XT - MATHS Grade 10

Subject: Algebra 3: Algebraic Fractions **Date:** 2010/06/28

Total Marks: 38

---

1. TRUE 3

Explanation:

$$\frac{20d^2 - 50d^3 + 10d}{-10d}$$

$$= \frac{20d^2}{-10d} + \frac{-50d^3}{-10d} + \frac{10d}{-10d}$$

$$= \frac{2d}{-1} + \frac{5d^2}{1} + \frac{1}{-1}$$

$$= -2d + 5d^2 - 1$$

---

2. FALSE 2

Explanation:

$$\frac{3b^3}{8a} \div \frac{15}{4}$$

$$= \frac{3b^3}{8a} \times \frac{4}{15}$$

$$= \frac{12b^3}{120a}$$

$$= \frac{b^3}{10a}$$

---

3. TRUE 2

Explanation: The order of operations is very important! You must simplify the brackets before you may divide. Then:

$$\frac{x}{y} \div \left(\frac{a}{b} \times \frac{c}{d}\right)$$

$$= \frac{x}{y} \div \frac{ac}{bd}$$

$$= \frac{x}{y} \times \frac{bd}{ac}$$

$$= \frac{bdx}{acy}$$

---

4. FALSE 2

Explanation: The LCD of x and y is: xy

Therefore:

$$\frac{3}{x}+\frac{2}{y}$$

$$=\left(\frac{3}{x}\times\frac{y}{y}\right)+\left(\frac{2}{y}\times\frac{x}{x}\right)$$

$$=\frac{3y}{xy}+\frac{2x}{xy}$$

$$=\frac{3y+2x}{xy}$$

---

5. FALSE 2

Explanation: Using the LCD, the sum of these two fractions will be calculated as follows:

$$\frac{3}{x^2}+\frac{2}{y^2}$$

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

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

---

6. FALSE 3

Explanation:

$$\frac{\frac{1}{a}+\frac{1}{b}}{\frac{1}{a+b}}$$

$$=\left(\frac{1}{a}+\frac{1}{b}\right)\div\left(\frac{1}{a+b}\right)$$

$$=\left(\frac{b+a}{ab}\right)\div\left(\frac{1}{a+b}\right)$$

$$=\left(\frac{b+a}{ab}\right)\times\left(\frac{a+b}{1}\right)$$

$$=\frac{(a+b)^2}{ab}$$

---

7. FALSE 2

Explanation: If the numerators are the same, then the larger the denominator the smaller the fraction.

Consider the following numerical example: $\frac{5}{8}>\frac{5}{10}>\frac{5}{12}>\frac{5}{14}$

This can be seen clearer by looking at their decimals: $0,625>0,5>0,41\dot{6}>0,357...$

Thus if ***x*** is natural, then ***S*** has the larger denominator.
Thus ***R > S***

---

8. C 2

Explanation:

$$\frac{60x^6y^3 - 15x^4y^4}{-5x^3y^2}$$

$$= \frac{60x^6y^3}{-5x^3y^2} + \frac{-15x^4y^4}{-5x^3y^2}$$

$$= \frac{12x^3y^1}{-1} + \frac{3x^1y^2}{1}$$

$$= -12x^3y + 3xy^2$$

---

9. E 2

Explanation: The numerator cannot be factorised and since the numerator as a whole cannot be cancelled with the factors of the denominator, this expression cannot be simplified.

---

10. A 4

Explanation:

$$\frac{\frac{1}{x} + \frac{2}{x^2} + \frac{1}{x^3}}{(x+1)^2}$$

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

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

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

$$= \frac{1}{x^3}$$

---

11. A 3

Explanation:

$$\frac{3}{2} - \frac{4-p}{8p} + \frac{3}{4p}$$

$= \frac{12p}{8p} - \frac{4-p}{8p} + \frac{6}{8p}$ [All denominators converted to $8p$]

$= \frac{12p - (4-p) + 6}{8p}$ [The three fractions added]

$= \frac{12p - 4 + p + 6}{8p}$ [Brackets removed]

$= \frac{13p + 2}{8p}$ [Simplified]

---

12. A 4

Explanation: $\frac{3-x}{3x} + \frac{3-x}{3} - \frac{3-x}{3x^2}$

$= \frac{x(3-x)}{3x^2} + \frac{x^2(3-x)}{3x^2} - \frac{3-x}{3x^2}$ [All denominators converted to $3x^2$]

$= \frac{3x-x^2}{3x^2} + \frac{3x^2-x^3}{3x^2} - \frac{3-x}{3x^2}$ [Brackets removed]

$= \frac{\left(3x-x^2\right)+\left(3x^2-x^3\right)-(3-x)}{3x^2}$ [The three fractions added]

$= \frac{3x-x^2+3x^2-x^3-3+x}{3x^2}$ [Brackets removed]

$= \frac{-x^3+2x^2+4x-3}{3x^2}$ [Simplified]

---

13. A 3

Explanation:

$\frac{4t^2}{3k^3} \times \frac{k^4-k^3}{2t} \div \frac{2t}{3}$

$= \frac{4t^2}{3k^3} \times \frac{k^4-k^3}{2t} \times \frac{3}{2t}$ [Multiplied by the reciprocal of the third fraction]

$= \frac{4t^2}{3k^3} \times \frac{k^3(k-1)}{2t} \times \frac{3}{2t}$ [Factorised the numerator of the middle fraction]

$= \frac{12t^2k^3(k-1)}{12t^2k^3}$ [Multiplied numerators together]
[Multiplied denominators together]

$= k-1$ [Simplified by cancelling like factors]

---

14. C 2

Explanation:

Terms cannot be cancelled; never in Maths can this be done!

The correct solution is $\frac{3x^2-8x}{3x^2} = \frac{x(3x-8)}{3x^2} = \frac{3x-8}{3x}$

---

15. 29 2

Explanation: $\frac{3}{2p} + \frac{7}{5p}$

$= \frac{(3 \times 5)+(7 \times 2)}{10p}$

$= \frac{15+14}{10p}$

$= \frac{29}{10p}$
