Grade 10 - Exponents:
Interactive 6: Fractions – Addition & subtraction, multiplication & division
(More advanced. Apply all exponent laws)

Screen	Question	Solution	3 wrong answer options
1	$Simplify$: $\frac{2^{n+2}-2^{n+1}}{2^n}$	$\frac{2^{n+2}-2^{n+1}}{2^n}$ $=\frac{2^n(2^2-2^1)}{2^n}$ $=4-2$ $=2$	2^n 4 1
	$Simplify$: $\frac{3^x-3^{x-1}}{3^{x+2}}$	$\frac{3^x-3^{x-1}}{3^{x+2}}$ $=\frac{3^x(1-3^{-1})}{3^x3^2}$ $=\frac{\frac{2}{3}}{9}$ $=\frac{2}{27}$	$\frac{8}{9}$ $\frac{1}{9}$ $\frac{8}{27}$
	$Simplify$: $\frac{3^x-3^{x-2}}{3^{x-2}}$	$\frac{3^x-3^{x-2}}{3^{x-2}}$ $=\frac{3^x(1-3^{-2})}{3^x3^{-2}}$ $=\frac{\frac{8}{9}}{\frac{1}{9}}$ $=8$	$\frac{8}{9}$ $\frac{1}{9}$ 9

2	$Simplify$: $\frac{3.2^n - 2^{n-2}}{2^{n+1}}$	$\frac{3.2^n - 2^{n-2}}{2^{n+1}}$ $= \frac{2^n(3 - 2^{-2})}{2^n 2^1}$ $= \frac{2\frac{3}{4}}{2}$ $= \frac{11}{8}$	$\frac{14}{8}$ $\frac{11}{4}$ $\frac{11}{2}$
	$Simplify$: $\frac{3^n - 3^{n+2}}{3^n}$	$\frac{3^n - 3^{n+2}}{3^n}$ $= \frac{3^n - 3^n 3^2}{3^n}$ $= 1 - 9$ $= -8$	8 $\frac{1}{8}$ 10
	$Simplify$: $\frac{x^{n+1} - x^n}{x - 1}$	$\frac{x^{n+1} - x^n}{x - 1}$ $= \frac{x^n x^1 - x^n}{x - 1}$ $= x^n$	x^{2n} x^{n-1} x

3	$Simplify$: $\frac{3^{n+4}-6.3^{n+1}}{3^{n+3}+2.9^{\frac{1}{2}n+1}}$	$\frac{3^{n+4}-6.3^{n+1}}{3^{n+3}+2.9^{\frac{1}{2}n+1}}$ $=\frac{3^{n+1}(3^3-6)}{3^{n+1}(3^2+2.3^1)}$ $=\frac{21}{15}$ $=\frac{7}{5}$	7 5 $\frac{4}{3}$
	$Simplify$: $\frac{2^{2n+1}-2^{2n}}{4^n+2^{2n-1}}$	$\frac{2^{2n+1}-2^{2n}}{4^n+2^{2n-1}}$ $=\frac{2^{2n}2^1-2^{2n}}{2^{2n}+2^{2n}2^{-1}}$ $=\frac{1}{\frac{3}{2}}$ $=\frac{2}{3}$	$\frac{3}{2}$ $\frac{1}{2}$ $\frac{1}{3}$
	$Simplify$: $\frac{5.2^x-4.2^{x-2}}{2^x-2^{x-1}}$	$\frac{5.2^x-4.2^{x-2}}{2^x-2^{x-1}}$ $=\frac{5.2^x-2^2.2^x2^{-2}}{2^x-2^x2^{-1}}$ $=\frac{5-1}{1-\frac{1}{2}}$ $=\frac{4}{\frac{1}{2}}$ $=8$	4 2 $\frac{1}{8}$

4	$Simplify$: $\frac{5^{2x-1}.9^{x-2}}{15^{2x-3}}$	$\frac{5^{2x-1}.9^{x-2}}{15^{2x-3}}$ $= \frac{5^{2x-1}.(3^2)^{x-2}}{(5.3)^{2x-3}}$ $= \frac{5^{2x-1}3^{2x-4}}{5^{2x-3}3^{2x-3}}$ $= 5^{2x-1-2x+3}3^{2x-4-2x+3}$ $= 5^2.3^{-1}$ $= \frac{25}{3}$	15 75 125
	$Simplify$: $\frac{2^{n+1}.3^{n-1}}{6^n}$	$\frac{2^{n+1}.3^{n-1}}{6^n}$ $= \frac{2^{n+1}3^{n-1}}{2^n3^n}$ $= 2^{n+1-n}3^{n-1-n}$ $= 2.3^{-1}$ $= \frac{2}{3}$	6 $\frac{3}{2}$ $\frac{1}{6}$
	$Simplify$: $\frac{125^x.25^{x+1}}{5^{5x+3}}$	$\frac{125^x.25^{x+1}}{5^{5x+3}}$ $= \frac{5^{3x}.5^{2x+2}}{5^{5x+3}}$ $= 5^{3x+2x+2-5x-3}$ $= 5^{-1}$ $= \frac{1}{5}$	5 -5 25

5	*Simplify*: $\frac{45^{x-3}.3.75^{4-x}}{25^{-x}.15^{x+2}}$	$\frac{45^{x-3}.3.75^{4-x}}{25^{-x}.15^{x+2}}$ $= \frac{(5.3^2)^{x-3}.3.(3.5^2)^{4-x}}{(5^2)^{-x}.(3.5)^{x+2}}$ $= \frac{5^{x-3}.3^{2x-6}.3.3^{4-x}.5^{8-2x}}{5^{-2x}.3^{x+2}.5^{x+2}}$ $= 5^{x-3+8-2x+2x-x-2}.3^{2x-6+1+4-x-x-2}$ $= 5^3.3^{-3}$ $= \frac{125}{27}$	$\frac{25}{9}$ 125 $\frac{25}{3}$
	Simplify: $\frac{\sqrt[3]{a} \times \sqrt{m^3}}{a^{-\frac{2}{3}}m^{\frac{1}{2}}}$	$\frac{\sqrt[3]{a} \times \sqrt{m^3}}{a^{-\frac{2}{3}}m^{\frac{1}{2}}}$ $= \frac{a^{\frac{1}{3}}m^{\frac{3}{2}}}{a^{-\frac{2}{3}}m^{\frac{1}{2}}}$ $= a^{\frac{1}{3}+\frac{2}{3}}m^{\frac{3}{2}-\frac{1}{2}}$ $= am$	$2am$ am^2 a^2m
	Simplify: $\frac{6^{x+1} \times 9^{x-1}}{2^x \times 27^x}$	$\frac{6^{x+1} \times 9^{x-1}}{2^x \times 27^x}$ $= \frac{2^{x+1}3^{x+1}3^{2x-2}}{2^x 3^{3x}}$ $= 2^{x+1-x}3^{x+1+2x-2-3x}$ $= 2.3^{-1}$ $= \frac{2}{3}$	$\frac{3}{2}$ 6 $\frac{2}{9}$