PRACTICE

Solve each equation. Check for extraneous solutions.

1. $2a\left(\frac{a+4}{2a} + \frac{2}{1} = \frac{3}{2}\right) = \frac{\cancel{2a}(a+4)}{\cancel{2a}} + \frac{2a\cdot 2}{1} = \frac{\cancel{2}a\cdot 3}{\cancel{2}}$

$a \neq 0$

$a+4+4a=3a$
$5a+4=3a$
$-5a \quad -5a$
$4=-2a$
$-2 \quad -2$
$\boxed{-2=a}$

2. $m^2\left(\frac{3m+15}{m^2} - \frac{1}{m} = \frac{1}{1}\right) = \frac{\cancel{m^2}(3m+15)}{\cancel{m^2}} - \frac{m^{\cancel{2}}\cdot 1}{\cancel{m}} = \frac{1\cdot m^2}{1}$

$m \neq 0$

$3m+15-m=m^2$
$2m+15=m^2$
$-2m \quad -2m$
$15=m^2-2m$
-15
$0=m^2-2m-15$
$0=(x-5)(x+3)$
$\boxed{X=5,-3}$

3. $(3x-5)8 = \frac{1+2x}{\cancel{3x-5}}\cancel{(3x-5)}$

$x \neq \frac{5}{3}$

$24x-40=1+2x$
$-2x \quad -2x$
$22x-40=1$
$+40 \quad +40$
$22x=41$
$\boxed{x=41/22}$

4. $6(y+1)\left(\frac{4}{3} - \frac{y}{y+1} = \frac{1}{2}\right)$ $\frac{{}^{2}\cancel{6}(y+1)4}{\cancel{3}} - \frac{6\cancel{(y+1)}y}{\cancel{y+1}} = \frac{{}^{3}\cancel{6}(y+1)\cdot 1}{\cancel{2}}$

$y \neq -1$

$8(y+1)-6y=3(y+1)$
$8y+8-6y=3y+3$
$2y+8=3y+3$
$-2y \quad -3 \quad -2y \quad -3$
$\boxed{5=y}$

5. $4(d+2)\left(\frac{-3d}{4d+8} + \frac{2}{1} = \frac{5}{d+2}\right) = \frac{\cancel{4(d+2)}(-3d)}{\cancel{4(d+2)}} + \frac{4(d+2)2}{1} = \frac{4\cancel{(d+2)}5}{\cancel{d+2}}$

$4d+8 = 4(d+2)$

$d \neq -2$

$-3d+8(d+2)=20$
$-3d+8d+16=20$
$5d+16=20$
$-16 \quad -16$
$5d=4$
$\overline{5} \quad \overline{5}$
$\boxed{d=\frac{4}{5}}$

6. $\frac{-4}{n-2} = \frac{n}{3n-6}$

$n \neq 2$

$n(n-2)=-4(3n-6)$
$n^2-2n=-12n+24$
$+12n \quad +12n$
$n^2+10n=24$
$-24 \quad -24$
$n^2+10n-24=0$
$(n+12)(n-2)=0$
$\boxed{n=-12, \cancel{2}}$ extraneous!

7. $(r+2)(r+4)\left(\frac{1}{r+2} + \frac{r-1}{r^2+6r+8} = \frac{1}{r+4}\right) = \frac{\cancel{(r+2)}(r+4)\cdot 1}{\cancel{r+2}} + \frac{\cancel{(r+2)(r+4)}(r-1)}{\cancel{(r+2)(r+4)}} = \frac{(r+2)\cancel{(r+4)}\cdot 1}{\cancel{r+4}}$

$r^2+6r+8 = (r+2)(r+4)$

$r \neq -2, -4$

$r+4+r-1=r+2$
$2r+3=r+2$
$-r \quad -3 \quad -r \quad -3$
$\boxed{r=-1}$

8. $$5(w-3)(w-1)\left(\frac{1}{5w-5} = \frac{1}{w-3} + \frac{w+2}{5w^2-20w+15}\right) = \frac{\cancel{5(w-3)}\cancel{(w-1)}\cdot 1}{\cancel{5(w-1)}} = \frac{5\cancel{(w-3)}(w-1)\cdot 1}{\cancel{w-3}} + \frac{\cancel{5(w-3)}\cancel{(w-1)}(w+2)}{\cancel{5(w-3)(w-1)}}$$

$5(w-1)$ $\qquad 5(w^2-4w+3)$

$5(w-3)(w-1)$

$w \neq 1, 3$

$$w - 3 = 5(w-1) + w + 2$$
$$w - 3 = 5w - 5 + w + 2$$
$$w - 3 = 6w - 3$$
$$\underline{-w \ +3} \qquad \underline{-w \ +3}$$
$$\frac{0}{5} = \frac{5w}{5}$$
$$0 = w$$

9. $$2k^2\left(\frac{1}{k^2} + \frac{k+3}{2k} = \frac{1}{2}\right) = \frac{2\cancel{k^2}\cdot 1}{\cancel{k^2}} + \frac{\cancel{2}k^{\cancel{2}}(k+3)}{\cancel{2k}} = \frac{\cancel{2}k^2\cdot 1}{\cancel{2}}$$

$k \neq 0$

$$2 + k(k+3) = k^2$$
$$2 + k^2 + 3k = k^2$$
$$\underline{-k^2} \qquad \underline{-k^2}$$
$$2 + 3k = 0$$
$$\underline{-2} \qquad \underline{-2}$$
$$\frac{3k}{3} = \frac{-2}{3}$$
$$k = \frac{-2}{3}$$

10. $$h(h-3)(h-3)\left(\frac{9}{h^2-6h+9} = \frac{3h}{h^2-3h}\right) = \frac{h\cancel{(h-3)}\cancel{(h-3)}9}{\cancel{(h-3)}\cancel{(h-3)}} = \frac{h\cancel{(h-3)}(h-3)\cdot 3\cancel{h}}{\cancel{h}\cancel{(h-3)}}$$

$(h-3)(h-3)$ $\qquad h(h-3)$

$h \neq 0, 3$

$$9h = h(h-3)3$$
$$9h = (h^2 - 3h)3$$
$$9h = 3h^2 - 9h$$
$$\underline{-9h} \qquad \underline{-9h}$$
$$0 = 3h^2 - 18h$$
$$0 = 3h(h-6)$$
$$h = \cancel{0}, 6$$

h = 0 is extraneous, so *h* = 6 is the only solution

Multiple Choice

11. Which of the following values of x solves: $\frac{2}{x-3} = \frac{1}{x^2-2x-3}$?

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

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

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

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

(D) $x = 3$

(E) None of the above

$(x-3)(x+1)\left[\frac{2}{x-3} = \frac{1}{(x-3)(x+1)}\right] \rightarrow 2(x+1) = -1$

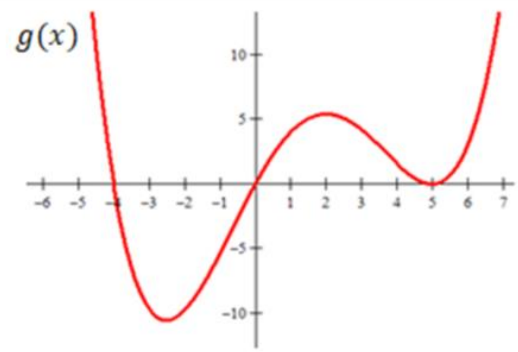
$2x+2 = 1$

$2x = -1$

$x = -1/2$

FREE RESPONSE

12. Given the graph of the polynomial $g(x)$.



a. Write a possible equation of $g(x)$.

$g(x) = x(x+4)(x-5)^2$

b. Describe the end behavior of $g(x)$.

$x \to -\infty$, $g(x) \to \infty$

$x \to \infty$, $g(x) \to \infty$