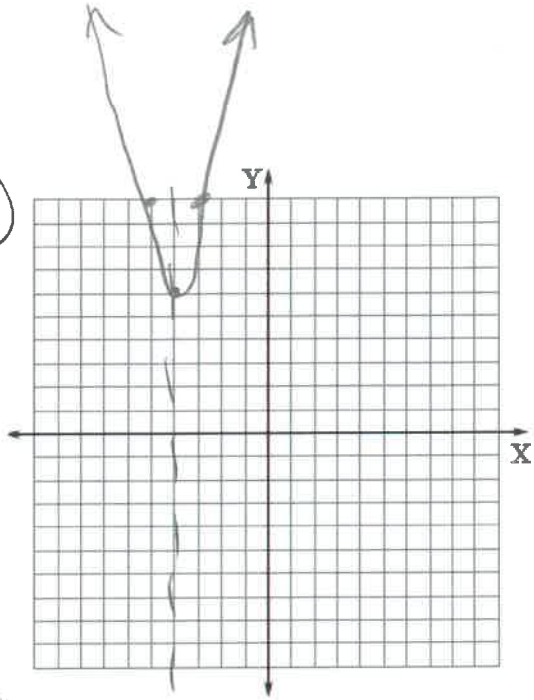

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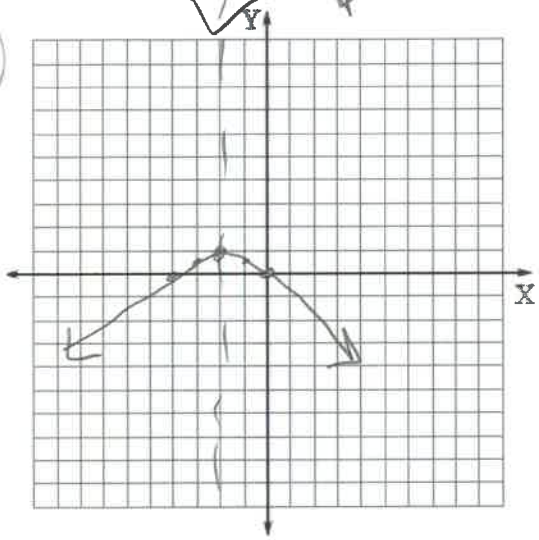

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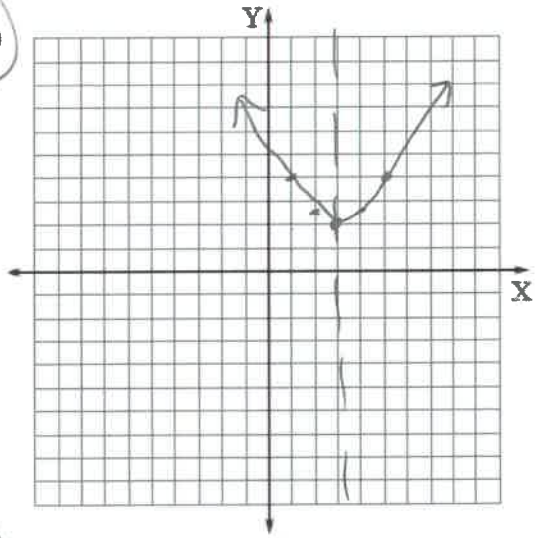

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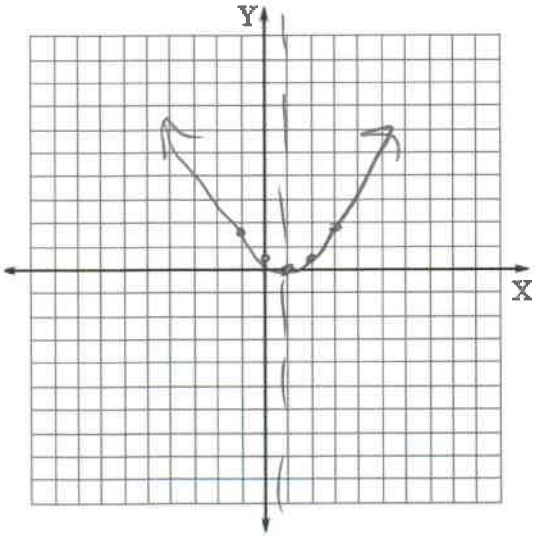

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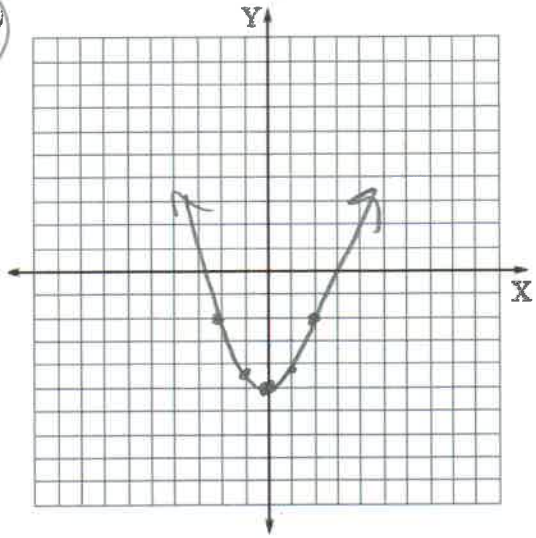

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Lesson 4, Day 1

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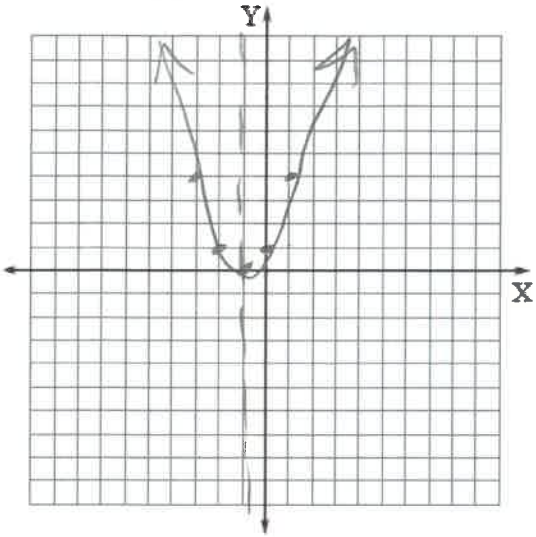

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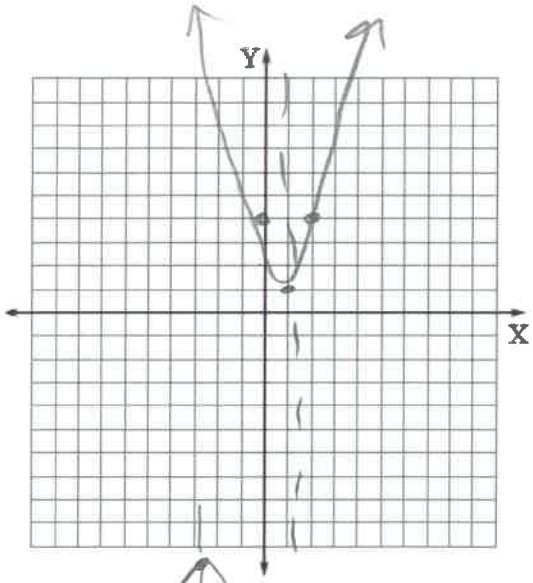

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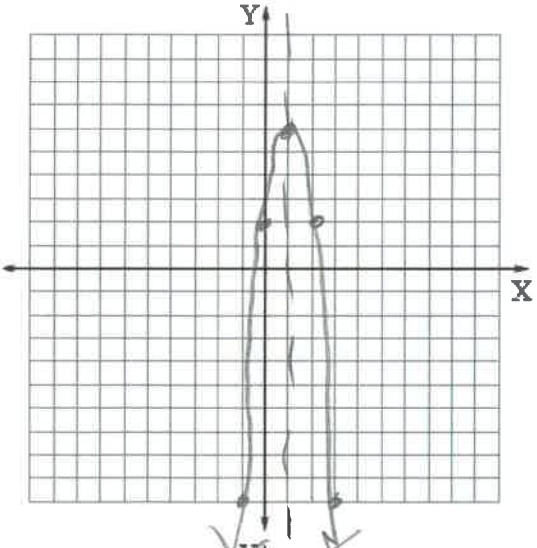

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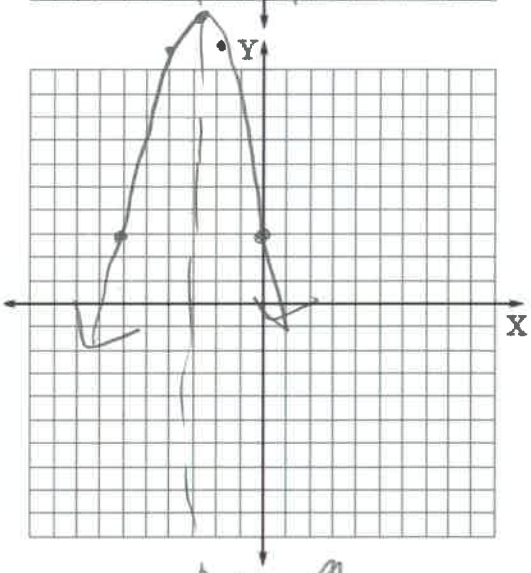

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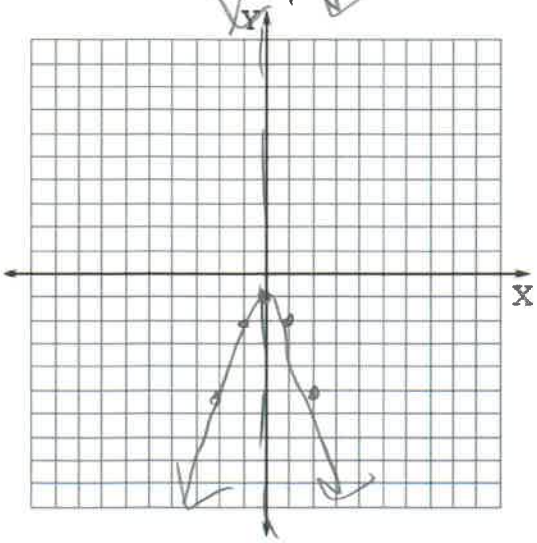

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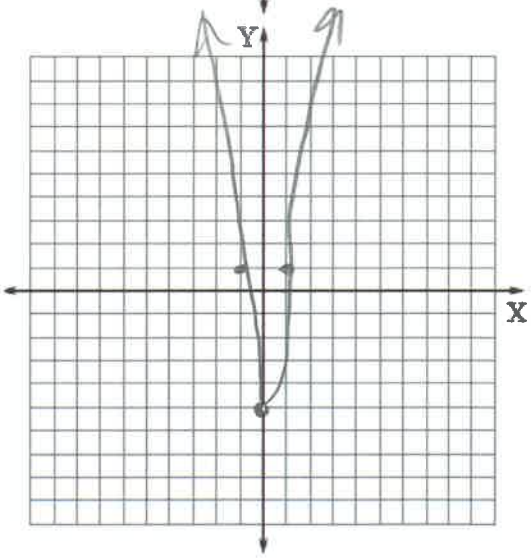

Intermediate Algebra – Chapter 8
Lesson 4, Day 1

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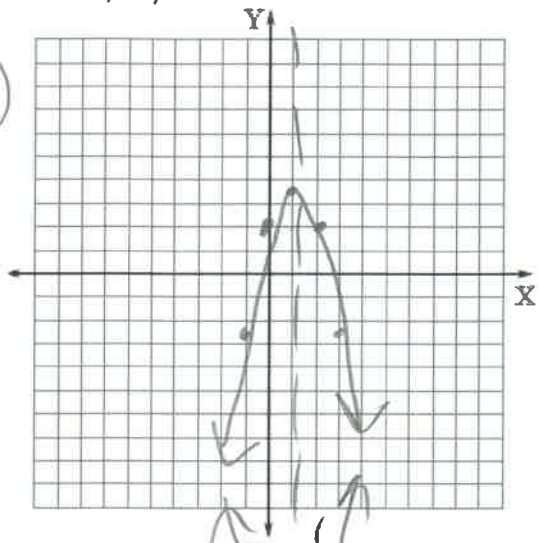

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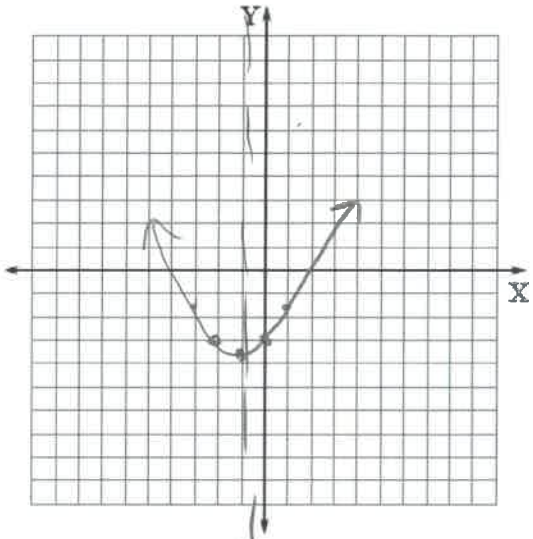

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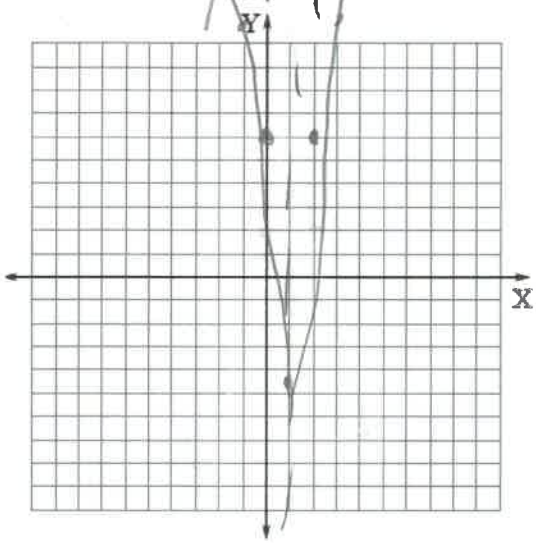

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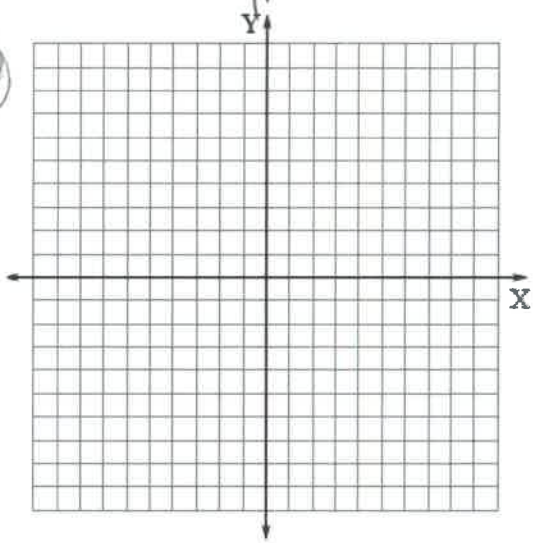


Intermediate Algebra – Chapter 8
Lesson 4, Day 2
Name _____

Find the minimum or maximum value of the function. Describe the domain and range of the function, and where the function is increasing and decreasing.

1. $Y = 6x^2 - 1$

a is positive - opens up
min value
Vertex: $\frac{0}{2(6)} = 0$
$(0,-1)$
Minimum $(0,-1)$
D: ARN
R: $y \geq -1$
Inc when $x > 0$
dec when $x < 0$

2. $Y = 9x^2 + 7$

a is positive - opens up
min value
Vertex: $\frac{0}{2(9)} = 0$
$(0,7)$
minimum $(0,7)$
D: ARN
R: $y \geq 7$
Inc when $x > 0$
dec when $x < 0$

3. $y = -x^2 - 4x - 2$

a is neg - opens down
max value
Vertex: $-\frac{-4}{2(-1)} = \frac{4}{-2} = -2$
$f(-2) = -(-2)^2 - 4(-2) - 2$
$-(4) + 8 - 2$
$4 - 2$
2
$(-2,0)$
max $(-2,0)$
D: ARN
R: $y \leq 0$
Inc when $x < -2$
dec when $x > -2$

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

a is negative - opens down
max value
$-\frac{-6}{2(-3)} = -\frac{6}{6} = -1$
$f(-1) = -3(-1)^2 - 6(-1) + 5$
$-3(1) + 6 + 5$
$-3 + 6 + 5$
$3 + 5$
8
$(-1,8)$
max $(-1,8)$
D: ARN
R: $y \leq 8$
Inc when $x < -1$
dec when $x > -1$

5. $f(x) = -2x^2 + 8x + 7$

a is negative → opens down
max value
$-\frac{8}{2(-2)} = \frac{-8}{-4} = 2$
$f(2) = -2(2)^2 + 8(2) + 7$
$-2(4) + 16 + 7$
$-8 + 16 + 7$
$8 + 7$
15
$(2,15)$
max: $(2,15)$
D: ARN
R: $y \leq 15$
Inc when $x < 2$
dec when $x > 2$

6. $F(x) = 3x^2 + 18x - 5$

a is positive - opens up
min value
$-\frac{18}{2(3)} = \frac{-18}{6} = -3$
$f(-3) = 3(-3)^2 + 18(-3) - 5$
$3(9) - 54 - 5$
$27 - 54 - 5$
$-27 - 5$
-32
$(-3,-32)$
min $(-3,-32)$
D: ARN
R: $y \geq -32$
Inc when $x > -3$
dec when $x < -3$

Intermediate Algebra – Chapter 8
Lesson 4, Day 2

7. $g(x) = 2x^2 - 12x$

a is pos → opens up
min value

$\frac{-12}{2(2)} = \frac{12}{4} = 3$

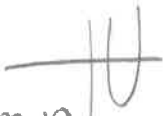
$f(3) = 2(3)^2 - 12(3)$
$2(9) - 36$
$18 - 36$
-18

$(3, -18)$

min $(3, -18)$
D: ARN
R: $y \geq -18$

Inc when $x > 3$
dec when $x < 3$

8. $G(x) = x^2 - 4x$



a is positive → opens up
min value

$\frac{-4}{2(1)} = \frac{4}{2} = 2$

$f(2) = (2)^2 - 4(2)$
$4 - 8$
-4

$(2, -4)$

min $(2, -4)$
D ARN
R: $y \geq -4$

Inc when $x > 2$
dec when $x < 2$

9. $y = \frac{1}{4}x^2 - 3x + 2$

a is positive → opens up
min value

$\frac{-(-3)}{2(\frac{1}{4})} = \frac{3}{\frac{1}{2}} = 3 \cdot \frac{2}{1} = 6$

$f(6) = \frac{1}{4}(6)^2 - 3(6) + 2$
$\frac{1}{4}(36) - 18 + 2$
$9 - 18 + 2$
$-9 + 2$
-7

$(6, -7)$

min $(6, -7)$
D: ARN
R: $y \geq -7$

Inc when $x > 6$
dec when $x < 6$

10. $F(x) = 3/2x^2 + 6x + 4$

a is positive → opens up
min value

$\frac{-6}{2(\frac{3}{2})} = \frac{-6}{3} = -2$

$f(-2) = \frac{3}{2}(-2)^2 + 6(-2) + 4$
$\frac{3}{2}(4) - 12 + 4$
$6 - 12 + 4$
$-6 + 4$
-2

$(-2, -2)$

min $(-2, -2)$
D: ARN
R: $y \geq -2$

Inc when $x > -2$
dec when $x < -2$

11. The path of a diver is modeled by the function $f(x) = -9x^2 + 9x + 1$, where $f(x)$ is the height of the diver (in meters) above the water and x is the horizontal distance (in meters) from the end of the diving board.

a. What is the height of the diving board?

$f(0) = 1$

1 meter

b. What is the maximum height of the diver?

$\frac{-9}{2(-9)} = \frac{-9}{18} = \frac{1}{2}$

$f(\frac{1}{2}) = -9(\frac{1}{2})^2 + 9(\frac{1}{2}) + 1$
$9(\frac{1}{4}) + \frac{9}{2} + 1$

$-\frac{9}{4} + \frac{18}{4} + \frac{4}{4}$
$\frac{27}{4} + \frac{4}{4}$
$\frac{31}{4}$

≈ 7.75 m

c. Describe where the diver is ascending and where the diver is descending.

ascending $x < \frac{1}{2}$ m
descending $x > \frac{1}{2}$ m

Intermediate Algebra – Chapter 8
Lesson 4, Day 2

12. The engine torque y (in foot-pounds) of one model of car is given by $y = -3.75x^2 + 23.2x + 38.8$, where x is the speed (in thousands of revolutions per minute) of the engine.

a. Find the engine speed that maximizes the torque. What is the maximum torque?

$\frac{-23.2}{2(-3.75)} = \frac{23.2}{7.5} \approx 3.1$ speed

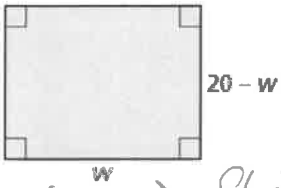
$f(3.1) = -3.75(3.1)^2 + 23.2(3.1) + 38.8$
$\Rightarrow \approx 74.7 \rightarrow$ max

b. Explain what happens to the engine torque as the speed of the engine increases.

as torque increases to 3.1, speed increases
after 3.1, speed decreases

Write an equation for the area of the figure. Then determine the maximum possible area of the figure.

13.

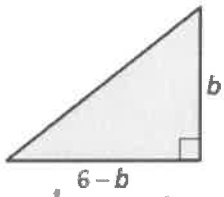


$w(20-w) = f(x)$
$20w - w^2$
$\boxed{-w^2 + 20w = f(x)}$

$-\frac{20}{2(-1)} = \frac{20}{2} = 10$

$f(10) = -(10)^2 + 20(10)$
$= -100 + 200$
$\boxed{100 \text{ - max area}}$

14.



$b(6-b) = f(x)$
$6b - b^2$
$\boxed{-b^2 + 6b = f(x)}$

$-\frac{6}{2(-1)} = \frac{-6}{-2} = 3$

$f(3) = -(3)^2 + 6(3)$
$-9 + 18$
9

$\boxed{\text{max area} = 9}$

Graph the function, label the x-intercept(s), vertex, and axis of symmetry.

15. $y = (x + 3)(x - 3)$

$\frac{3-3}{2} = \frac{0}{2} = 0$

$f(0) = (0+3)(0-3)$
$= (3)(-3)$
$= -9$

V: $(0, -9)$
x-int: $-3, 3$
AfS: $x = 0$
$(0, -9)$

16. $y = (x + 1)(x - 3)$

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

$f(1) = (1+1)(1-3)$
$= (2)(-2)$
$= -4$

V: $(1, -4)$
x-int: $-1, 3$
AfS: $x = 1$

17. $y = 2(x + 2)(x + 6)$

$\frac{-2-6}{2} = \frac{-8}{2} = -4$

$f(-4) = 2(-4+2)(-4+6)$
$= 2(-2)(2)$
$= -8$

V: $(-4, -8)$
x-int: $-2, -6$
AfS: $x = -4$

18. $F(x) = 2(x - 5)(x - 1)$

$\frac{5+1}{2} = \frac{6}{2} = 3$

$f(3) = 2(3-5)(3-1)$
$2(-2)(2)$
-8

V: $(3, -2)$
x-int: $5, 1$
AfS: $x = 3$

19. $g(x) = -x(x + 6)$

$\frac{0-6}{2} = -\frac{6}{2} = -3$

$f(-3) = -(-3)(-3+6)$
$3(3)$
9

V: $(-3, 9)$
x-int: $0, -6$
AfS: $x = -3$

20. $y = -4x(x + 7)$

$\frac{0-7}{2} = \frac{-7}{2}$

$f(-\frac{7}{2}) = -4(-\frac{7}{2})(-\frac{7}{2} + \frac{14}{2})$
$= 14(\frac{7}{2})$
$= 49$

V: $(-\frac{7}{2}, 49)$
x-int: $0, -7$
AfS: $x = -\frac{7}{2}$

Intermediate Algebra – Chapter 8
Lesson 4, Day 2

21. $g(x) = -2(x - 3)^2$

V: (3,0)
X-int - 3
AoS: x=3

22. $Y = 4(x - 7)^2$

V: (7,0)
x-int: 7
AoS: x=7

Identify the x-intercepts of the function and describe where the graph is increasing and decreasing. If possible, use a graphing calculator to verify your answer.

23. $Y = \frac{1}{2}(x - 2)(x + 6)$ a pos-open up

X-int: 2, -6
$\frac{2+6}{2} = \frac{-4}{2} = -2$
$f(-2) = \frac{1}{2}(-2-2)(-2+6)$
$= \frac{1}{2}(-4)(4)$
$= \frac{1}{2}(-16) = -8$

Inc when x > -2
dec when x < -2

24. $Y = \frac{3}{4}(x + 1)(x - 3)$ a pos-open up

X-int: -1, 3
$\frac{-1+3}{2} = \frac{2}{2} = 1$
$f(1) = \frac{3}{4}(1+1)(1-3)$
$\frac{3}{4}(2)(-2)$
$\frac{3}{2}(-4) = 3$

Inc when x > 1
dec when x < 1

25. $f(x) = -4(x - 4)(x - 2)$ a neg → open down

X-int: 4, 2
$\frac{4+2}{2} = \frac{6}{2} = 3$
$f(3) = -4(3-4)(3-2)$
$-4(-1)(1)$
4

Inc when x > 3
dec when x < 3

26. $H(x) = -5(x + 5)(x + 1)$ a neg-opens down

X-int: -5, -1
$\frac{-5-1}{2} = \frac{-6}{2} = -3$
$f(-3) = -5(-3+5)(-3+1)$
$-5(2)(-2)$
20

Inc when x > -3
dec when x < -3

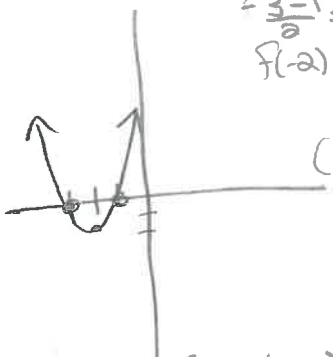
27. Compare the graphs of the three quadratic functions. What do you notice? Rewrite the functions f and g in standard form to justify your answer.

$f(x) = (x + 3)(x + 1)$

$g(x) = (x + 2)^2 - 1$

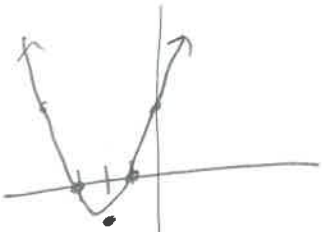
$h(x) = x^2 + 4x + 3$

$f(x) = (x+3)(x+1)$
$\frac{-3-1}{2} = \frac{-4}{2} = -2$
$f(-2) = (-2+3)(-2+1)$
$= (1)(-1)$
$= -1$
$(-2, -1)$



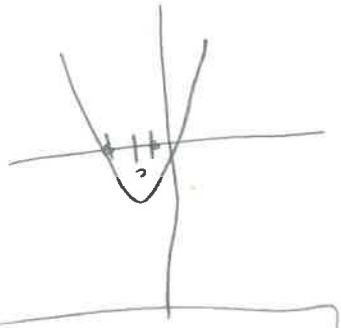
$f(x) = (x+3)(x+1)$
$= x^2+3x+x+3$
$\boxed{= x^2+4x+3}$

$g(x) = (x+2)^2 - 1$
V: (-2, -1)
$g(-1) = (-1+2)^2 - 1$
$(1)^2 - 1$
0
$g(0) = (0+2)^2 - 1$
$(2)^2 - 1$
$4 - 1$
3



$g(x) = (x+2)^2 - 1$
$(x+2)(x+2) - 1$
$(x^2 + 2x + 2x + 4) - 1$
$(x^2 + 4x + 4 - 1$
$\boxed{x^2 + 4x + 3}$

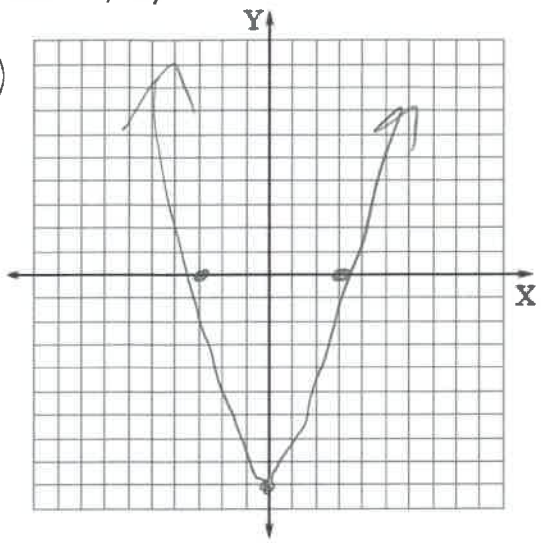
$h(x) = x^2 + 4x + 3$
$\frac{-4}{2(1)} = \frac{-4}{2} = -2$
$h(-2) = (-2)^2 + 4(-2) + 3$
$(4) - 8 + 3$
$-4 + 3$
-1



$\boxed{h(x) = x^2 + 4x + 3}$

Intermediate Algebra – Chapter 8
Lesson 4, Day 2

15



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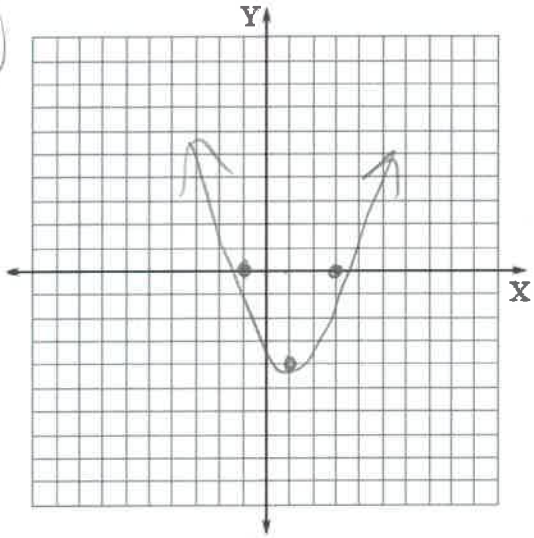

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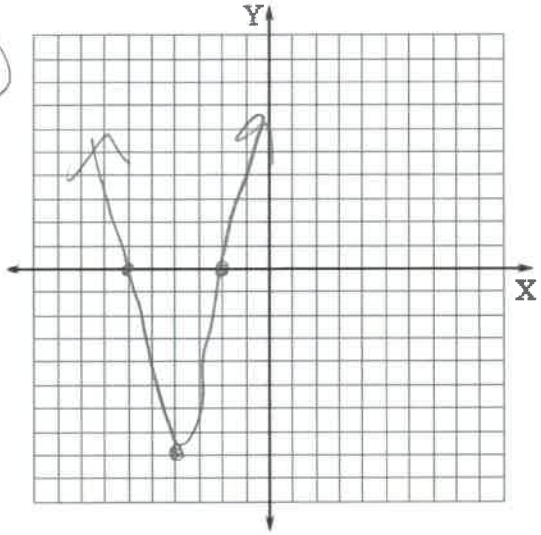

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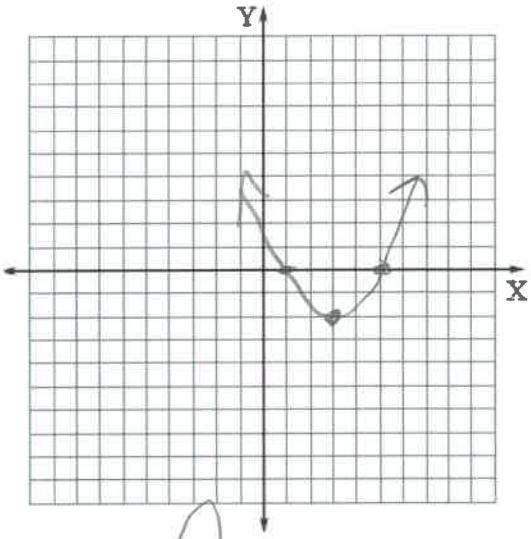

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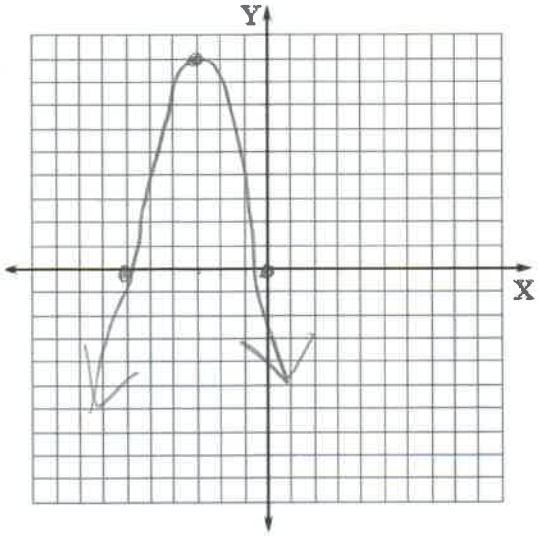

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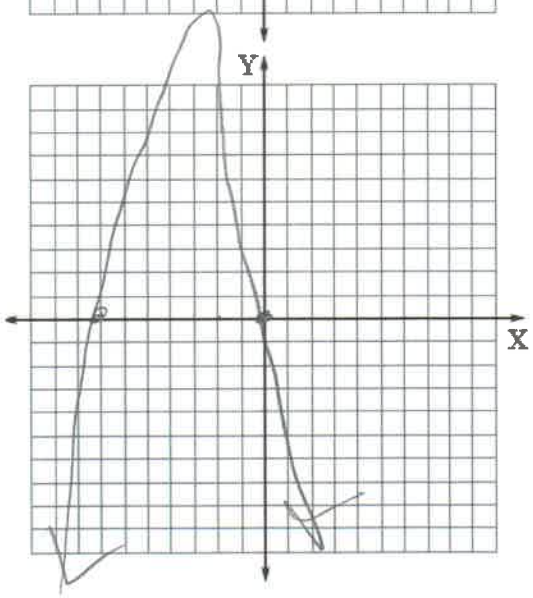
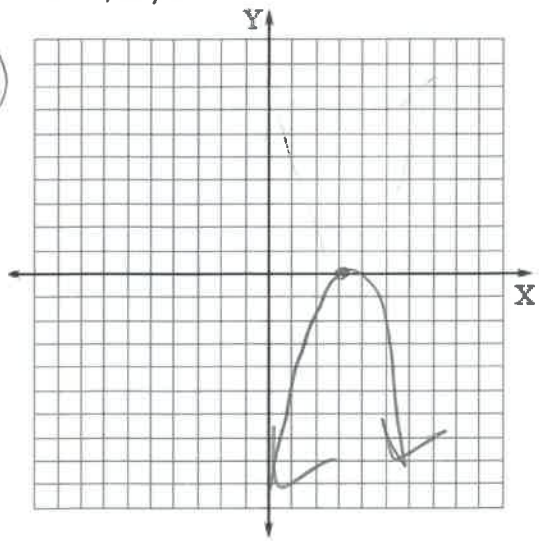
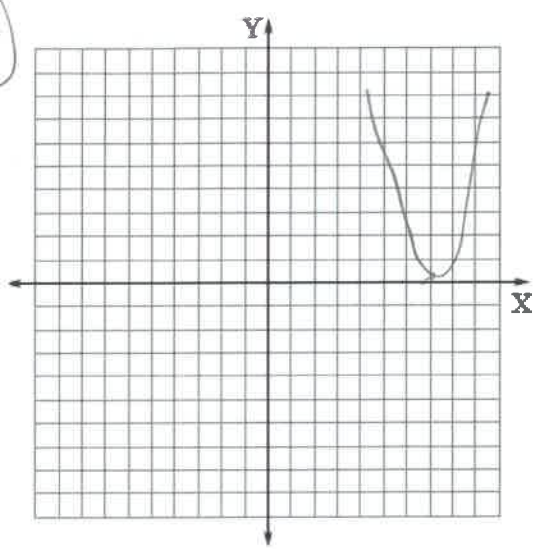


Intermediate Algebra – Chapter 8
Lesson 4, Day 2

21



22



Intermediate Algebra – Chapter 8
Lesson 5

Name _____

Match the inequality with its graph.

1. $y \le x^2 + 4x + 3$

$\frac{-4}{2(1)} = \frac{4}{2} = -2$

Test $(-2,1)$

$1 \le (-2)^2 + 4(-2) + 3$

$1 \le 4 - 8 + 3$

$1 \le -4 + 3$

$1 \le -1$ No!

C

2. $y > -x^2 + 4x - 3$

A

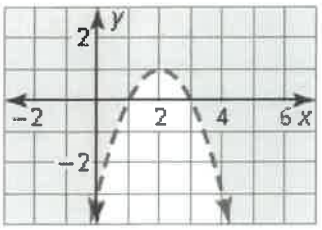
3. $y < x^2 - 4x + 3$

B

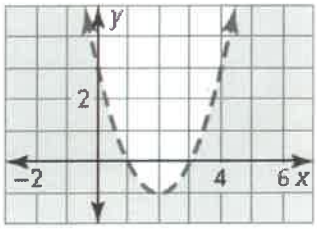
4. $y \ge x^2 + 4x + 3$

D

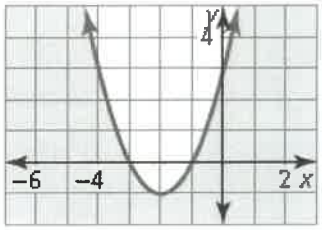
A.



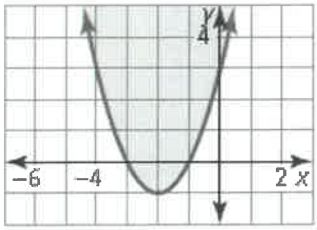
B.



C.

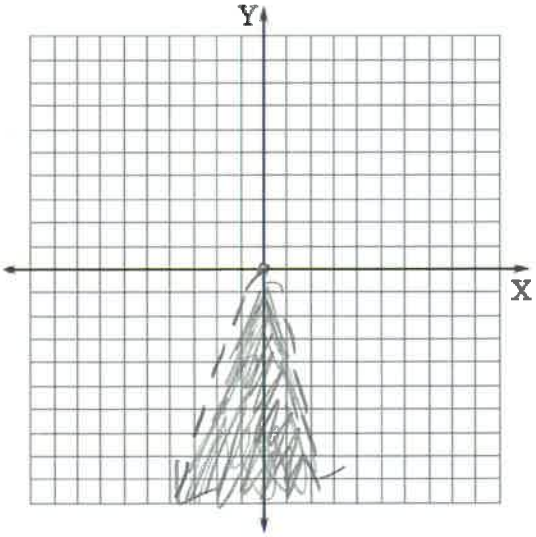


D.



Graph the inequality.

5. $Y < -x^2$

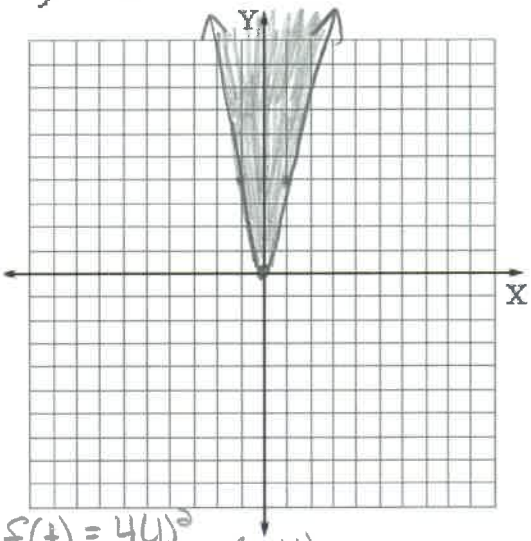


Test $(0,-3)$

$-3 < 0$

Yes!

6. $y \ge 4x^2$



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

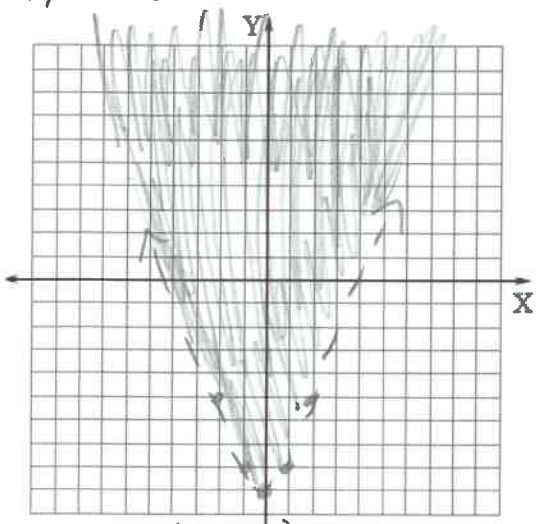
Test: $(0,5)$

$5 \ge 4(0)$

$5 \ge 4$ Yes!

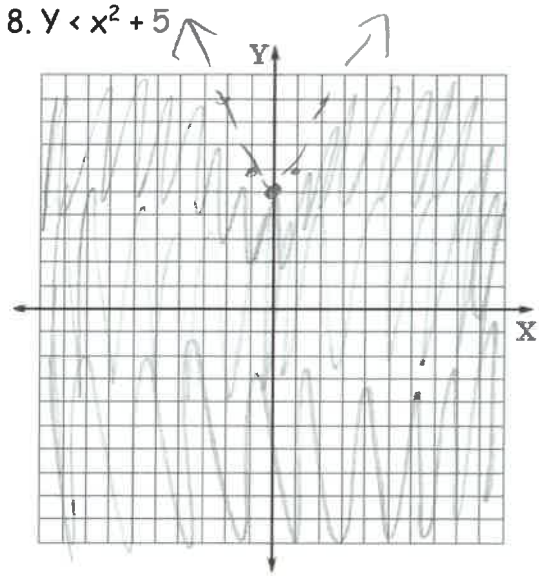
Intermediate Algebra – Chapter 8
Lesson 5

7. $y > x^2 - 9$



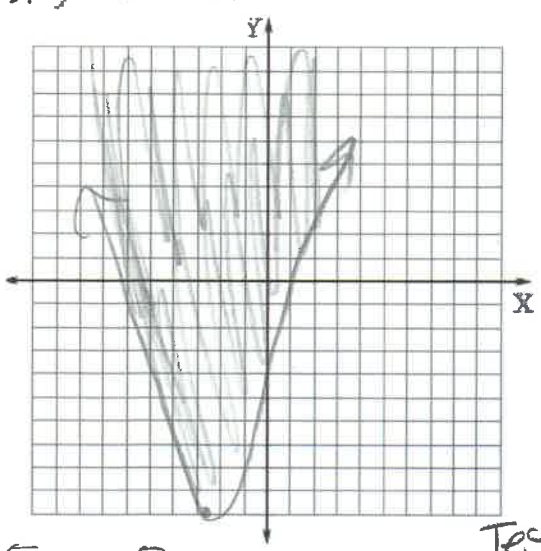
Test (0, 0)
$0 > 0^2 - 9$
$0 > -9$ Yes!

8. $y < x^2 + 5$



Test (0,0)
$0 < 0^2 + 5$
$0 < 5$ Yes!

9. $y \le x^2 + 5x$



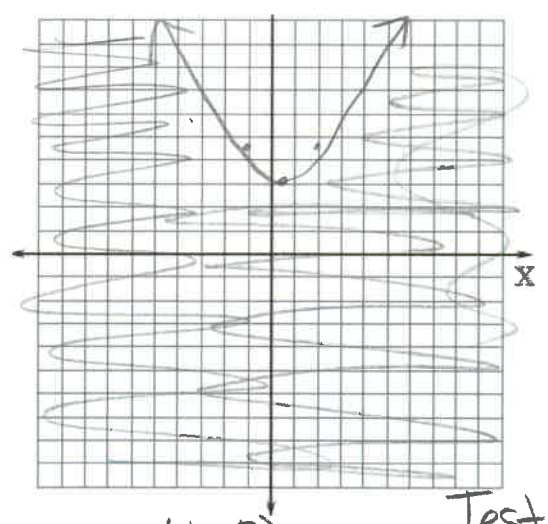
$\frac{-5}{2(1)} = -\frac{5}{2}$

$\left(-\frac{5}{2}\right)^2 + 5\left(-\frac{5}{2}\right)$

$\frac{25}{4} - \frac{25}{2} \Rightarrow \frac{25}{4} - \frac{50}{2} = -\frac{25}{2}$

Test (-5,0)
$0 \le (-5)^2 + 5(-5)$
$0 \le 25 - 25$
$0 \le 0$ Yes!

10. $y \le \left(x - \frac{1}{2}\right)^2 + \frac{5}{2}$



V: $\left(\frac{1}{2}, \frac{5}{2}\right)$

$f(-1) = \left(-1 - \frac{1}{2}\right)^2 + \frac{5}{2}$

$= \left(-\frac{3}{2}\right)^2 + \frac{5}{2}$

$\frac{9}{4} + \frac{10}{4}$

$\frac{19}{4}$

Test (0,0)
$0 \le \left(0 - \frac{1}{2}\right)^2 + \frac{5}{2}$
$0 \le \left(-\frac{1}{2}\right)^2 + \frac{5}{2}$
$0 \le \frac{1}{4} + \frac{10}{4}$
$0 \le \frac{11}{4}$ Yes!

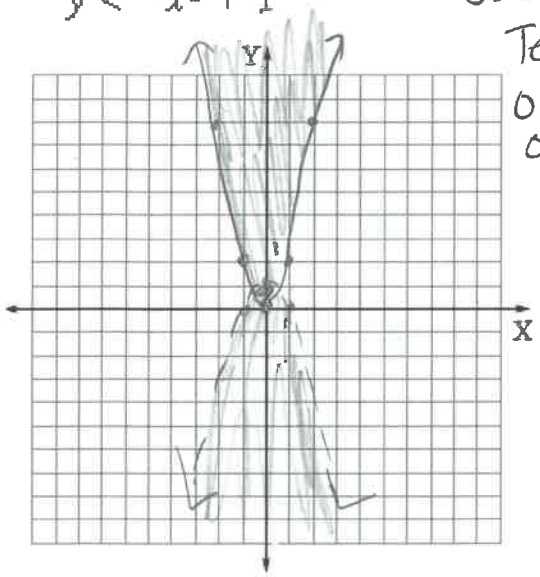
Intermediate Algebra – Chapter 8
Lesson 5

Graph the system of quadratic inequalities.

11. $y \geq 2x^2$
$y < -x^2 + 1$

Test (0,5)
$5 \geq 2(0)^2$
$5 \geq 0$ Yes!

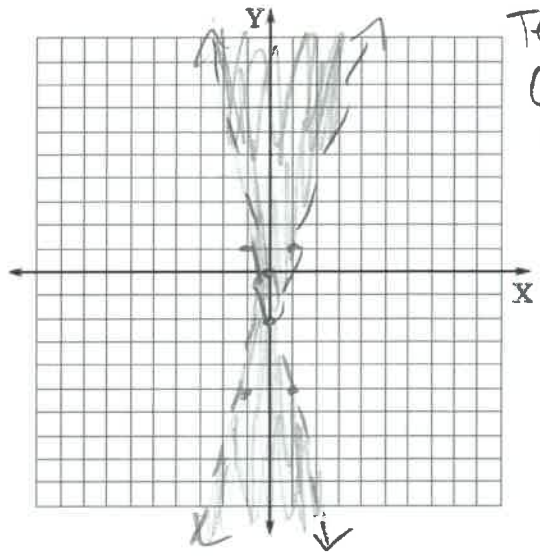
Test (0,0)
$0 < -(0)^2 + 1$
$0 < 1$ Yes



12. $y > -5x^2$
$y > 3x^2 - 2$

Test (0,-3)
$-3 > -5(0)^2$
$-3 > 0$ Yes

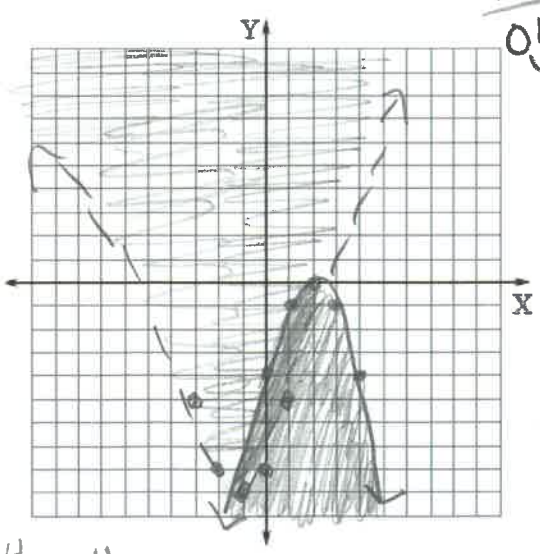
Test (0,0)
$0 > 3(0)^2 - 2$
$0 > -2$
Yes



13. $y \leq -x^2 + 4x - 4$
$y < x^2 + 2x - 8$

Test (0,0)
$0 \leq -4$ No!

Test (0,0)
$0 < -8$
Yes!

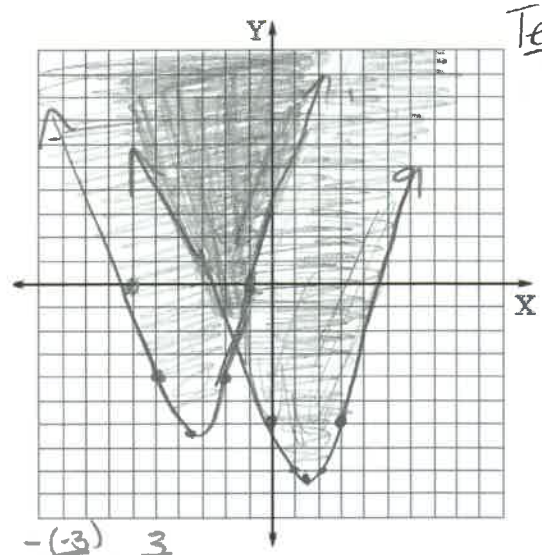


$\frac{-4}{2(-1)} = \frac{-4}{-2} = 2$
$f(2) = -(2)^2 + 4(2) - 4 \Rightarrow -4 + 8 - 4 \Rightarrow 0$
$V(2,0)$
$f(1) = -(1)^2 + 4(1) - 4 \Rightarrow -1 + 4 - 4 \Rightarrow -1$ $(1,-1)$
$f(0) = -4$ $(0,-4)$
$\frac{-2}{2(1)} = \frac{-2}{2} = -1$
$f(-1) = (-1)^2 + 2(-1) - 8 \Rightarrow 1 - 2 - 8 = -9$ $(-1,-9)$
$f(0) = -8$ $(0,-8)$
$f(1) = (1)^2 + 2(1) - 8 = 1 + 2 - 8 = -5$ $(1,-5)$

14. $y \geq x^2 - 3x - 6$
$y \geq x^2 + 7x + 6$

Test (0,0)
$0 \geq -6$
Yes!

Test (0,0)
$0 \geq 6$
No!



$\frac{-(-3)}{2(1)} = \frac{3}{2}$
$f(\frac{3}{2}) = (\frac{3}{2})^2 - 3(\frac{3}{2}) - 6 \Rightarrow \frac{9}{4} - \frac{9}{2} - 6 \Rightarrow \frac{9}{4} - \frac{18}{4} - \frac{24}{4}$
$-\frac{33}{4}$ $V: (\frac{3}{2}, -\frac{33}{4})$
$f(1) = (1)^2 - 3(1) - 6 \Rightarrow 1 - 3 - 6 = -8$ $(1,-8)$
$f(0) = -6$ $(0,-6)$
$\frac{-7}{2(1)} = \frac{-7}{2}$
$f(-\frac{7}{2}) \Rightarrow (-\frac{7}{2})^2 + 7(-\frac{7}{2}) + 6 \Rightarrow \frac{49}{4} - \frac{49}{2} + 6 \Rightarrow \frac{49}{4} - \frac{98}{4} + \frac{24}{4}$
$\Rightarrow -\frac{25}{4}$ $V(-\frac{7}{2}, -\frac{25}{4})$
$f(-2) = (-2)^2 + 7(-2) + 6 \Rightarrow 4 - 14 + 6 = -4$ $(-2,-4)$
$f(-1) = (-1)^2 + 7(-1) + 6 \Rightarrow 1 - 7 + 6 = 0$ $(-1,0)$

Intermediate Algebra – Chapter 8

Lesson 5

Solve the inequality algebraically.

15. $\frac{4x^2}{4} < \frac{25}{4}$

$\sqrt{x^2} < \sqrt{\frac{25}{4}}$

$x < \pm\frac{5}{2}$

Test −4

$4(-4)^2 < 25$

$4(16) < 25$

$64 < 25$

No!

Test 0

$4(0) < 25$

$0 < 25$

Yes!

Test 4

$4(4)^2 < 25$

$4(16) < 25$

$64 < 25$

No!

$\boxed{-\frac{5}{2} < x < \frac{5}{2}}$

16. $x^2 + 10x + 9 < 0$

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

$x = -9 \quad x = -1$

Test −10

$(-10)^2 + 10(-10) + 9 < 0$

$100 - 100 + 9 < 0$

$9 < 0$

No!

Test −5

$(-5)^2 + 10(-5) + 9 < 0$

$25 - 50 + 9 < 0$

$-16 < 0$

Yes!

Test 0

$9 < 0$

No!

$\boxed{-9 < x < -1}$

17. $x^2 - 11x \geq -28$

$x^2 - 11x - 28 = 0$

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

$x = 7 \quad x = 4$

Test 0

$0 \geq -28$

Yes!

Test 6

$(6)^2 - 11(6) \geq -28$

$36 - 66 \geq -28$

$-30 \geq -26$

No!

Test 9

$(9)^2 - 11(9) \geq -28$

$81 - 99 \geq -28$

$-18 \geq -28$

Yes!

$\boxed{x \leq 4 \text{ or } x \geq 7}$

18 $3x^2 - 13x > -10$

$3x^2 - 13x + 10 = 0$

$(3x-1)(x-3) = 0$

$x = \frac{1}{3} \quad x = 3$

Test 0

$0 > -10$

Yes!

Test 2

$3(2)^2 - 13(2) > -10$

$3(4) - 26 > -10$

$12 - 26 > -10$

$-14 > -10$

No!

Test 4

$3(4)^2 - 13(4) > -10$

$3(16) - 52 > -10$

$48 - 52 > -10$

$-4 > -10$

Yes!

$\boxed{x < \frac{1}{3} \text{ or } x > 3}$

19. $3x^2 - 8 \leq -2x$

$3x^2 + 2x - 8 = 0$

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

$x = \frac{4}{3} \quad x = -2$

Test −4

$3(-4)^2 - 8 \leq -2(-4)$

$3(16) - 8 \leq 8$

$48 - 8 \leq 8$

$40 \leq 8$

No!

Test 0

$3(0) - 8 \leq -2(0)$

$-8 \leq 0$

Yes!

Test 3

$3(3)^2 - 8 \leq -2(3)$

$3(9) - 8 \leq -6$

$27 - 8 \leq -6$

$19 \leq -6$

No!

$\boxed{-2 \leq x \leq \frac{4}{3}}$

20. $\frac{1}{3}x^2 + 2x \geq 2$

Typo!

Intermediate Algebra – Chapter 9

Lesson 1, Day 1

Solve for y = f(x) for x. Then find the input(s) when the output is -3.

1. F(x) = 3x + 5

$y = 3x + 5$
$-5 \quad -5$

$\frac{y-5}{3} = \frac{3x}{3}$

$\boxed{\frac{y-5}{3} = x}$

$\frac{-3-5}{3}$

$\boxed{\frac{-8}{3}}$

2. F(x) = -7x - 2

$y = -7x - 2$
$+2 \quad +2$

$\frac{y+2}{-7} = \frac{-7x}{-7}$

$\boxed{\frac{y+2}{-7} = x}$

$\frac{-3+2}{-7}$

$\frac{-1}{-7} = \boxed{\frac{1}{7}}$

3. f(x) = $\frac{1}{2}$x - 3

$y = \frac{1}{2}x - 3$
$+3 \quad +3$

$2(y+3) = \frac{1}{2}x(2)$

$\boxed{2y+6 = x}$

$2(-3)+6$
$-6+6$

$\boxed{0}$

4. F(x) = $-\frac{2}{3}$x + 1

$y = \frac{2}{3}x + 1$
$-1 \quad -1$

$\frac{3}{2}(y-1) = \frac{2}{3}x\left(\frac{3}{2}\right)$

$\boxed{\frac{3}{2}y - \frac{3}{2} = x}$

$\frac{3}{2}(-3) - \frac{3}{2}$

$-\frac{9}{2} - \frac{3}{2}$

$-\frac{12}{2} = \boxed{-6}$

5. f(x) = $2x^4 - 5$

$y = 2x^4 - 5$
$+5 \quad +5$

$\frac{y+5}{2} = \frac{2x^4}{2}$

$\sqrt[4]{\frac{y+5}{2}} = \sqrt[4]{x^4}$

$\sqrt[4]{\frac{y+5}{2}} = x$

$\sqrt[4]{\frac{3+5}{2}}$

$\sqrt[4]{\frac{2}{2}}$

$\sqrt[4]{1} = \boxed{1}$

6. F(x) = $(x - 5)^3 - 1$

$y = (x-5)^3 - 1$
$+1 \quad +1$

$\sqrt[3]{y+1} = \sqrt[3]{(x-5)^3}$

$\sqrt[3]{y+1} = x - 5$
$+5 \quad +5$

$\boxed{\sqrt[3]{y+1} + 5 = x}$

$\sqrt[3]{-3+1} + 5$

$\boxed{\sqrt[3]{-2} + 5}$

Intermediate Algebra – Chapter 9
Lesson 1, Day 1

Find the inverse of the function.

7. $f(x) = \frac{1}{3}x - 1$

$x = \frac{1}{3}y - 1$
$+1 \qquad +1$

$3(x+1) = \frac{1}{3}y\,(3)$

$\boxed{3x+3=y}$

8. $F(x) = -\frac{4}{5}x + \frac{1}{5}$

$x = -\frac{4}{5}y + \frac{1}{5}$
$-\frac{1}{5} \qquad -\frac{1}{5}$

$\left(-\frac{5}{4}\right)\left(x - \frac{1}{5}\right) = -\frac{4}{5}y\,\left(-\frac{5}{4}\right)$

$\boxed{-\frac{5}{4}x + \frac{1}{4} = y}$

Determine whether each pair of functions f and g are inverses. Explain your reasoning.

9.

X	-2	-1	0	1	2
Y	-2	1	4	7	10

X	-2	1	4	7	10
Y	-2	-1	0	1	2

Yes!

10.

X	2	3	4	5	6
Y	8	6	4	2	0

X	2	3	4	5	6
Y	-8	-6	-4	2	0

No

11.

X	-4	-2	0	2	4
Y	2	10	18	26	34

X	-4	-2	0	2	4
Y	$\frac{1}{2}$	1/10	1/18	1/26	1/34

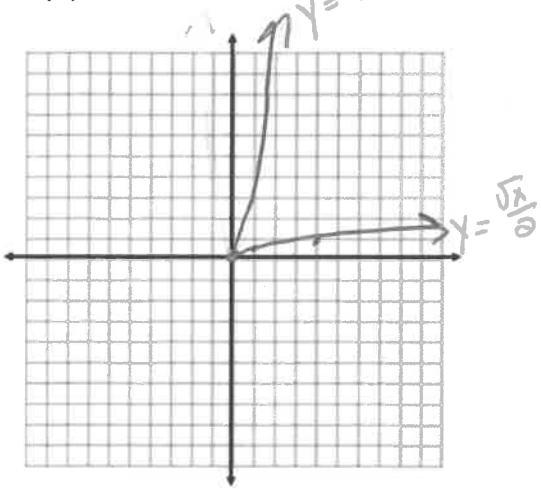
No!

Intermediate Algebra – Chapter 9

Lesson 1, Day 2

Find the inverse of the function. Then graph the function and its inverse.

1. $f(x) = 4x^2$; $x \geq 0$



$\frac{x}{4} = \frac{4y^2}{4}$

$\sqrt{\frac{1}{4}x} = \sqrt{y^2}$

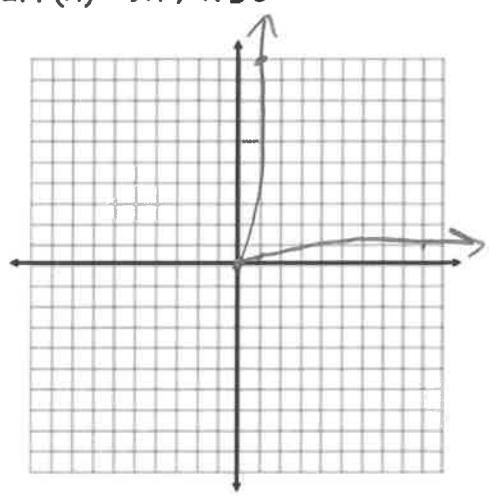
$\frac{\sqrt{x}}{2} = y, x \geq 0$

$f(1) = \frac{\sqrt{1}}{2} = \frac{1}{2}$ $(1, \frac{1}{2})$

$f(0) = 0$ $(0,0)$

$f(4) = \frac{\sqrt{4}}{2} = \frac{2}{2} = 1$ $(4,1)$

2. $F(x) = 9x^2$; $x \geq 0$



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

$\sqrt{\frac{x}{9}} = \sqrt{y^2}$

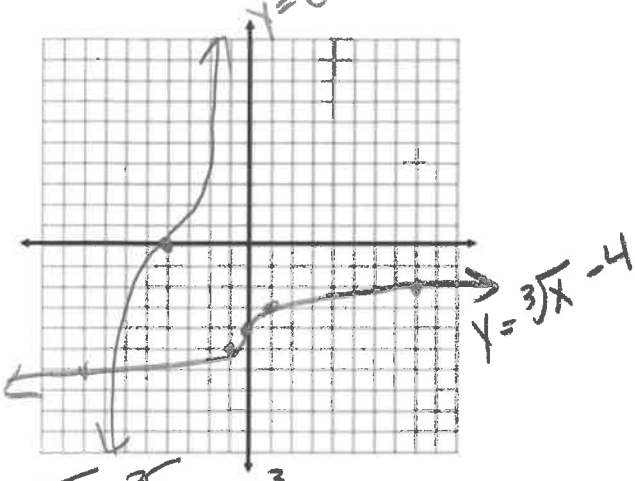
$\frac{\sqrt{x}}{3} = y, x \geq 0$

$f(0) = \frac{0}{3} = 0$ $(0,0)$

$f(1) = \frac{\sqrt{1}}{3} = \frac{1}{3} = (1, \frac{1}{3})$

$f(9) = \frac{\sqrt{9}}{3} = \frac{3}{3} = 1$ $(9,1)$

3. $f(x) = (x + 4)^3$



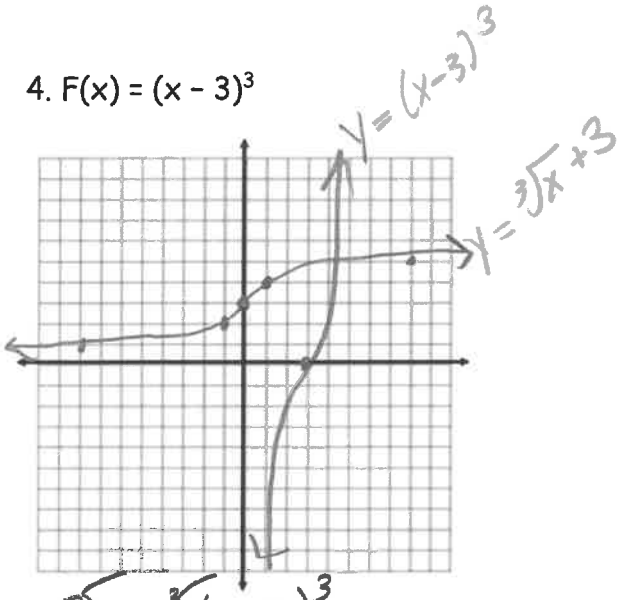
$\sqrt[3]{x} = \sqrt[3]{(y+4)^3}$

$\sqrt[3]{x} = y + 4$
$-4 \qquad -4$

$\boxed{\sqrt[3]{x} - 4 = y}$

$f(0) = \sqrt[3]{0} - 4 = -4 \quad (0,-4)$
$f(1) = \sqrt[3]{1} - 4 = 1-4 = -3 \quad (0,-3)$
$f(8) = \sqrt[3]{8} - 4 = 2-4 = -2 \quad (8,-2)$
$f(-1) = \sqrt[3]{-1} - 4 = -1-4 = -5 \quad (-1,-5)$
$f(-8) = \sqrt[3]{-8} - 4 = -2-4 = -6 \quad (-8,-6)$

4. $F(x) = (x - 3)^3$



$\sqrt[3]{x} = \sqrt[3]{(y-3)^3}$

$\sqrt[3]{x} = y - 3$
$+3 \qquad +3$

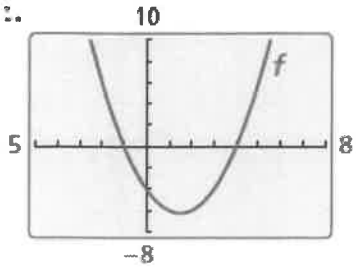
$\boxed{\sqrt[3]{x} + 3 = y}$

$f(0) = \sqrt[3]{0} + 3 = 0+3 = 3 \quad (0,3)$
$f(1) = \sqrt[3]{1} + 3 = 1+3 = 4 \quad (1,4)$
$f(8) = \sqrt[3]{8} + 3 = 2+3 = 5 \quad (8,5)$
$f(-1) = \sqrt[3]{-1} + 3 = -1+3 = 2 \quad (-1,2)$
$f(-8) = \sqrt[3]{-8} + 3 = -2+3 = 1 \quad (-8,1)$

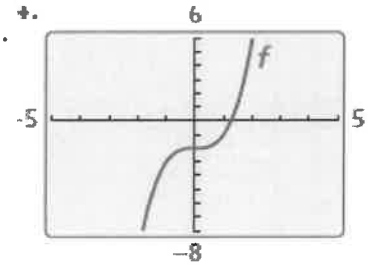
Intermediate Algebra – Chapter 9

Lesson 1, Day 2

Use the graph to determine whether the inverse of f is a function. Explain your reasoning.

5. 

No, does not pass HLT

6. 

Yes, Passes HLT

Determine whether the functions are inverses.

7. $f(x) = 2x - 9$; $g(x) = \frac{x}{2} + 9$

$2\left(\frac{x}{2}+9\right)-9$

$x+\frac{9}{2}-9$

No!

8. $F(x) = \frac{x-3}{4}$; $g(x) = 4x + 3$

$\frac{(4x+3)-3}{4} \Rightarrow \frac{4x}{4} = x$ ✓

$4\left(\frac{x-3}{4}\right)+3 \Rightarrow x-3+3 = x$ ✓

Yes!

9. $f(x) = \sqrt[5]{\frac{x+9}{5}}$; $g(x) = 5x^5 - 9$

$\sqrt[5]{\frac{5x^5-9+9}{5}} \Rightarrow \sqrt[5]{\frac{5x^5}{5}} \Rightarrow \sqrt[5]{x^5} = x$ ✓

$5\left(\sqrt[5]{\frac{x+9}{5}}\right)^5-9 \Rightarrow 5\left(\frac{x+9}{5}\right)-9 \Rightarrow$

$x+9-9 = x$ ✓

Yes!

10. $F(x) = 7x^{3/2} - 4$; $g(x) = \left(\frac{x+4}{7}\right)^{3/2}$

$7\left[\left(\frac{x+4}{7}\right)^{3/2}\right]^{3/2} = 7\left(\frac{x+4}{7}\right)^{\frac{9}{4}}$

No!

Intermediate Algebra – Chapter 9

Lesson 2

Find (f + g)(x) and (f − g)(x) and state the domain of each. Then evaluate f + g and f − g for the given value of x.

1. $f(x) = -5\sqrt[4]{x}$; $g(x) = 19\sqrt[4]{x}$;
   $x = 16$

$(f+g)(x) \Rightarrow -5\sqrt[4]{x} + 19\sqrt[4]{x} \Rightarrow \boxed{14\sqrt[4]{x}}$

$f(16) = 14\sqrt[4]{16} \Rightarrow 14(2) = \boxed{28}$

$(f-g)(x) = -5\sqrt[4]{x} - 19\sqrt[4]{x} \Rightarrow \boxed{-24\sqrt[4]{x}}$

$f(16) = -24\sqrt[4]{16} \Rightarrow -24(2) \Rightarrow \boxed{-48}$

2. $f(x) = 6x - 4x^2 - 7x^3$; $g(x) = 9x^3 - 5x$;
   $x = -1$

$(f+g)(x) = 6x - 4x^2 - 7x^3 + 9x^3 - 5x \Rightarrow$

$\boxed{2x^3 - 4x^2 + x}$

$f(-1) = 2(-1)^3 - 4(-1)^2 + (-1) \Rightarrow 2(-1) - 4(1) - 1 \Rightarrow$

$-2 - 4 - 1 = \boxed{-7}$

$(f-g)(x) = (6x - 4x^2 - 7x^3) - (9x^3 - 5x) \Rightarrow$

$6x - 4x^2 - 7x^3 - 9x^3 + 5x \Rightarrow$

$\boxed{-16x^3 - 4x^2 + 11x}$

$f(-1) = -16(-1)^3 - 4(-1)^2 + 11(-1) \Rightarrow$

$-16(-1) - 4(1) - 11 \Rightarrow 16 - 4 - 11 \Rightarrow$

$12 - 11 = \boxed{1}$

3. $f(x) = \sqrt[3]{2x}$; $g(x) = -11\sqrt[3]{2x}$
   $x = -4$

$(f+g)(x) = \sqrt[3]{2x} - 11\sqrt[3]{2x} \Rightarrow \boxed{-10\sqrt[3]{2x}}$

$f(-4) = -10\sqrt[3]{2(-4)} \Rightarrow -10\sqrt[3]{-8} \Rightarrow 10(-2) = -7$

$\boxed{20}$

$(f-g)(x) = \sqrt[3]{2x} + 11\sqrt[3]{2x} \Rightarrow \boxed{12\sqrt[3]{2x}}$

$f(-4) = 12\sqrt[3]{2(-4)} \Rightarrow 12\sqrt[3]{-8} \Rightarrow 12(-2)$

$\boxed{-24}$

4. $g(x) = 11x + 2x^2$; $g(x) = -7x - 3x^2 + 4$
   $x = 2$

$(f+g)(x) = 11x + 2x^2 - 7x - 3x^2 + 4 \Rightarrow$

$\boxed{-x^2 + 4x + 4}$

$f(2) = -(2)^2 + 4(2) + 4 \Rightarrow -4 + 8 + 4 \Rightarrow$

$4 + 4 \Rightarrow \boxed{8}$

$(f-g)(x) = (11x + 2x^2) - (-7x - 3x^2 + 4) \Rightarrow$

$11x + 2x^2 + 7x + 3x^2 - 4 \Rightarrow$

$\boxed{5x^2 + 18x - 4}$

$f(2) = 5(2)^2 + 18(2) - 4 \Rightarrow 5(4) + 36 - 4 \Rightarrow$

$20 + 36 - 4 \Rightarrow 56 - 4 = \boxed{52}$

Intermediate Algebra – Chapter 9

Lesson 2

Find (fg)(x) and $(\frac{f}{g})(x)$ and state the domain and range of each. Then evaluate fg and $\frac{f}{g}$ for the given value of x.

5. $f(x) = x^4$; $g(x) = 9x^{1/2}$

$x = 9$

$(fg)(x) \Rightarrow x^4(9x^{1/2}) \Rightarrow \boxed{9x^{\frac{9}{2}}}$

$f(9) = 9(9)^{\frac{9}{2}} \Rightarrow 9(3)^9 \Rightarrow 9(19683)$

$= \boxed{177,147}$

$(\frac{f}{g})(x) \Rightarrow \frac{x^4}{9x^{1/2}} = \frac{1}{9}x^{\frac{8}{2}-\frac{1}{2}} \Rightarrow \boxed{\frac{1}{9}x^{7/2}}$

$f(9) \Rightarrow \frac{1}{9}(9)^{7/2} \Rightarrow \frac{1}{9}(3)^7 \Rightarrow \frac{1}{9}(2187)$

$= \boxed{243}$

6. $f(x) = 11x^3$; $g(x) = 7x^{7/3}$;

$x = -8$

$(fg)(x) \Rightarrow 11x^3(7x^{7/3}) \Rightarrow 77x^{\frac{9}{3}+\frac{7}{3}} = \boxed{77x^{\frac{16}{3}}}$

$f(-8) \Rightarrow 77(-8)^{16/3} \Rightarrow 77(-2)^{16}$

$\Rightarrow 77(65536) = \boxed{5046272}$

$(\frac{f}{g})(x) = \frac{11x^3}{7x^{7/3}} = \frac{11}{7}x^{\frac{9}{3}-\frac{7}{3}} = \boxed{\frac{11}{7}x^{\frac{2}{3}}}$

$f(-8) = \frac{11}{7}(-8)^{2/3} \Rightarrow \frac{11}{7}(-2)^2 = \frac{11}{7}(4)$

$= \boxed{\frac{44}{7}}$

7. $f(x) = 4x^{5/4}$; $g(x) = 2x^{1/2}$;

$x = 16$

$(fg)(x) \Rightarrow 4x^{5/4}(2x^{1/2}) \Rightarrow 8x^{\frac{5}{4}+\frac{2}{4}} = \boxed{8x^{\frac{7}{4}}}$

$f(16) \Rightarrow 8(16)^{7/4} \Rightarrow 8(2)^7 \Rightarrow 8(128)$

$= \boxed{1024}$

$(\frac{f}{g})(x) = \frac{4x^{\frac{5}{4}}}{2x^{1/4}} \Rightarrow 2x^{\frac{5}{4}-\frac{2}{4}} \Rightarrow \boxed{2x^{\frac{3}{4}}}$

$f(16) \Rightarrow 2(16)^{3/4} \Rightarrow 2(2)^3 \Rightarrow 2(8)$

$= \boxed{16}$

8. $f(x) = 7x^{3/2}$; $g(x) = -14x^{1/2}$;

$x = 64$

$(fg)(x) = 7x^{\frac{3}{2}}(-14x^{1/2}) \Rightarrow -98x^{\frac{3}{2}+\frac{1}{2}}$

$\Rightarrow \boxed{-98x^2}$

$f(64) \Rightarrow -98(64)^2 \Rightarrow -98(4096)$

$= \boxed{-401,408}$

$(\frac{f}{g})(x) = \frac{7x^{\frac{3}{2}}}{-14x^{1/2}} \Rightarrow -\frac{1}{2}x^{\frac{3}{2}-\frac{1}{2}} \Rightarrow \boxed{-\frac{1}{2}x}$

$f(64) = -\frac{1}{2}(64) = \boxed{-32}$

Intermediate Algebra – Chapter 9
Lesson 5, Day 1

Name _____ Date _____

Use $\log_7 4 \approx 0.712$ and $\log_7 12 \approx 1.277$ to evaluate the logarithm.

1. $\log_7 3$

$\log_7 3 \Rightarrow \log_7 \frac{12}{4} \Rightarrow$
$\log_7 12 - \log_7 4 \Rightarrow 1.277 - 0.712$
$\boxed{0.565}$

2. $\log_7 48$

$\log_7 48 = \log_7 12 \cdot 4$
$\log_7 12 + \log_7 4 \Rightarrow 1.277 + 0.712$
$\boxed{1.989}$

3. $\log_7 16$

$\log_7 16 \Rightarrow \log_7 4^2 \Rightarrow$
$2\log_7 4 \Rightarrow 2(0.712)$
$\boxed{1.424}$

4. $\log_7 64$

$\log_7 64 \Rightarrow \log_7 4^3 \Rightarrow$
$3\log_7 4 \Rightarrow 3(0.712)$
$\boxed{2.136}$

5. $\log_7 \frac{1}{4}$

$\log_7 \frac{1}{4} = \log_7 \frac{12}{12 \cdot 4} \Rightarrow$
$\log_7 12 - (\log_7 12 + \log_7 4) \Rightarrow$
$1.277 - (1.277 + 0.712) =$
$\boxed{0.712}$

6. $\log_7 \frac{1}{3}$

$\log_7 \frac{1}{3} = \log_7 \frac{4}{12} \Rightarrow$
$\log_7 4 - \log_7 12 \Rightarrow$
$0.712 - 1.277$
$\boxed{-0.565}$

Match the expression with the logarithm that has the same value. Justify your answer.

7. $\log_3 6 - \log_3 2$
8. $2\log_3 6$
9. $6\log_3 2$
10. $\log_3 6 + \log_3 2$

A. $\log_3 64$
B. $\log_3 3$
C. $\log_3 12$
D. $\log_3 36$

Intermediate Algebra – Chapter 9
Lesson 5, Day 1

Expand the logarithmic expression.

11. $\log_3 4x$

$\log_3 4 + \log_3 x$

12. $\ln 3x^4$

$\ln 3 + 4\ln x$

13. $\ln \frac{6x^2}{y^4}$

$(\ln 6 + 2\ln x) - 4\ln y$

14. $\text{Log}_5 \sqrt[3]{x^2 y}$

$\log_5 x^{2/3} y^{1/3}$

$\frac{2}{3}\log_5 x + \frac{1}{3}\log_5 y$

Condense the logarithmic expression.

15. ln 12 - ln 4

$\ln \frac{12}{4}$

$\boxed{\ln 3}$

16. 2 log x + log 11

$\log x^2 11$

$\boxed{\log 11x^2}$

17. 6 ln 2 - 4 ln y

$\ln 2^6 - \ln y^4$

$\boxed{\ln \frac{64}{y^4}}$

18. 5 ln 2 + 7 ln x + 4 ln y

$\ln 2^5 + \ln x^7 + \ln y^4$

$\boxed{\ln 32x^7y^4}$

19. $\log_5 3 + \frac{1}{3}\log_5 x$

$\log_5 3 + \log_5 x^{\frac{1}{3}}$

$\boxed{\log_5 3x^{1/3}}$

20. $\log_3 4 + 2\log_3 \frac{1}{2} + \log_3 x$

$\log_3 4 + \log_3 (\frac{1}{2})^2 + \log_3 x$

$\log_3 4(\frac{1}{4})x$

$\boxed{\log_3 x}$

Intermediate Algebra – Chapter 9
Lesson 5, Day 2

Name _____ Date _____

1. Which of the following is *not* equivalent to $\log_5 \frac{y^4}{3x}$? Justify your answer.

① $4\log_5 y - \log_5 3x$ → $\log_5 y^4 - \log_5 3x \Rightarrow \log_5 \frac{y^4}{3x}$

② $4\log_5 y - \log_5 3 + \log_5 x$ $\log_5 \frac{y^4}{3} + \log_5 x \Rightarrow \log \frac{xy^4}{3}$

③ $4\log_5 y - \log_5 3 - \log_5 x$

④ $\log_5 y^4 - \log_5 3 - \log_5 x$

2. Which of the following equations is correct? Justify your answer.

① $\log_7 x + 2\log_7 y = \log_7(x + y^2)$

② $9\log\ x - 2\log\ y = \log\ \frac{x^9}{y^2}$

③ $5\log_4 x + 7\log_2 y = \log_6 x^5 y^7$

④ $\log_9 x - 5\log_9 y = \log_9 \frac{x}{5y}$

Use the change-of-base formula to evaluate the logarithm.

3. $\log_4 7$

$\frac{\log 7}{\log 4} \approx 1.404$

4. $\log_5 13$

$\frac{\log 13}{\log 5} \approx 1.594$

5. $\log_8 22$

$\frac{\log 22}{\log 8} \approx 1.486$

6. $\log_2 28$

$\frac{\log 28}{\log 2} \approx 4.807$

7. $\log_7 \frac{3}{16}$

$\frac{\log 3/16}{\log 7} \approx -0.860$

8. $\text{Log}_3 \frac{9}{40}$

$\frac{\log 9/40}{\log 3} \approx -1.358$

Intermediate Algebra – Chapter 9

Lesson 5, Day 2

9. Let $f(x) = x^4$ and $g(x) = x^2$. Find $(fg)(x)$. Then evaluate the product when $x = 3$.

$(fg)(x) \Rightarrow x^4(x^2) \Rightarrow x^{4+2} = \boxed{x^6}$

$f(3) \Rightarrow 3^6 = \boxed{729}$

10. Let $f(x) = 4x^6$ and $g(x) = 2x^3$. Find $(\frac{f}{g})(x)$. Then evaluate the quotient when $x = 5$.

$(\frac{f}{g})(x) \Rightarrow \frac{4x^6}{2x^3} \Rightarrow 2x^{6-3} = \boxed{2x^3}$

$f(5) \Rightarrow 2(5)^3 \Rightarrow 2(125) = \boxed{250}$

11. Let $f(x) = 6x^3$ and $g(x) = 8x^3$. Find $(f + g)(x)$. Then evaluate the sum when $x = 2$.

$(f+g)(x) \Rightarrow 6x^3 + 8x^3 = \boxed{14x^3}$

$f(2) \Rightarrow 14(2)^3 \Rightarrow 14(8) = \boxed{112}$

12. Let $f(x) = 2x^2$ and $g(x) = 3x^2$. Find $(f - g)(x)$. Then evaluate the different when $x = 6$.

$(f-g)(x) \Rightarrow 2x^2 - 3x^2 \Rightarrow \boxed{-x^2}$

$f(6) = -(6)^2 \Rightarrow \boxed{-36}$

Intermediate Algebra – Chapter 9
Lesson 6, Day 1

Name _____ Date _____

Solve the equation.

1. $7^{3x+5} = 7^{1-x}$

$3x+5=1-x$
$+x \quad -5 \quad -5 \quad +x$
$\frac{4x}{4} = \frac{-4}{4}$
$\boxed{x=-1}$

2. $6^{2x-6} = 36^{3x-5}$

$6^{2x-6} = 6^{2(3x-5)}$
$2x-6=2(3x-5)$
$2x-6 = 6x-10$
$-6x \quad +6 \quad -6x \quad +6$
$\frac{-4x}{-4} = \frac{-4}{-4}$
$\boxed{x=1}$

3. $5^x = 33$

$\log_5 5^x = \log_5 33$
$x = \log_5 33$
$\Rightarrow \frac{\log 33}{\log 5}$
≈ 2.172

4. $512^{5x-1} = \left(\frac{1}{8}\right)^{-4-x}$

$\left(\frac{1}{8}\right)^{-3(5x-1)} = \frac{1}{8}^{-4-x}$
$-3(5x-1) = -4-x$
$-15x+3 = -4-x$
$+x \quad -3 \quad -3 \quad +x$
$\frac{-14x}{-14} = \frac{-7}{-14}$
$\boxed{x=\frac{1}{2}}$

5. $11^{6x} = 38$

$\log_{11} 11^{6x} = \log_{11} 38$
$6x = \frac{\log 38}{\log 11}$
$\frac{6x}{6} \approx \frac{1.517}{6}$
$\boxed{x \approx 0.253}$

6. $2e^{2x} - 7 = 5$

$+7 \quad +7$
$\frac{2e^{2x}}{2} = \frac{12}{2}$
$e^{2x} = 6$
$\ln e^{2x} = \ln 6$
$\frac{2x}{2} \approx \frac{1.792}{2}$
$\boxed{x \approx .896}$

Intermediate Algebra – Chapter 9

Lesson 6, Day 1

7. The length l (in centimeters) of a scalloped hammerhead shark can be modeled by the function $l = 266 - 219e^{-0.05t}$, where t is the age (in years) of the shark. How old is a shark that is 175 centimeters long?

$175 = 266 - 219e^{-0.05t}$

$-266 \quad -266$

$\frac{-91}{-219} = \frac{-219e^{-0.05t}}{-219}$

$.416 \approx e^{-0.05t}$

$\rightarrow \ln .416 \approx \ln e^{-0.05t}$

$\frac{-.877}{-0.05} \approx \frac{-0.05t}{-0.05}$

$\boxed{17.54 \approx t}$

8. One hundred grams of radium are stored in a container. The amount R (in grams) of radium present after t years can be modeled by $R = 100e^{-0.00043t}$. After how many years will only 5 grams of radium be present?

$\frac{5}{100} = \frac{100e^{-0.00043t}}{100}$

$.05 = e^{-0.00043t}$

$\ln .05 = \ln e^{-0.00043t}$

$\frac{-2.996}{-0.00043} \approx \frac{-0.00043t}{-0.00043}$

$\rightarrow \boxed{6967.442 \approx t}$

9. You are driving on a hot day when your car overheats and stops running. The car overheats at 280°F and can be driven again at 230°F. When it is 80°F outside, the cooling rate of the car is r = 0.0058. How long do you have to wait until you can continue driving?

*Did not include formula (Sorry)

Intermediate Algebra – Chapter 9
Lesson 6, Day 2

Name _____ Date _____

Solve the equation.

1. $\ln(4x - 7) = \ln(x + 11)$

$4x - 7 = x + 11$
$-x \quad +7 \quad -x \quad +7$
$\frac{3x}{3} = \frac{18}{3}$
$\boxed{x = 6}$

2. $\log_2(3x - 4) = \log_2 5$

$3x - 4 = 5$
$+4 \quad +4$
$\frac{3x}{3} = \frac{9}{3}$
$\boxed{x = 3}$

3. $\log(7x + 3) = \log 38$

$7x + 3 = 38$
$-3 \quad -3$
$\frac{7x}{7} = \frac{35}{7}$
$\boxed{x = 5}$

4. $\text{Log}_3(2x + 1) = 2$

$\cancel{3^{\log_3}}(2x+1) = 3^2$
$2x + 1 = 9$
$-1 \quad -1$
$\frac{2x}{2} = \frac{8}{2}$
$\boxed{x = 4}$

5. $\log_5(5x + 10) = 4$

$\cancel{5^{\log_5}}(5x+10) = 5^4$
$5x + 10 = 625$
$-10 \quad -10$
$\frac{5x}{5} = \frac{615}{5}$
$\boxed{x = 123}$

6. $\text{Log}_6(5x + 9) = \log_6 6x$

$5x + 9 = 6x$
$-5x \quad -5x$
$\boxed{9 = x}$

7. $\log(12x - 9) = \log 3x$

$12x - 9 = 3x$
$-12x \quad -12x$
$\frac{-9}{-9} = \frac{-9x}{-9}$
$\boxed{1 = x}$

8. $\log_3(x^2 + 9x + 27) = 2$

$\cancel{3^{\log_3}}(x^2+9x+27) = 3^2$
$x^2 + 9x + 27 = 9$
$-9 \quad -9$
$x^2 + 9x + 18 = 0$
$(x+6)(x+3) = 0$
$\boxed{x = -6}$ $\boxed{x = -3}$

Intermediate Algebra – Chapter 9

Lesson 6, Day 2

Solve the equation. Check for extraneous solutions.

9. $\ln x + \ln(x - 2) = 5$

10. $\log_4(-x) + \log_4(x + 10) = 2$

Solve the inequality.

11. $9^x > 54$

$\log_9 9^x > \log_9 54$

$x > \frac{\log 54}{\log 9}$

$\boxed{x > 1.815}$

12. $\log_4 x < 4$

$\cancel{4}^{\log_4 x} < 4^4$

$\boxed{x < 256}$

13. $e^{3x+4} > 11$

$\ln e^{3x+4} > \ln 11$

$3x + 4 > 2.398$

$-4 \quad -4$

$\frac{3x}{3} > \frac{-1.602}{3}$

$\boxed{x > -0.534}$

14. $-4\log_5 x - 5 \geq 3$

$+5 \quad +5$

$\frac{-4\log_5 x}{-4} \geq \frac{8}{-4}$

$\log_5 x \leq -2$

$5^{\log_5 x} \leq 5^{-2}$

$x \leq \frac{1}{5^2}$

$\boxed{x \leq \frac{1}{25}}$

15. You deposit \$1000 in an account that pays 3.5% annual interest compounded monthly. When is your balance at least \$1200? \$3500?