

# Quarter 1 Review

① right 1, up 8, vertical stretch of 3

② left 5, down 7

③ D:  $(-\infty, -2) \cup (-2, \infty)$   
R:  $(-\infty, -4) \cup (-4, \infty)$

④ Inc:  $(-\infty, 3) \cup (3, \infty)$   
Dec: Never

⑤ Inc:  $(-\infty, -\frac{3}{8})$   
Dec:  $(-\frac{3}{8}, \infty)$

⑥ D:  $(-\infty, \infty)$   
R:  $[-\frac{13}{16}, \infty)$

⑦ a)  $3x^2 - 243$   
 $3(x^2 - 81)$   
 $3(x-9)(x+9)$

b)  $x^2 - 2x - 8$   
 $(x-4)(x+2)$

c)  $2x^2 - 8x - 90$   
 $2(x^2 - 4x - 45)$   
 $2(x-9)(x+5)$

d)  $g^3 h^2 k^3 - 3g^2 h^2 k^3 - 28gh^2 k^3$   
 $gh^2 k^3 (g^2 - 3g - 28)$   
 $gh^2 k^3 (g-7)(g+4)$

e)  $4m^3 - 16m$   
 $4m(m^2 - 4)$   
 $4m(m-2)(m+2)$

⑧ a)  $n^2 + 8n = -15$   
 $n^2 + 8n + 15 = 0$   
 $(n+3)(n+5) = 0$   
 $n = \boxed{-3}$   $n = \boxed{-5}$

b)  $6x^2 + 2x = 0$   
 $2x(3x+1) = 0$   
 $2x = 0$   $3x+1 = 0$   
 $x = \boxed{0}$   $3x = -1$   
 $x = \boxed{-\frac{1}{3}}$

c)  $3x^2 = 2 - 5x$

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

$$\begin{array}{r} -6 \\ \times \\ 6 \\ \hline -1 \\ \hline 5 \end{array} \quad \begin{array}{l} 3x^2 + 6x - x - 2 = 0 \\ 3x(x+2) - 1(x+2) = 0 \\ (3x-1)(x+2) = 0 \end{array}$$

$$3x-1=0 \rightarrow x = \boxed{\frac{1}{3}} \quad x+2=0 \rightarrow x = \boxed{-2}$$

d)  $3r^2 - 33r + 98 = 2r^2 - 22r + 8$

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

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

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

$$e) n^2 + 7n = 2n + 36$$

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

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

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

$$g) 2(x-9)^2 = 144$$

$$(x-9)^2 = 72$$

$$x-9 = \pm\sqrt{72}$$

$$x-9 = \pm 6\sqrt{2}$$

$$x = \boxed{9 \pm 6\sqrt{2}}$$

$$f) x^2 = 16x - 15$$

$$x^2 - 16x + 15 = 0$$

$$(x-15)(x-1) = 0$$

$$x = \boxed{15} \quad x = \boxed{1}$$

$$\textcircled{9} -4 \text{ and } 8$$

$$y = (x+4)(x-8)$$

$$y = x^2 - 8x + 4x - 32$$

$$y = \boxed{x^2 - 4x - 32}$$

$$\textcircled{10} 0, 2, \text{ and } -1$$

$$y = x(x-2)(x+1)$$

$$y = x(x^2 + x - 2x - 2)$$

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

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

$$\textcircled{11} a) 4x^2 - 3x + 1$$

$$(-3)^2 - 4(4)(1) = \boxed{-7}$$

2 imaginary roots

$$b) -2x^2 - x + 9$$

$$(-1)^2 - 4(-2)(9) = \boxed{73}$$

2 irrational roots

$$c) x^2 - 49$$

$$(0)^2 - 4(1)(-49) = \boxed{196}$$

2 rational roots

$$d) -x^2 + 2x - 3$$

$$(2)^2 - 4(-1)(-3) = \boxed{-8}$$

2 imaginary roots

$$e) x^2 + 14x + 49$$

$$(14)^2 - 4(1)(49) = \boxed{0}$$

1 real rational root

$$\textcircled{12} y = -2x^2 - 5x + 7$$

$$x = -\frac{b}{2a} \rightarrow x = \frac{5}{2(-2)} = -\frac{5}{4}$$

$$x = \boxed{-\frac{5}{4}}$$

$$\textcircled{13} 3x^2 - 81$$

$$x = \frac{0}{2(3)} = 0$$

$$y = 3(0)^2 - 81 = -81$$

$$\boxed{(0, -81)}$$

$$\textcircled{14} y = x^2 + 4x - 12$$

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

$$\boxed{x = -2} \text{ a.o.s.}$$

$$y = (-2)^2 + 4(-2) - 12 = -16$$

$$\text{Vertex: } \boxed{(-2, -16)}$$

⑮  $y = -0.016t^2 + 0.58t$   
 $y$  of vertex: 2<sup>nd</sup>, Trace, max

about ~~5.86~~ feet high

⑯ a) graph attached

$D: [3, \infty)$

$R: [2, \infty)$

Inc:  $(3, \infty)$

Dec: never

⑰ graph attached

$D: (-\infty, \infty)$

$R: (-\infty, \infty)$

Inc:  $(-\infty, \infty)$

Dec: never

⑱ all graphs attached

⑲  $y = 25x^2 - 28x + 585$  ← model from calc. (Quad. Regression)

10 weeks:  $x = 10$

$y = 25(10)^2 - 28(10) + 585 = 2805$  birds

⑳ Run regression!

a)  $(-1, 0) (1, 2) (3, 0)$

$y = -0.5x^2 + x + 1.5$

b)  $(-1, 4) (1, 0) (3, 4)$

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

㉑ a)  $\frac{(3a^2b^4)^2}{27ab^{-2}} = \frac{9a^4b^8}{27ab^{-2}} = \frac{a^3b^{10}}{3}$

b)  $(2m^3n)(4mn^3)^2 = (2m^3n)(16m^2n^6) = 32m^5n^7$

c)  $\frac{(7x^6y^0)^2(3xy)^0}{(56x^{-4}y^{-1})^{-2}} = (7x^6y^0)^2(56x^{-4}y^{-1})^2 = (49x^{12})(3136y^{-2}x^{-8})$   
 $= \frac{153664x^4}{y^2}$

㉒ a)  $\sqrt{2x} - 8x = 0$

$\sqrt{2x} = 8x$

$2x = 64x^2$

$0 = 64x^2 - 2x$

$0 = 2x(32x - 1)$

$32x - 1 = 0$

$x = 0$

and  $x = \frac{1}{32}$

b)  $\sqrt{110-n} = n$

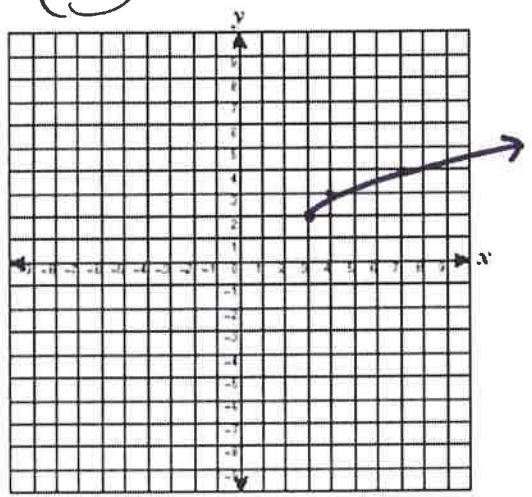
$110-n = n^2$

$0 = n^2 + n - 110$

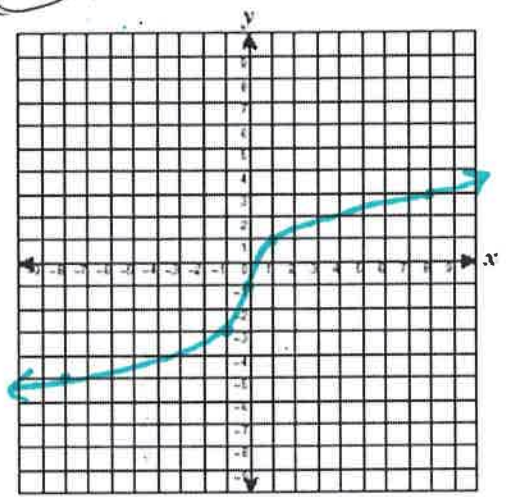
$0 = (n+11)(n-10)$

$n \neq -11$   $n = 10$

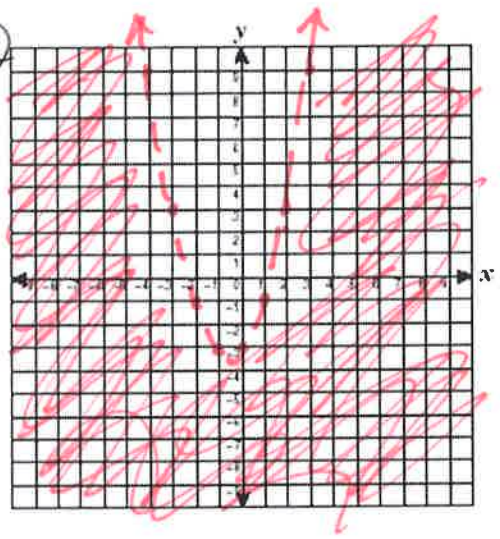
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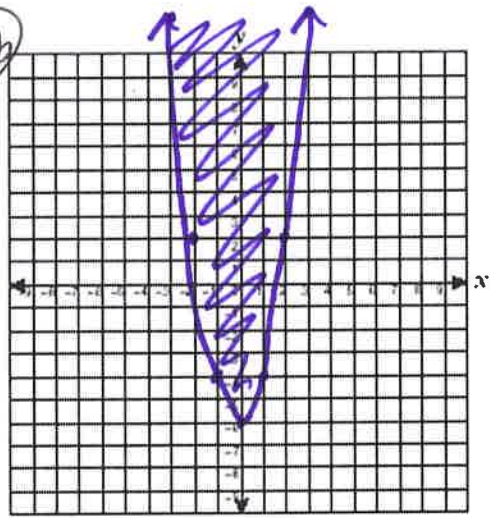
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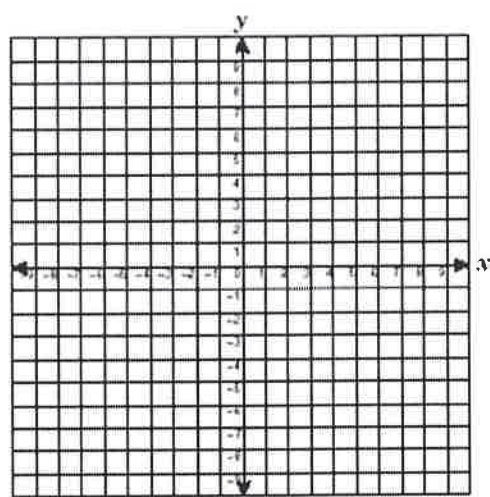
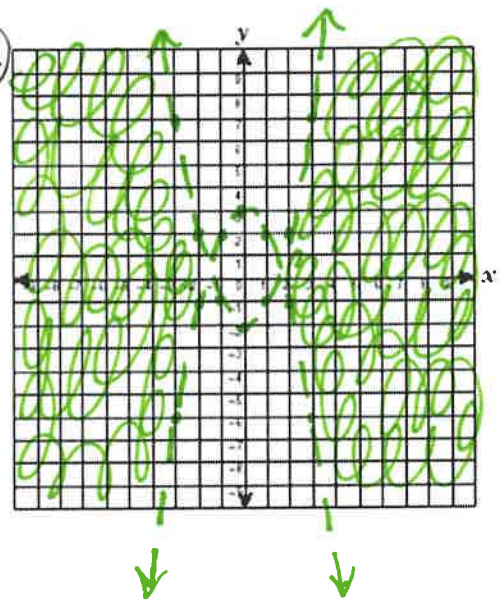
#18a



#18b



#18c



$$c) y-5 = \sqrt{y+1}$$

$$(y-5)^2 = y+1$$

$$y^2 - 10y + 25 = y+1$$

$$y^2 - 11y + 24 = 0$$

$$(y-8)(y-3) = 0$$

$$\boxed{y=8} \quad \cancel{y=3}$$

$$d) -8\sqrt[3]{m-8} = 48$$

$$\sqrt[3]{m-8} = -6$$

$$m-8 = \cancel{-216} -216$$

$$m = \cancel{-208} \boxed{-208} \checkmark$$

$$\boxed{\text{NO SOLUTION}}$$

$$e) \sqrt[3]{2x-4} = -2$$

$$2x-4 = -8$$

$$2x = -4$$

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

$$f) \sqrt[4]{x^3-7} = 1$$

$$\sqrt[4]{x^3} = 8$$

$$x^3 = 4096 \rightarrow \boxed{x = 16}$$

23 a)  $x^2 + y^2 = 18$

$y = x$

$$x^2 + x^2 = 18$$

$$2x^2 = 18$$

$$x^2 = 9$$

$$x = 3 \quad y = 3$$

or  $x = -3 \quad y = -3$

$\boxed{(-3, -3)}$   
and  
 $\boxed{(3, 3)}$

b)  $y = x^2 - 6x + 6$

$y = x - 4$

$$x^2 - 6x + 6 = x - 4$$

$$x^2 - 7x + 10 = 0$$

$$(x-5)(x-2) = 0$$

$x = 5 \quad x = 2$

$x = 5 \quad y = 5 - 4 = 1 \quad \boxed{(5, 1)}$

$x = 2 \quad y = 2 - 4 = -2 \quad \boxed{(2, -2)}$

and

c)  $y - x = -2 \rightarrow y = x - 2$

$$x^2 + y^2 = 2$$

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

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

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

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

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

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

$$x = 1$$

$y - 1 = -2$   
 $y = -1$

$\boxed{(1, -1)}$

- 24 \*all in calculator
- a) x of vertex:  $\boxed{\text{about .5 seconds}}$
- b) y of vertex:  $\boxed{484 \text{ feet}}$
- c) positive zero value:  $\boxed{6 \text{ seconds}}$