Properties of Exponents

1. Simplify $(3x^0)^2(2x^4)$.

   A. x^4 **B.** $12x^4$ **C.** $18x^6$ **D.** $18x^4$

2. Simplify $\dfrac{3y^2z}{15y^5}$. Assume that no variable equals 0.

   A. $\dfrac{z}{5y^3}$ **B.** $\dfrac{y^3z}{5}$ **C.** $5y^3z$ **D.** $\dfrac{y^7z}{5}$

3. Simplify $(3a^0b^2)(2a^{-3}b^2)^2$.

   A. $\dfrac{12b^6}{a^6}$ **B.** $\dfrac{36b^8}{a^6}$ **C.** $6b^8$ **D.** $\dfrac{12b^6}{a}$

4. Simplify $\dfrac{4a^4b^2c}{12a^2b^{-5}c^3}$. Assume that no variable equals 0.

   A. $\dfrac{a^2b^7}{8c^2}$ **B.** $\dfrac{a^2b^3}{3c^2}$ **C.** $\dfrac{a^2c^2}{3b^3}$ **D.** $\dfrac{a^2b^7}{3c^2}$

Operations with Polynomials

5. Simplify $(5m - 9) + (4m + 2)$.

   A. $9m - 11$ **B.** $m - 11$ **C.** $9m - 7$ **D.** $20m^2 - 18$

6. Simplify $3x(2x^2 - y)$.

   A. $5x^3 + 3xy$ **B.** $12x - y$ **C.** $6x^2 - 3y$ **D.** $6x^3 - 3xy$

7. Simplify $(3a^3 - 7a^2 + a) - (6a^3 - 4a^2 - 8)$.

   A. $-3a^6 - 3a^4 + a + 8$ **B.** $-3a^3 - 11a^2 + a - 8$
   C. $-3a^6 - 11a^4 + a - 8$ **D.** $-3a^3 - 3a^2 + a + 8$

8. Simplify $(7m - 8)^2$.

   A. $49m^2 + 64$ **B.** $49m^2 - 64$
   C. $49m^2 - 112m + 64$ **D.** $49m^2 - 30m + 64$

Dividing Polynomials

9. Simplify $(x^2 - 2x - 35) \div (x + 5)$.

   A. $x^2 - x - 30$ **B.** $x - 7$
   C. $x + 5$ **D.** $x^3 + 3x^2 - 45x - 175$

10. Simplify $(4x^3 - 2x^2 + 8x + 8) \div (2x + 1)$.

   A. $2x^2 - 2x + 5 + \dfrac{3}{2x + 1}$ **B.** $2x^2 + 4 - \dfrac{9}{2x + 1}$

   C. $2x^2 + 4 - \dfrac{12}{2x + 1}$ **D.** $x^2 - 4x + 6 - \dfrac{14}{2x + 1}$

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

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

11. _____

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

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

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

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

12. Which represents the correct synthetic division of $(2x^3 - 5x + 40) \div (x + 3)$?

12. _____

A.
$$
\begin{array}{r|rrr}
-3 & 2 & -5 & 40 \\
   &   & -6 & 33 \\
\hline
   & 2 & -11 & 73
\end{array}
$$

B.
$$
\begin{array}{r|rrr}
3 & 2 & -5 & 40 \\
  &   & 6 & 3 \\
\hline
  & 2 & 1 & 43
\end{array}
$$

C.
$$
\begin{array}{r|rrrr}
-3 & 2 & 0 & -5 & 40 \\
   &   & -6 & 18 & -39 \\
\hline
   & 2 & -6 & 13 & 1
\end{array}
$$

D.
$$
\begin{array}{r|rrrr}
3 & 2 & 0 & -5 & 40 \\
  &   & 6 & 18 & 39 \\
\hline
  & 2 & 6 & 13 & 79
\end{array}
$$

Polynomial Functions

13. Find $p(-3)$ if $p(x) = 4 - x$.

13. _____

   A. 12   **B.** 4   **C.** 1   **D.** 7

14. Find $p(-4)$ if $p(x) = 3x^3 - 2x^2 + 6x - 4$.

14. _____

   A. -188 **B.** -252 **C.** -140 **D.** -204

15. If $r(x) = x^3 - 2x + 1$, find $r(2a^3)$.
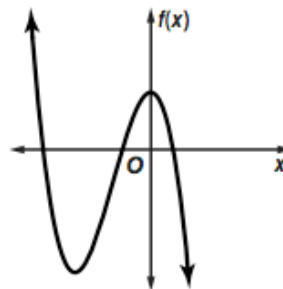
15. _____

   A. $8a^6 - 4a^3 + 1$ **B.** $4a^6 + 4a^3 + 1$

   C. $6a^6 - 4a^3 + 1$ **D.** $8a^9 - 4a^3 + 1$

16. State the number of real zeros for the function whose graph is shown at the right.

16. _____

   A. 0   **B.** 2

   C. 3   **D.** 1

Solving Polynomial Equations

17. Solve $x^4 - 13x^2 + 36 = 0$.

   A. $-3, -2, 2, 3$ **B.** $-9, -4, 4, 9$ **C.** $2, 3, 2i, 3i$ **D.** $-2, -3, 2i, 3i$

17. _____

18. Solve $x^4 - 6x^2 - 27 = 0$.

   A. $\sqrt{3}, 3, 3i, i\sqrt{3}$ **B.** $-3, -\sqrt{3}, \sqrt{3}, 3$
   C. $-3, 3, i\sqrt{3}, -i\sqrt{3}$ **D.** $-\sqrt{3}, 3, 3i, -3i$

18. _____

19. Solve $b^4 + 2b^2 - 24 = 0$.

   A. $-2, -\sqrt{6}, \sqrt{6}, 2$ **B.** $-\sqrt{6}, 2, 2i, i\sqrt{6}$
   C. $-2, 2, -i\sqrt{6}, i\sqrt{6}$ **D.** $-2i, 2i, -\sqrt{6}, \sqrt{6}$

19. _____

Pascal's Triangle

20. Use Pascal's triangle to expand $(m + 1)^3$.

   A. $m^3 + 3m^2 + 3m + 1$ **B.** $m^2 + 2m + 1$
   C. $m^3 + 1$ **D.** $m^3 + 2m^2 + 2m + 1$

20. _____

21. Use Pascal's triangle to expand $(m - n)^5$.

   A. $m^5 - 4m^4n + 6m^3n^2 + (-6m^2n^3) + 4mn^4 - n^5$
   B. $m^5 + 5m^4n - 10m^3n^2 + 10m^2n^3 - 5mn^4 + n^5$
   C. $m^5 + 4m^4n - 6m^3n^2 + 6m^2n^3 - 4mn^4 + n^5$
   D. $m^5 - 5m^4n + 10m^3n^2 - 10m^2n^3 + 5mn^4 - n^5$

21. _____