Problems for Gateway #1: Working with Fractions

1. A common denominator of $\frac{1}{x}$ and $\frac{x}{4}$ is:

(a) $x + 4$ **(b)** x

(c) 4 **(d)** $4x$

(e) $x + 1$

2. A common denominator of $\frac{a+1}{b}$ and $\frac{1}{a \cdot b}$ is:

(a) a **(b)** b

(c) $a + 2$ **(d)** $a^2 + a \cdot b$

(e) $a \cdot b$

3. A common denominator of $\frac{x}{1}$ and $\frac{1}{x^2}$ is:

(a) $1 + x^2$ **(b)** x^2

(c) $x^3 + 1$ **(d)** 1

(e) $(1 - x) \cdot (1 + x)$

4. A common denominator of $\frac{3}{4}$ and $\frac{1}{4 \cdot (x+1)^2}$ is:

(a) $4 \cdot (1 + x)^2$ **(b)** $5 + x^2$

(c) $x^2 + 4x + 4$ **(d)** $4x^2 + 4$

(e) $(x + 1)^2$

5. A common denominator of $\frac{x}{x+1}$ and $\frac{x+1}{x}$ is:

(a) $x^2 + 1$ **(b)** $x \cdot (x + 1)$

(c) $2x + 1$ **(d)** x^2

(e) $(x + 1)^2$

6. If you reduced the expression $\frac{1}{x} + \frac{x}{x+1}$ to a single fraction you could obtain:

(a) $\frac{x+1}{2x+1}$ **(b)** $\frac{3}{2}$

(c) $\frac{x^2+x+1}{x \cdot (x+1)}$ **(d)** $\frac{2}{3}$

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

7. If you reduced the expression $\frac{a}{b} + \frac{b}{a}$ to a single fraction you could obtain:

(a) 1 **(b)** 2

(c) $\frac{a+b}{a \cdot b}$ **(d)** $\frac{a^2+b^2}{a \cdot b}$

(e) $\frac{a \cdot b}{a+b}$

8. If you reduced the expression $\frac{1}{2} + \frac{1}{a}$ to a single fraction you could obtain:

(a) $\frac{1}{2a}$ **(b)** $\frac{2}{a}$

(c) $\frac{1}{2+a}$ **(d)** $\frac{2}{2+a}$

(e) $\frac{a+2}{2a}$

9. If you reduced the expression $\frac{1}{x^2}+\frac{x^2}{x+1}$ to a single fraction you could obtain:

(a) $\frac{x^4+x+1}{x^2\cdot(x+1)}$ **(b)** $\frac{1+x^2}{x^2\cdot(x+1)}$

(c) $\frac{x^2+x+1}{x\cdot(x+1)}$ **(d)** $\frac{1+x^2}{x^2+x+1}$

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

10. If you reduced the expression $\frac{a^2}{3}+\frac{3}{a}$ to a single fraction you could obtain:

(a) a **(b)** $\frac{a^3+9}{3a}$

(c) $\frac{3a^2}{3+a}$ **(d)** $\frac{a^2+3}{3+a}$

(e) $\frac{a^2+3}{3a}$

11. If you reduced the expression $a-\frac{1}{a}$ to a single fraction you could obtain:

(a) $\frac{a-1}{a}$ **(b)** $\frac{1-a}{a^2}$

(c) $\frac{a^2-1}{a}$ **(d)** $\frac{1}{a^2}$

(e) These quantities cannot be combined into a single fraction.

12. If you reduced the expression $\frac{1}{x}-\frac{1}{x+1}$ to a single fraction you could obtain:

(a) 0 **(b)** $\frac{0}{-1}$

(c) $\frac{x^2-1}{x\cdot(x+1)}$ **(d)** $\frac{1}{-1}$

(e) $\frac{1}{x\cdot(x+1)}$

13. If you reduced the expression $\frac{2}{x+1}-\frac{1}{x+1}$ to a single fraction you could obtain:

(a) $\frac{1}{2x+2}$ **(b)** $\frac{1}{0}$

(c) $\frac{x^2+x+1}{x+1}$ **(d)** $\frac{1}{x+1}$

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

14. If you reduced the expression $\frac{x+1}{x}-\frac{2}{x+1}$ to a single fraction you could obtain:

(a) $\frac{x^2+1}{x\cdot(x+1)}$ **(b)** $\frac{x-1}{x\cdot(x+1)}$

(c) $\frac{x^2+2x+1}{x\cdot(x+1)}$ **(d)** $\frac{x^2+2x-1}{x\cdot(x+1)}$

(e) $\frac{x}{x+1}$

15. If you reduced the expression $\frac{a^2}{b}-\frac{b}{a}$ to a single fraction you could obtain:

(a) $\frac{a^2-b}{b-a}$ **(b)** $\frac{a^3-b^2}{ab}$

(c) $\frac{a^2-b}{ab}$ **(d)** $\frac{a^2b}{b-a}$

(e) $\frac{a^2+b}{b-a}$

16. If you reduced the expression $\frac{1}{x}\cdot\frac{x}{x+1}$ to a single fraction you could obtain:

(a) $\frac{x}{2x+1}$ **(b)** $\frac{2x}{x+1}$

(c) $\frac{1}{x+1}$ **(d)** $\frac{1}{x^2+1}$

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

17. If you reduced the expression $\frac{a^3}{1+b}\cdot\frac{1+b}{a^6}$ to a single fraction you could obtain:

(a) $\frac{(1+b)^2}{a^3}$ **(b)** $\frac{1}{a^3}$

(c) $\frac{a^3}{(1+b)^2}$ **(d)** $\frac{a^9}{(1+b)^2}$

(e) $\frac{a^3+b+1}{a^6+b+1}$

18. If you reduced the expression $\frac{\sqrt{x}}{x} \cdot \frac{x}{\sqrt{x}+1}$ to a single fraction you could obtain:

(a) $\frac{x+\sqrt{x}}{x+\sqrt{x}+1}$ **(b)** $\frac{x^{3/2}}{x^{3/2}+1}$

(c) $\frac{x+\sqrt{x}}{x\cdot\left(\sqrt{x}+1\right)}$ **(d)** $1+\frac{1}{\sqrt{x}}$

(e) $\frac{\sqrt{x}}{\sqrt{x}+1}$

19. If you reduced the expression $\frac{x-1}{x+1} \cdot \frac{x}{x+1}$ to a single fraction you could obtain:

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

(c) $\frac{x^2+x+1}{x\cdot(x+1)}$ **(d)** $\frac{x^2-x}{(x+1)^2}$

(e) $\frac{x}{x+1}$

20. If you reduced the expression $\frac{1}{x-1} \cdot \frac{x^2}{x+1}$ to a single fraction you could obtain:

(a) $\frac{x^2}{x^2-1}$ **(b)** $\frac{x^2+1}{x^2-1}$

(c) $\frac{1+x}{x^2-1}$ **(d)** $\frac{x^2-1}{x+1}$

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

21. If you reduced the expression $\frac{\frac{1}{x}}{x}$ to a single fraction you could obtain:

(a) $\frac{1}{2x}$ **(b)** x^2

(c) 1 **(d)** $\frac{1}{x^2}$

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

22. If you reduced the expression $\frac{\frac{a}{b}}{\frac{a}{b}}$ to a single fraction you could obtain:

(a) $\frac{a^2}{b^2}$ **(b)** $\frac{2a}{b}$

(c) $\frac{a}{b}$ **(d)** $a^2 \cdot b^2$

(e) 1

23. If you reduced the expression $\frac{x^2}{\frac{1}{x}}$ to a single fraction you could obtain:

(a) x^3 **(b)** $\frac{1}{x^3}$

(c) x **(d)** $\frac{1}{x}$

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

24. If you reduced the expression $\dfrac{\frac{x+1}{x}}{x}$ to a single fraction you could obtain:

(a) $\dfrac{x+1}{2x}$ **(b)** $1+\dfrac{1}{x}$

(c) $\dfrac{x+1}{x^2}$ **(d)** 2

(e) $\dfrac{2}{x}$

25. If you reduced the expression $\dfrac{1+x}{\frac{1}{x^2}}$ to a single fraction you could obtain:

(a) $\dfrac{x+1}{2x+1}$ **(b)** $x^2 + x^3$

(c) $\dfrac{x^2+x+1}{x+1}$ **(d)** $\dfrac{2x^2}{1+x}$

(e) $\dfrac{x}{x^2+x^3}$

26. Simplifying the expression $\dfrac{x^3-3x^2}{x}$ could produce:

(a) x^2-3x **(b)** x^2-3x^2

(c) $-2x^2$ **(d)** x^3-3x

(e) $\dfrac{x}{x^3-3x^2}$

27. Simplifying the expression $\dfrac{\sqrt{x}\cdot(x-1)}{x^2-1}$ could produce:

(a) $x^{3/2} + 1$ **(b)** x^2-1

(c) $\dfrac{1}{x+1}$ **(d)** $\dfrac{\sqrt{x}}{x+1}$

(e) $\dfrac{1}{\sqrt{x}-1}$

28. Simplifying the expression $\frac{x^3}{x+x^2}$ could produce:

(a) 1 **(b)** $\frac{x}{1+x}$

(c) x^2 **(d)** $\frac{1}{x}+x$

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

29. Simplifying the expression $\frac{\frac{1}{x}+x}{x}$ could produce:

(a) $\frac{1}{x}+1$ **(b)** $\frac{1+x^2}{x^2}$

(c) $\frac{1}{x^2}+x$ **(d)** $x^2 + 1$

(e) $\frac{1}{x^2}-1$

30. Simplifying the expression $\frac{\sqrt{x}+x}{\sqrt{x}}$ could produce:

(a) $1 + x$ **(b)** $2\sqrt{x}$

(c) $1 + \sqrt{x}$ **(d)** $x^2 + 1$

(e) $x+\frac{1}{\sqrt{x}}$

Answers:

1.	D	**2.**	E	**3.**	B	**4.**	A	**5.**	B	**6.**	C
7.	D	**8.**	E	**9.**	A	**10.**	B	**11.**	C	**12.**	E
13.	D	**14.**	A	**15.**	B	**16.**	C	**17.**	B	**18.**	E
19.	D	**20.**	A	**21.**	D	**22.**	E	**23.**	A	**24.**	C
25.	B	**26.**	A	**27.**	D	**28.**	E	**29.**	B	**30.**	C