

Wkst 4 Solns

1. a. $f(x) = x^2 + 3x - 10$
~~domain: all real #s~~

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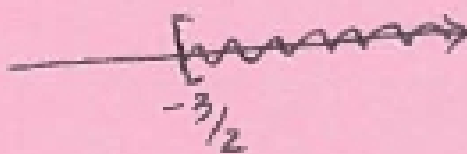
$(-\infty, \infty)$

b. $g(x) = \sqrt{2x+3}$

$2x+3 \geq 0$
 $-3 \quad -3$

$\frac{2x}{2} \geq \frac{-3}{2}$

$x \geq -\frac{3}{2}$



$[-\frac{3}{2}, \infty)$

c. $h(x) = \frac{x-5}{x^2-9}$

bad if $x^2-9=0$
 $x = \pm 3$



$(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

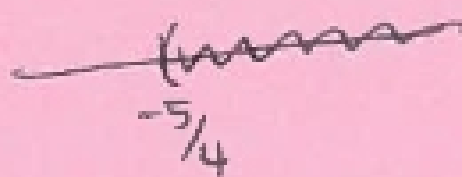
d. $p(x) = \frac{2x}{\sqrt{4x+5}}$

$4x+5 \geq 0$ and $4x+5 \neq 0$

then $4x+5 > 0$

$\frac{4x}{4} > \frac{-5}{4}$

$x > -\frac{5}{4}$

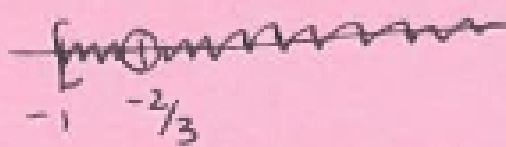


$(-\frac{5}{4}, \infty)$

e. $q(x) = \frac{\sqrt{x+1}}{3x+2}$

$x+1 \geq 0$ and $3x+2 \neq 0$
 $-1 \quad -1$ $-2 \quad -2$

$x \geq -1$ and $x \neq -\frac{2}{3}$



$[-1, -\frac{2}{3}) \cup (-\frac{2}{3}, \infty)$

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

a. $f(-2) = -2(-2)^2 + 4(-2)$
 $= -2(4) - 8$
 $= -16$

b. $f(\frac{3}{2}) = -2(\frac{3}{2})^2 + 4(\frac{3}{2})$
 $= -2(\frac{9}{4}) + 2 \cdot 3$
 $= -\frac{9}{2} + 6$
 $= -\frac{9}{2} + \frac{12}{2}$
 $= \frac{3}{2}$

$$\begin{aligned}
 2c. \quad & f(2a) + 8a \\
 &= -2(2a)^2 + 4(2a) + 8a \\
 &= -2(4a^2) + 8a + 8a \\
 &= \boxed{-8a^2 + 16a}
 \end{aligned}$$

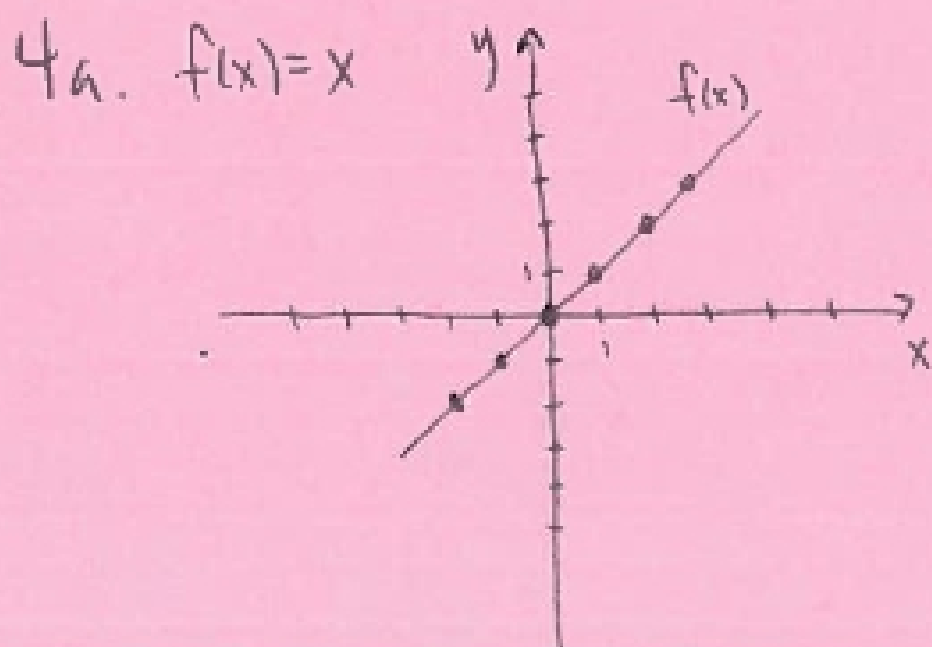
$$\begin{aligned}
 d. \quad & f(a+1) = -2(a+1)^2 + 4(a+1) \\
 &= -2(a+1)(a+1) + 4a + 4 \\
 &= -2(a^2 + 2a + 1) + 4a + 4 \\
 &= -2a^2 - 4a - 2 + 4a + 4 \\
 &= \boxed{-2a^2 + 2}
 \end{aligned}$$

$$\begin{aligned}
 3. a \quad & f(x+h) - f(x) \\
 &= 3(x+h) + 1 - (3x+1) \\
 &= 3x + 3h + 1 - 3x - 1 \\
 &= \boxed{3h}
 \end{aligned}$$

$$\begin{aligned}
 b. \quad & f(x+h) - f(x) \\
 &= 2(x+h)^2 - (x+h) - (2x^2 - x) \\
 &= 2(x+h)(x+h) - x - h - 2x^2 + x \\
 &= 2(x^2 + 2xh + h^2) - x - h - 2x^2 + x \\
 &= 2x^2 + 4xh + 2h^2 - x - h - 2x^2 + x \\
 &= \boxed{4xh + 2h^2 - h}
 \end{aligned}$$

$$\begin{aligned}
 c. \quad & f(x+h) - f(x) \\
 &= \frac{1}{x+h-4} - \frac{1}{x-4} \\
 &= \frac{x-4}{(x+h-4)(x-4)} - \frac{x+h-4}{(x+h-4)(x-4)} \\
 &= \frac{x-4 - (x+h-4)}{(x+h-4)(x-4)} \\
 &= \frac{x-4 - x - h + 4}{(x+h-4)(x-4)} \\
 &= \boxed{\frac{-h}{(x+h-4)(x-4)}}
 \end{aligned}$$

$$\begin{aligned}
 d. \quad & f(x+h) - f(x) \\
 &= \frac{1}{(x+h)^2} - \frac{1}{x^2} \\
 &= \frac{x^2 - (x+h)^2}{(x+h)^2 x^2} \\
 &= \frac{x^2 - (x^2 + 2xh + h^2)}{(x+h)^2 x^2} \\
 &= \frac{x^2 - x^2 - 2xh - h^2}{x^2 (x+h)^2} \\
 &= \frac{-2xh - h^2}{x^2 (x+h)^2} = \boxed{\frac{-h(2x+h)}{x^2 (x+h)^2}}
 \end{aligned}$$



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

domain: $(-\infty, \infty)$
 range: $(-\infty, \infty)$