Name:_____ 9/9/25 Math 2412

Test Prep

1. Foil the following factors

a) $(2x+5)(x-9)$

2. Factor the following polynomials

a) $4x^2+13x-12$

b) x^2-x-30

3. Evaluate the following circle equation, and rewrite the equation into Standard form

$$x^2+y^2-8x-16y-24=0$$

4. Find an equation of the circle that has the points $P(1,8)$ and $Q(5,-6)$ as the endpoints of a diameter.

5. The point $(1,-2)$ lies on a circle whose center is at $(-3,-5)$. Write the standard form for the of the circle.

6. Find the difference quotient of $f(x) = x^2 - 4x + 7$

$$\text{difference quotient} = \frac{f(x+h) - f(x)}{h}$$

7. For the function $f(x) = (x-5)^2$ whose graph is shown below, find the net change and average rate of change between the following values of x.

a) $x=1$ and $x=4$

net change:

average rate of change:

8. Evaluate the following rational functions

a) $\frac{2x^2-8x-24}{x^2-5x-6}$

Steps to remember
1. find horizontal asymptote
2. factor
3. holes
4. Vertical asymptote
5. x-intercepts

all 3 cases of horizontal asymptotes

b) $\frac{x^2+5x+4}{x-3}$

c) $\frac{4x-8}{x^2-3x-4}$

9. Evaluate the following rational inequality

$$\frac{(x+2)(x-1)}{(x-3)(x+4)} \geq 0$$

10. Use polynomial long division to divide $(x^3+9x^2+23x+15)$ by $(x+1)$. Use answer to find remaining factors.

11. Evaluate the following logarithms

a) $\frac{1}{4} \cdot \log_3 81$

b) $\ln(3x+1)$

c) $\log_2 8^{33}$

$\log b^x = x \cdot \log b$

$\log a \cdot b = \log a + \log b$

$\log \frac{a}{b} = \log a - \log b$

$\log_a a^a = a$

$\log_b x = \frac{\log_a x}{\log_a b}$

12. Evaluate the following exponential expressions

a) $5 \cdot 4^{3-2x} = 8$

b) $10^{5x} = 24$

c) $3^{x+5} = 4$

Solve $e^{2x} - e^x - 6 = 0$

Solve $\log_5(x^2+1) = \log_5(x-2) + \log_5(x+3)$

formulas

$n(t) = n_0 2^{t/a}$ - exponential growth (doubling time)

$n(t) = n_0 e^{rt}$ - exponential growth (Relative Growth Rate)

$n(t) = \frac{M}{1+Ae^{-rt}}$ logistic growth $A = (M-n_0)/n_0$

$m(t) = m_0 e^{-rt}$ - radioactive decay model

$r = \frac{\ln 2}{h}$ is the relative decay rate

$T(t) = T_s + D_0 e^{-kt}$

$pH = -\log[H^+]$

$M = \log \frac{I}{S}$ $S = 10^{-4}$ cm

$B = 10 \log \frac{I}{I_0}$ $I_0 = 10^{-12}$ W/m^2

$A = P\left(1+\frac{r}{n}\right)^{nt}$

$A = Pe^{rt}$

Carmen opened a savings account and deposited $4,583.00 as principal. The account earns 7% interest, compounded annually. What is the balance after 9 years?

Use the formula $A = P\left(1 + \frac{r}{n}\right)^{nt}$, where A is the balance (final amount), P is the principal (starting amount), r is the interest rate expressed as a decimal, n is the number of times per year that the interest is compounded, and t is the time in years.

Round your answer to the nearest cent.

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1) Susan wants to invest her savings at a bank. Her new account has n interest rate of 6.5% compounded continuously. She wants to use ne money to buy a car in 36 months. How much should she invest if he wants to reach $7,500 in that time frame?