Precalculus 11 – Flashback #2

1. In a geometric sequence, $t_1 = 10$ and $t_2 = -25$, what is $t_{8?}$?

$t_n = a r^{n-1}$

$r = \frac{t_n}{t_{n-1}}$ $\quad \frac{-25}{10} = -\frac{5}{2}$

$t_8 = 10\left(\frac{-5}{2}\right)^{8-1}$

$t_8 = 10\left(\frac{-5}{2}\right)^{7}$

$t_8 = -6103.515625$

2. Evaluate $2\sqrt[3]{8} - 4\sqrt[4]{16}$

$2 \cdot 2 - 4 \cdot 2$

$4 - 8$

-4

Think

$\sqrt[3]{2 \cdot 2 \cdot 2} = 2$

$\sqrt[4]{2 \cdot 2 \cdot 2 \cdot 2} = 2$

3. Solve $\sqrt{2x+7} - x = -4$. What are the restrictions on x?

restrictions on x: $2x + 7 \geq 0$, $2x \geq -7$, $x \geq -7/2$

$(2x+7)^2 = (x-4)^2$

$2x + 7 = x^2 - 8x + 16$

$0 = x^2 - 10x + 9$

$0 = (x-9)(x-1)$

$\therefore x = 9$ and $x = 1$

check

4. Solve: $3x^2 - 11x - 4 = 0$

$(3x+1)(x-4) = 0$

$3x + 1 = 0$ $\quad x = 4$

$3x = -1$

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

or quadratic formula

$a = 3$

$b = -11$

$c = -4$

Precalculus 11 – Flashback #2

5. Define $|x|$ the absolute value of x. Visually is means the distance between a number and zero. It is also $\sqrt{x^2}$. This means you will always end up with (output) a positive number

So $|x| = x$ if $x \geq 0$

$|x| = -x$ if $x < 0$

6. Determine S_∞ for $\frac{3}{2} - \frac{1}{2} + \frac{1}{6} \ldots$

Note: when $|r| < 1$, there is a sum of the infinite geometric series

$r = -\frac{1}{2} \div \frac{3}{2} = -\frac{2}{6} = -\frac{1}{3}$

$\frac{1}{6} \div -\frac{1}{2} = -\frac{2}{6} = -\frac{1}{3}$

$S_\infty = \frac{a}{1-r}$

$= 3/2 \div (1^{3/3} + \frac{1}{3})$

$= 3/2 \div (4/3)$

$= \frac{9}{8}$

7. Rationalize and reduce: $\frac{2\sqrt{8} - \sqrt{5}}{1 + \sqrt{3}} \cdot \frac{1-\sqrt{3}}{1-\sqrt{3}}$ Conjugate!

$\frac{2\sqrt{8} - 2\sqrt{24} - \sqrt{5} + \sqrt{15}}{1 - \sqrt{9}}$ ($2\sqrt{8} = 2\sqrt{2}$, $2\sqrt{24} = 2\sqrt{6}$, $\sqrt{9} = 3$)

$\frac{4\sqrt{2} - 4\sqrt{6} - \sqrt{5} + \sqrt{15}}{-2}$

$\frac{-4\sqrt{2} + 4\sqrt{6} + \sqrt{5} - \sqrt{15}}{2}$

Precalculus 11 – Flashback #2

8. ~~Simplify~~: Find the vertex of $2x^2 - 5x = 9$.

$2x^2 - 5x - 9 = 0$

$\left(\frac{5}{2\cdot 2}\right)^2$

$2\left(x^2 - \frac{5}{2}x + \frac{25}{16}\right) - 9 - \frac{50}{16} = 0$

$2\left(x - \frac{5}{4}\right)^2 - \frac{97}{8}$

$-\frac{9}{1} - \frac{50}{16}$ ($\frac{25}{8}$)

$-\frac{72}{8} - \frac{25}{8}$

$-\frac{97}{8}$

Vertex $\left(\frac{5}{4}, -\frac{97}{8}\right)$

9. Solve: $x^2 - 6x = -7$

$x^2 - 6x + 7 = 0$

Doesn't factor → quadratic ∫mula

$a = 1$
$b = -6$
$c = 7$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{+6 \pm 36 - 1(1)(7)}{2(1)}$

$x = \frac{+6 \pm 36 - 8}{2}$

$x = \frac{6 \pm \sqrt{8}}{2}$ ($2\sqrt{2}$)

$x = \frac{6 \pm 2\sqrt{2}}{2}$ (3, 1, 1)

$x = 3 \pm \sqrt{2}$

10. What is the maximum height in meters of a projectile modelled by the equation $h(t) = -5t^2 - 100t$

Vertex

$-(-500)$

$h(t) = -5\left(t^2 + 20t + \frac{100}{}\right) + 0 + \underline{500}$

$h(t) = -5(t + 10)^2 + 500$

$(-10, 500)$

maximum height is $\underline{500\text{ m}}$

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Answers can be found in your One Note Notebook.