"PAIRS SHARE" REVIEW 2.1, 2.3, 2.4 SOLUTION KEY

① VERTEX: (3, 8)
AXIS OF SYMMETRY: $x = 3$
x-intercepts: $\{(1,0) + (5,0)\}$

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

② when $f(x) = ax^2 + bx + c$ with vertex (h, k),

$h = \frac{-b}{2a}$, so in this case $h = \frac{-(-7)}{2(-2)} = \boxed{\frac{7}{-4}}$

$k = f(h) = f(-\frac{7}{4}) = \frac{81}{8} \longrightarrow$ VERTEX $= \left(-\frac{7}{4}, \frac{81}{8}\right)$

AXIS OF SYMMETRY $= x = -\frac{7}{4}$

$-2x^2 - 7x + 4 = 0$

$x = \frac{7 \pm \sqrt{49+32}}{-4} = -\frac{7}{4} \pm \frac{9}{4} \Longrightarrow$ x-intercepts $\{(-4,0), (\frac{1}{2}, 0)\}$

③ $y = a(x+3)^2 + 2$

$8 = a(0+3)^2 + 2$
$8 = 9a + 2$
$9a = 6$
$a = 2/3$

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

④ $y = a(x-2)^2 + -5$

$1 = a(5-2)^2 - 5$
$1 = 9a - 5$
$6 = 9a$
$a = \frac{2}{3}$ $\longrightarrow$

$y = \frac{2}{3}(x-2)^2 - 5$

(5) a) NOT POSSIBLE
b) STRONG
c) weak
d) weak
e) strong

(6) FALSE (the NUMERICAL value measures how closely the data falls to a straight line model, not the steepness of slopes)

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

$-10 = a(-4+3)(-4-\frac{1}{2})(-4+2)^2$

$\rightarrow a = -5/9$

$$\boxed{Y = -\frac{5}{9}(x+3)(x-\tfrac{1}{2})(x+2)^2}$$

(8) $Y = a(x-2)(x+2)(x-1)^3$

$12 = a(3-2)(3+2)(3-1)^3$

$12 = a(1)(5)(2)^3$

$\rightarrow a = \frac{3}{10}$

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

(9)

	2	$K+1$	$-6K$	-11
		-2	$-K+1$	$7K-1$
-1	2	$K-1$	$-7K+1$	$7K-12$

$7K-12 = 0 \rightarrow \boxed{K = 12/7}$

(10)

	3	$-K+2$	$-5K$	-11
		9	$-3K+33$	$-24K+99$
3	3	$-K+11$	$-8K+33$	$-24K+88$

$-24K+88 = 0 \rightarrow \boxed{K = 11/3}$

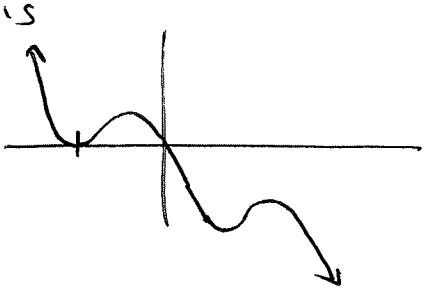
(11) a) 1
b) 2
c) ∞
d) ∞

(12) a) "Bounce" off x-axis

b) 3

c) ∞

d) $-\infty$



(13)

4 extrema

5 zeros

(14) $\frac{\text{factors of } 8}{\text{factors of } 3} = \pm\left\{1, 2, 4, 8, \frac{1}{3}, \frac{2}{3}, \frac{4}{3}, \frac{8}{3}\right\}$

(15)

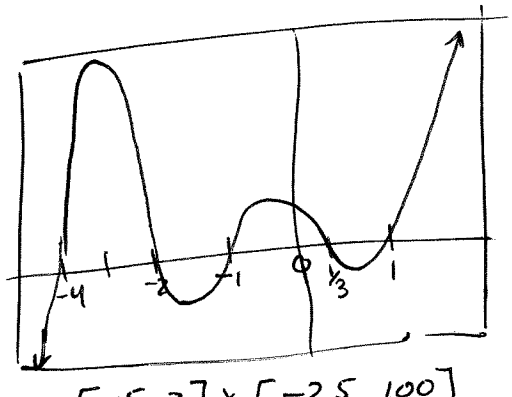
	3	17	15	−25	−18	8
		−3	−14	−1	26	−8
−1	3	14	1	−26	8	0
		−6	−8	30	−8	
−2	3	8	−7	4	0	
		−12	16	−4		
−4	3	−4	1	0		

$(x+1)(x+2)(x+4)(3x^2-4x+1)$

$(3x-1)(x-1)$

zeros: $\{-4, -2, -1, \frac{1}{3}, 1\}$

(16)



$[-5, 3] \times [-25, 100]$

(17)

	1	0	−9	−4	5
		−3	9	0	12
−3	1	−3	0	−4	17

yes!

make sure you put a zero in for the missing TERMS!

(18)

	2	−5	−11	0	−13	−3
		8	12	4	16	12
4	2	3	1	4	3	9

yes!

(19)

$$2x-1 \;\overline{)\; 4x^4 - 8x^3 + x^2 + 3x + 6}$$

$2x^3 - 3x^2 - x + 1$

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

$-6x^3 + x^2$

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

$-2x^2 + 3x$

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

$2x + 6$

$-(2x - 1)$

7

SUMMARY

$$\frac{4x^4-8x^3+x^2+3x+6}{2x-1} = (2x^3-3x^2-x+1) + \frac{7}{2x-1}$$

(20)

$$x^2+0x-5 \;\overline{)\; x^4 + 3x^3 + 0x^2 - 9x + 15}$$

$\leftarrow$ (NOTE ZEROS ADDED!)

$x^2 + 3x + 5$

$x^4 + 0x^3 - 5x^2$

$3x^3 + 5x^2 - 9x$

$3x^3 + 0x^2 - 15x$

$5x^2 + 6x + 15$

$5x^2 + 0x - 25$

$6x + 40$

SUMMARY

$$\frac{x^4+3x^3-9x+15}{x^2-5} = x^2 + 3x + 5 + \frac{6x+40}{x^2-5}$$