

Chapter 5 Practice Test

SCORE _____

Simplify. Assume that no variable equals 0.

1. $(5r^2t)^2(3r^0t^4)$

$(25r^4t^2)(3t^4)$

2. $\frac{2a^4bc^5}{18a^2b^7c^1} = \frac{1a^{4-2}b^{1-7}c^{5-1}}{9} = \frac{a^2b^{-6}c^4}{9}$

1. $75r^4t^6$

2. $\frac{a^2c^4}{9b^6}$

For Questions 3–5, simplify.

3. $(4c^2 - 12c + 7) - (c^2 + 2c - 5)$

$4c^2 - 12c + 7 - c^2 - 2c + 5$

4. $(3x + 4)^2$

$9x^2 + 24x + 16$

$(\frac{-9}{2} - \frac{15}{2} = -\frac{24}{2})$

3. $3c^2 - 14c + 12$

4. $9x^2 + 24x + 16$

5. Use long division to find $(10y^3 - 9y^2 + 6y - 10) \div (2y + 3)$.

$(10y^3 - 9y^2 + 6y - 10) (\frac{1}{2}) = \frac{5y^3 - \frac{9}{2}y^2 + 3y - 5}{y + \frac{3}{2}}$

$-\frac{3}{2} \overline{) 5 - \frac{9}{2} 3 - 5}$
 $\underline{-15 \quad 18 \quad -\frac{63}{2}}$
 $5 - 12 = -7$

5. $5y^2 - 12y + 21 - \frac{73}{2(2y+3)}$

6. Simplify $(12k^7 + 4k^5 - k^2)(2k^2 - 3)$.

$24k^9 + 8k^7 - 2k^4 - 36k^7 + 12k^5 + 3k^2$

26. $24k^9 - 28k^7 + 12k^5 - 2k^4 + 3k^2$

7. Which represents the correct synthetic division of $(x^2 - 4x + 7) \div (x - 2)$?

A $\begin{array}{r|rrr} -2 & 1 & -4 & 7 \\ & & -2 & 12 \\ \hline & 1 & -6 & 19 \end{array}$

C $\begin{array}{r|rrr} -2 & 1 & -4 & 7 \\ & & -2 & -16 \\ \hline & 1 & 8 & -9 \end{array}$

B $\begin{array}{r|rrr} 2 & 1 & -4 & 7 \\ & & 2 & 4 \\ \hline & 1 & -2 & 11 \end{array}$

D $\begin{array}{r|rrr} 2 & 1 & -4 & 7 \\ & & 2 & -4 \\ \hline & 1 & -2 & 3 \end{array}$

7. D

8. Factor $y^3 + 27$ completely.

$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$y^3 + 3^3 \quad y = a \quad 3 = b$

$\frac{35}{5} = 7$

8. $(y+3)(y^2 - 3y + 9)$

9. Find $p(-5)$ if $p(x) = x^3 - 2x^2 + x + 4$.

$-5 \overline{) 1 \quad -2 \quad 1 \quad 4}$
 $\underline{-5 \quad 35 \quad -180}$
 $1 \quad -7 \quad 36 \quad -176$

9. $p(-5) = -176$

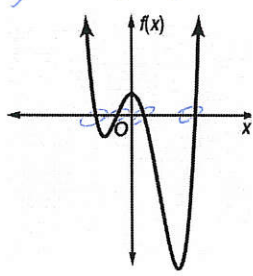
10. Find $p(3u^3)$ if $p(x) = x^2 - 3x - 1$.

$(3u^3)^2 - 3(3u^3) - 1$

10. $9u^6 - 9u^3 - 1$

11. State the number of real zeros for the function

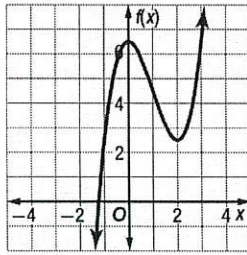
whose graph is shown at the right.



11. 4 real zeros

Chapter 5 Practice Test (continued)

For Questions 12 and 13, use the graph shown at the right.



12. Determine the values of x between which a real zero is located.

12. -1 or 2

13. Estimate the x -coordinate at which a relative minimum occurs.

13. $x = 2$

14. Write the expression $9n^6 - 36n^3$ in quadratic form, if possible.

14. $9n^3(n^2 - 4)$

15. Solve $x^4 - 12x^2 - 45 = 0$.

15. $x = \pm\sqrt{15}, \pm i\sqrt{3}$

$(x^2 - 15)(x^2 + 3) = 0$

16. Use synthetic substitution to find $f(-4)$ for $f(x) = x^3 + 3x^2 - 5x - 7$.

16. $f(-4) = -3$

17. One factor of $x^3 + 2x^2 - 23x - 60$ is $x + 4$. Find the remaining factors.

17. $(x+4)(x+5)(x-2)$

18. State the number and type of roots of the equation for $f(x) = 3x^4 - 2x^3 - 5x^2 + 6x - 2$.

18. _____

$f(x) = 3x^4 - 2x^3 - 5x^2 + 6x - 2$
 3 positive OR 2 positive, 1 negative, 2 complex
 1 negative OR 1 negative, 2 complex

19. List all of the possible imaginary zeros of $f(x) = 2x^3 + x^2 - 4x + 8$.

19. $\pm 1, \pm 2, \pm 4, \pm 8, \pm \frac{1}{2}$

20. Find all of the rational zeros of $g(x) = 2x^3 - x^2 - 7x + 6$.

20. $x = 1, \frac{1}{2}, 2$

Bonus ?

$\frac{p}{q} = \pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}$

$$\begin{array}{r} 3 \overline{) 2 \ -1 \ -7 \ 6} \\ \underline{6 \ 15 \ -24} \\ 2 \ 5 \ 8 \ 30 \end{array} \quad \left. \begin{array}{r} 1 \overline{) 2 \ -1 \ -7 \ 6} \\ \underline{2 \ 1 \ -5} \\ 2 \ 1 \ 6 \ 0 \end{array} \right\}$$

$(x-1)(2x^2 - x + 6) \leftarrow \text{factor...}$
 $(x-1)(x+1)(x-2)$