

look at quiz!!

Advanced Algebra 2

Name: Key

Chapter 5 Test Review Worksheet

Simplify each expression. Show steps.

no calc.

1. $5^5 \cdot 5^{-2} = \frac{5^5}{5^2} = 5^3$

2. $(7^4)^2 = 7^8$

3. $\left(\frac{3}{4}\right)^{-3} = \frac{3^{-3}}{4^{-3}} = \frac{4^3}{3^3} = \frac{64}{27}$

4. $(q^2u^4)^{-2} = q^{-4}u^{-8} = \frac{1}{q^4u^8}$

5. $\left(\frac{2a^{-3}b^2}{6a^2b^4}\right)^{-1} = \frac{2^{-1}a^3b^{-2}}{6^{-1}a^{-2}b^{-4}} = \frac{6a^3a^2b^4}{2b^2} = 3a^5b^2$

6. $(a^5b^{-7})(a^{-4}b^9) = \frac{a^5b^9}{b^7a^4} = ab^2$

no calc.

7. Use direct substitution to evaluate $5x^4 + 3x^2 - 5x - 7$ for $x = -1$.

$5(-1)^4 + 3(-1)^2 - 5(-1) - 7 = 6$

$$\begin{array}{r|rrrrr} -1 & 5 & 0 & 3 & -5 & -7 \\ & & -5 & 5 & -8 & 13 \\ \hline & 5 & -5 & 8 & -13 & 6 \end{array}$$

8. Use synthetic substitution to evaluate $4x^5 - 2x^3 + 7x^2 + 6$ for $x = 2$. Show work.

$$\begin{array}{r|rrrrrr} 2 & 4 & 0 & -2 & 7 & 0 & 6 \\ & & 8 & 16 & 28 & 70 & 140 \\ \hline & 4 & 8 & 14 & 35 & 70 & 146 \end{array}$$

9. For the given polynomial: Write in standard form. State the degree, leading coefficient, and type. Give a table of values from -2 to 2 and draw the graph.

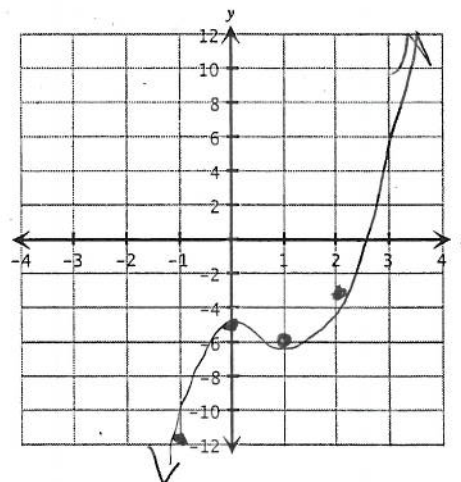
calc.

$f(x) = 2x^3 - 4x^2 + x - 5$

Standard Form: $2x^3 - 4x^2 + x - 5$

Degree: 3 LC: 2 Type: cubic

| | | | | | |
|---|-----|-----|----|----|----|
| x | -2 | -1 | 0 | 1 | 2 |
| y | -39 | -12 | -5 | -6 | -3 |



10. The leading coefficient of a polynomial is positive and the degree is odd. Fill in the blanks

of the statement. $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$ and $f(x) \rightarrow \infty$ as $x \rightarrow +\infty$



Perform the indicated operation. Show work.

11. $(2x^2 - 3x + 7)(4x + 1)$

| | | | |
|------|--------|----------|-------|
| | $2x^2$ | $-3x$ | 7 |
| $4x$ | $8x^3$ | $-12x^2$ | $28x$ |
| 1 | $2x^2$ | $-3x$ | 7 |

$8x^3 - 10x^2 + 25x + 7$

Factor each polynomial completely.

13. $\frac{16x^5 - 250x^2}{2x^2 \cdot 2x^2}$

$8x^3 - 125$
 $(2x)^3 - (5)^3$

$2x^2(8x^3 - 125)$
 $2x^2(2x - 5)(4x^2 + 10x + 25)$

15. $\frac{2x^5 - 8x^3 - 42x}{2x \cdot 2x \cdot 2x}$

$2x(x^4 - 4x^2 - 21)$
 $2x(x^2 - 7)(x^2 + 3)$

12. $(7x - 2)^2$ $(a - b)^2 = a^2 - 2ab + b^2$

$49x^2 - 28x + 4$

or $7x - 2$

| | |
|------|------|
| $7x$ | -2 |
| -2 | |

14. $4y^3 + 24y^2 - 25y - 150$

| | | |
|-------|--------|---------|
| | $4y^3$ | $24y^2$ |
| -25 | $-25y$ | -150 |

$(4y + 6)(4y^2 - 25) = (4y + 6)(2y - 5)(2y + 5)$

16. $\frac{4x^7 - 64x^3}{4x^3 \cdot 4x^3}$

$4x^3(x^4 - 16)$
 $4x^3(x^2 - 4)(x^2 + 4)$
 $4x^3(x - 2)(x + 2)(x^2 + 4)$

Divide the polynomials using long division. You must show work.

17. $(2x^3 - 25x^2 + 83x - 88) \div (x - 8)$

| | |
|---------|--|
| | $2x^2 - 9x + 11$ |
| $x - 8$ | $\overline{) 2x^3 - 25x^2 + 83x - 88}$ |
| | $-(2x^3 - 16x^2)$ |
| | $\hline -9x^2 + 83x$ |
| | $-(-9x^2 + 72x)$ |
| | $\hline 11x - 88$ |
| | $-(11x - 88)$ |
| | $\hline 0$ |

$2x^2 - 9x + 11$

Divide the polynomials using synthetic division. You must show work.

18. $(x^3 + 4x^2 - x - 1) \div (x + 3)$ use -3

| | | | | | |
|------|-----|-----|------|------|------|
| -3 | $ $ | 1 | 4 | -1 | -1 |
| | | | -3 | -3 | 12 |
| | | 1 | 1 | -4 | 11 |

$x^2 + x - 4 + \frac{11}{x + 3}$

Given polynomial $f(x)$ and one zero of $f(x)$, factor $f(x)$ completely and find the other zeros. Show work.

19. $f(x) = x^3 + 5x^2 - 18x - 72$; zero: 4

$$4 \begin{array}{r|rrrr} & 1 & 5 & -18 & -72 \\ & & 4 & 36 & 72 \\ \hline & 1 & 9 & 18 & 0 \end{array}$$

$(x-4)(x^2 + 9x + 18)$

$(x-4)(x+3)(x+6)$

Factors: $(x-4)(x+3)(x+6)$

Zeros: $4, -3, -6$

List all the possible rational zeros of the function. Then find all the zeros of the function. Show work for finding the zeros. Simplify any answers.

20. $f(x) = 2x^4 + 5x^3 - 18x^2 - 19x + 42$ - P

Ans. $-2 \begin{array}{r|rrrrr} & 2 & 5 & -18 & -19 & 42 \\ & & -4 & -2 & 40 & -42 \\ \hline & 2 & 1 & -20 & 21 & 0 \end{array}$
 $\frac{3}{2} \begin{array}{r|rrrr} & & 3 & 6 & -21 \\ \hline & 2 & 4 & -14 & 0 \end{array}$

$42, 21, 2, 6, 7, 14, 3$
 $2, 1$

PRZ: $\pm 42, \pm 21, \pm \frac{21}{2}, \pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{7}{2}, \pm 7$
 $\pm 14, \pm \frac{3}{2}$

Zeros: $-2, \frac{3}{2}, -1 \pm 2\sqrt{2}$

$2x^2 + 4x - 14$
 $2(x^2 + 2x - 7)$

Write a polynomial function with the given zeros. Show work.

21. $-1, 2, -3i$ $(x+1)(x-2)(x+3i)(x-3i)$

| | | |
|-------|--------|---------|
| x^2 | $-x$ | -2 |
| x^4 | $-x^3$ | $-2x^2$ |
| 9 | $9x$ | -18 |

$(x+1)(x-2)(x^2 + 9)$

$(x^2 + x - 2)(x^2 + 9)$

$x^4 - x^3 + 7x^2 - 9x - 18$

22. $3, -4, 1 + \sqrt{5}$ $(x-3)(x+4)(x-(1+\sqrt{5}))(x-(1-\sqrt{5}))$

| | | |
|-------|---------|----------|
| x^2 | x | -12 |
| x^4 | x^3 | $-12x^2$ |
| $-2x$ | $-2x^3$ | $-2x$ |
| 4 | $-4x^2$ | $-4x$ |
| | | 48 |

$(x-3)(x+4)(x^2 - 2x + 1 - 5)$

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

$(x^2 + x - 12)(x^2 - 2x - 4)$

$x^4 - x^3 - 18x^2 + 20x + 48$

$\frac{-2 \pm \sqrt{4 - (4 \cdot 1 \cdot -7)}}{2}$

$\frac{-2 \pm \sqrt{4 - (-28)}}{2}$

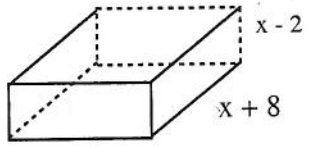
$\frac{-2 \pm \sqrt{32}}{2}$

$\frac{-2 \pm 4\sqrt{2}}{2}$

$-1 \pm 2\sqrt{2}$

Calc.

23. The rectangular box below has a volume of 96 cubic inches. Find the dimensions of the box. Show the polynomial used to solve this.



$$x(x-2)(x+8) = 96$$
$$(x^2 - 2x)(x+8) - 96 = 0$$

| | | |
|-----|--------|---------|
| | x^2 | $-2x$ |
| x | x^3 | $-2x^2$ |
| 8 | $8x^2$ | $-16x$ |

$$x^3 + 6x^2 - 16x - 96 = 0$$

| | | |
|-------|--------|--------|
| | x | 6 |
| x^2 | x^3 | $6x^2$ |
| -16 | $-16x$ | -96 |

or graphing calculator to find zeros

$$(x+6)(x^2 - 16) = 0$$

$$(x+6)(x-4)(x+4) = 0$$

| |
|---------|
| $x = 4$ |
|---------|