

ANSWERS

No calculators are permitted.

Answer all questions below. Questions 1–9 are worth 4 points each. Circle the letter of the correct answer. There is no partial credit for questions 1–9. There is partial credit for questions 10–12.

1. Simplify the expression: $(5x^4 - 5x) - (2x - 4x^4 - 4)$

A. $9x^4 - 7x - 4$

B. $3x^4 - 7x + 4$

C. $9x^4 - 7x + 4$

D. $4x^4 - 4x + 4$

2. Simplify the expression: $3v^4(5v^3 - 4v^2 + 3)$

A. $15v^{12} - 12v^8 + 9v^4$

B. $15v^7 - 12v^6 + 6v^4$

C. $15v^7 - 12v^6 + 9v^4$

D. $8v^7 - 7v^6 + 6v^4$

3. Simplify the expression: $\frac{3(a^{-1}b^2)^{-2}}{9a^{-2}b^{-1}}$

A. $\frac{1}{3ab^2}$

B. $\frac{b^5}{6a^5}$

C. $\frac{a^5}{3b^5}$

D. $\frac{a^4}{3b^3}$

4. Perform the operation and identify the result written in standard form: $\frac{24x^3 + 30x^6 + 12x^7}{6x^4}$

A. $4x + 5x^2 + 2x^3$

B. $\frac{4}{x} + 5x^2 + 2x^3$

C. $4x^7 + 5x^{10} + 2x^{11}$

D. $\frac{4}{x} + 5x^6 + 2x^7$

5. Perform the operation and simplify the expression: $(\sqrt[6]{x^5})^6$.

A. x^{30}

B. $x^{6/5}$

C. $x^{5/6}$

D. x^5

6. If $x^{2/5}$ is multiplied by $x^{1/2}$, the result is equal to:

A. $x^{5/6}$

B. $x^{2/10}$

C. $x^{9/10}$

D. $x^{5/4}$

E. None of the above

7. If $f(x) = 3x - x^2$, then the expression $f(2+h) - f(2)$ is equal to:

- A. $-h - h^2$ B. $3h - h^2$ C. $-4h - h^2$ D. $7h + h^2$ E. None of the above

8. Factor completely: $5x^2 + 13x - 6$.

- A. $(5x - 3)(x + 2)$ B. $(5x - 1)(x + 6)$ C. $(5x - 2)(x - 3)$ D. $(5x + 2)(x - 3)$ E. None of the above

9. The solution of the equation: $20(2.18)^t = 60$ is $t =$:

- A. $\frac{\ln(3)}{2.18}$ B. $\ln\left(\frac{3}{2.18}\right)$ C. $\frac{\ln(3)}{\ln(2.18)}$ D. $\frac{2.18}{3}$ E. None of the above

10. (4 points) Solve the equation $17x - 9 = 27 - 8x$. Show work. Write your answer as a fraction or a decimal.

Answer:

$$\begin{aligned} 17x + 8x &= 27 + 9 && \dots 2 \text{ pts} \\ 25x &= 36 && \dots 1 \text{ pts} \\ x &= \frac{36}{25} = 1.44 && \dots 1 \text{ pts} \end{aligned}$$

11. (5 points) Find an equation in the form $y = mx + b$ of the line that passes through the points $(5, -7)$ and $(-15, 5)$. Show work.

Answer:

$$\begin{aligned} m &= \frac{5 - (-7)}{-15 - 5} = \frac{12}{-20} = -0.6 && \dots 2 \text{ pts} \\ -7 &= -0.6 \times 5 + b, && \dots 1 \text{ pts} \\ b &= -4. && \dots 1 \text{ pts} \end{aligned}$$

Then, the line is $y = -0.6x - 4$ (1 pts)

12. (5 points) Simplify the following expression completely:

$$\frac{\frac{1}{2} - \frac{1}{x}}{\frac{2}{x} - \frac{1}{4}}$$

Answer:

$$\frac{\frac{1}{2} - \frac{1}{x}}{\frac{2}{x} - \frac{1}{4}} = \frac{\left(\frac{x-2}{2x}\right)}{\left(\frac{8-x}{4x}\right)} = \left(\frac{x-2}{2x}\right) \left(\frac{4x}{8-x}\right) = \frac{2(x-2)}{8-x}$$