06th November

Completed Exercises from the lecture on

< Equivalent Expressions >

1. Hard, Pages 2-9;

Can be found below.

Hard

(1) ${\bf 371cbf6b}$ Multiple choice One answer only

$$(ax+3)(5x^2 - bx + 4) = 20x^3 - 9x^2 - 2x + 12$$

The equation above is true for all x, where a and b are constants. What is the value of ab?

$$(-ab + 15)x^2 = -9x^2$$

= -ab+15 = -9
= ab = 15+g = 24

$$ax(5x^{2}-bx+u) + 3(5x^{2}-bx+u) = 20x^{3}-9x^{2}-2x+12$$

 $5ax^{3}-abx^{2}+4ax+15x^{2}-3bx+12=20x^{3}-9x^{2}-2x+12$
 $5ax^{3}+(15-ab)x^{2}+(4a-3b)x+12=20x^{3}-9x^{2}-2x+12$
 $16-3b=-2+b=6$

(2) 40c09d66 Short answer Case-Insensitive

If $\frac{\sqrt{x^5}}{\sqrt[3]{x^4}} = x^{\frac{a}{b}}$ for all positive values of x, what is the value of $\frac{a}{b}$?

$$x^{a-b} = \frac{x^a}{x^b}$$

$$\alpha \sqrt{x} = \alpha^{1}$$

$$= x^{\frac{a}{b}} = \sqrt[3]{x^5}$$

$$\sqrt[3]{x^4}$$

$$=\frac{(x^5)^{\frac{1}{2}}}{(x^4)^{\frac{1}{3}}}$$

$$= x^{\frac{5}{2} - \frac{43}{3}} = x^{\frac{3}{4}}$$

(3) 34847f8a Multiple Choice One answer only
$$\frac{2}{x-2} + \frac{3}{x+5} = \frac{rx+t}{(x-2)(x+5)}$$

The equation above is true for all x > 2, where r and t are positive constants. What is the value of rt?

- a. 60
- b. 15
- c. 20
- d. -20

$$\frac{2}{x-2}, \frac{x+5}{x+5} + \frac{3}{x+5}, \frac{x-2}{(x-2)}$$

$$\frac{5}{(x-2)(x+5)} = \frac{x+t}{(x-2)(x+5)} \implies r=5 \quad t=4$$

$$\sqrt[5]{70n}(\sqrt[6]{70n})^2$$

For what value of x is the given expression equivalent to $(70n)^{30x}$, where n > 1 ?

$$= (70n)^{\frac{1}{5}} \cdot \frac{(70n)^{\frac{1}{6}}^{2}}{(70n)^{\frac{1}{6}}^{2}}$$

$$(x^{\alpha})^{b} = x^{\alpha \cdot b}$$

$$\exists \frac{8}{15} = 30 \times \exists x = \frac{8}{15.30} = \frac{8}{450} = \frac{4}{225}$$

 $(5) \ \ \textbf{ea6d05bb} \ \boxed{ \tiny \texttt{Short answer} } \ \ \boxed{ \tiny \texttt{Case-Insensitive} }$

The expression (3x-23)(19x+6) is equivalent to the expression $ax^2 + bx + c$, where a, b, and c are constants. What is the value of b?

$$18x + -23 \cdot 19x = (18 + -23 \cdot 19)x$$

= (b) x
= (18 + -23 \cdot 19) = b = -419

(6) d8789a4c Multiple Choice One answer only
$$\frac{x^2 - c}{x - b} = () \times () \times () \times () \times ()$$

In the expression above, b and c are positive integers. If the expression is equivalent to x+b and $x \neq b$, which of the following could be the value of c?

a. 6
$$\frac{b. 4}{c. 8}$$

$$= \chi^{2} + b\chi - b\chi - b^{2}$$

$$= \chi^{2} - c = \chi^{2} - b^{2}$$

$$c = b^{2}, b integer$$

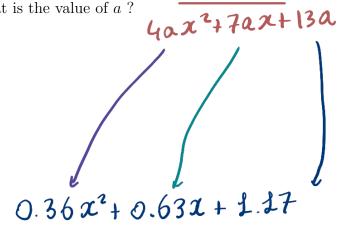
$$\Rightarrow c = b^{2}, b integer$$

$$\Rightarrow c = b^{2}, b integer$$

$$(7) \ \ \mathbf{5355c0ef} \ \boxed{\text{Short answer}} \ \ \boxed{\text{Case-Insensitive}}$$

$$0.36x^2 + 0.63x + 1.17$$

The given expression can be rewritten as $a(4x^2 + 7x + 13)$, where a is a constant. What is the value of a?



$$40=0.36 \Rightarrow a=0.09$$

$$0.09. \frac{9}{100}$$

(20) **7355b9d9** Multiple choice

If k-x is a factor of the expression $-x^2 + \frac{1}{29}nk^2$, where n and k are constants and k > 0, what is the value of n?

a.
$$-\frac{1}{29}$$

$$\frac{1}{29} n K^2 - x^2 = (K - x)(-1)$$

Total of marks: 64

two squares

$$\sqrt{\frac{1}{29}} n K^{\nu} \sqrt{x^{\nu}}$$

$$(K-x)(-1) = \frac{1}{29} n K^2 - x^2 = (\sqrt{\frac{1}{29}} n K - x)(\sqrt{\frac{1}{29}} n K + x)$$

Then by comparison

$$(K-x) = (\sqrt{\frac{1}{29}} K - x)$$

$$= 1 = Coeff K = Coeff K = \sqrt{\frac{1}{29}} N$$

$$\exists 1 = \sqrt{\frac{1}{29}} = \frac{1}{29} = 1 = 1 = 29$$