Name: _____ Period: _____ Date: _____

Dividing Polynomials Assignment

Divide the following polynomials by monomials.

1. $24x^2 - 16x^3 + 8x - 16 \text{ by } 8$

2. $12a^4 - 30a^3 + 18a - 6 \text{ by } 6$

3. $50x^5 - 7x^4 + x^2 \text{ by } x$

4. $24x^6 - 32x^4 + 8x^2 \text{ by } -8x^2$

5. $9r^2s^2 + 3r^4s - 6rs^2 \text{ by } -3rs$

6. $4x^4y - 8x^6y^2 + 12x^8y^6 \text{ by } 4x^4y$

7. $4x^4 + 8x^3 - 16x^2 + 10x \text{ by } 2x$

8. $5b^4 - 10b^3 - 15b^2 + 10b \text{ by } 5b$

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Dividing Polynomials Assignment

Divide the polynomials by binomials.

9. $x^2+10x+21 \text{ by } x+7$

10. $2a^2-3a-6 \text{ by } a+2$

11. $2a^3-11a^2-6a-5 \text{ by } a-6$

12. $a^3-6a^2+12a-8 \text{ by } a-2$

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Dividing Polynomials Assignment

13. $12x^3 - 11x^2 + 8x - 4 \text{ by } 3x - 2$

14. $2c^3 - 9c^2 - 7c - 1 \text{ by } 2c - 3$

15. $y^2 - y - 110 \text{ by } y + 10$

16. $8d^2 + 3d + 4 \text{ by } d - 3$

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Dividing Polynomials Assignment

Divide the following polynomials using synthetic division.

17. $3x^3 - x^2 - 8x + 5 \ by \ x + 2$

18. $x^3 - x - 2 \ by \ x - 3$

19. $a^4 + 16 \ by \ a + 2$

20. $4x^5 - 3x + 122 \ by \ x + 2$

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Dividing Polynomials Assignment

Answer:

Divide the following polynomials by monomials.

1. $24x^2-16x^3+8x-16 \text{ by } 8$

Solution:

$$\frac{-16x^3+24x^2+8x-16}{8}$$

$$=-2x^3+4x^2+x-2$$

2. $12a^4-30a^3+18a-6 \text{ by } 6$

Solution:

$$\frac{12a^4-30a^3+18a-6}{6}$$

$$=2a^4-5a^3+2a-1$$

3. $50x^5-7x^4+x^2 \text{ by } x$

Solution:

$$\frac{50x^5-7x^4+x^2}{x}$$

$$=50x^4-7x^3+x$$

4. $24x^6-32x^4+8x^2 \text{ by } -8x^2$

Solution:

$$\frac{24x^6-32x^4+8x^2}{-8x^2}$$

$$=-3x^4+4x^2-1$$

5. $9r^2s^2+3r^4s-6rs^2 \text{ by } -3rs$

Solution:

$$\frac{9r^2s^2+3r^4s-6rs^2}{-3rs}$$

$$=-3rs-r^3+2s$$

$$=-r^3-3rs+2s$$

6. $4x^4y-8x^6y^2+12x^8y^6 \text{ by } 4x^4y$

Solution:

$$\frac{4x^4y-8x^6y^2+12x^8y^6}{4x^4y}$$

$$=1-2x^2y+3x^4y^5$$

$$=3x^4y^5-2x^2y+1$$

7. $4x^4+8x^3-16x^2+10x \text{ by } 2x$

Solution:

$$\frac{4x^4+8x^3-16x^2+10x}{2x}$$

$$=2x^3+4x^2-8x+5$$

8. $5b^4-10b^3-15b^2+10b \text{ by } 5b$

Solution:

$$\frac{5b^4-10b^3-15b^2+10b}{5b}$$

$$=b^3-2b^2-3b+2$$

Divide the polynomials by binomials.

9. $x^2+10x+21 \text{ by } x+7$

Solution:

$$x+7\overline{)\,x^2+10x+21}$$

$$x+3$$

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

$$3x+21$$

$$-(3x+21)$$

$$0$$

$$=x+3$$

10. $2a^2-3a-6 \text{ by } a+2$

Solution:

$$a+2\overline{)\,2a^2-3a-6}$$

$$2a-7$$

$$-(2a^2+4a)$$

$$-7a-6$$

$$-(-7a-14)$$

$$8$$

$$=2a-7+\frac{8}{a+2}$$

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Dividing Polynomials Assignment

11. $2a^3-11a^2-6a-5$ *by* $a-6$

Solution:

$$a-6\overline{)2a^3-11a^2-6a-5}$$

$$\begin{array}{r} 2a^2+a \\ -(2a^3-12a^2) \\ \hline a^2-6a \\ -(a^2-6a) \\ \hline 0-5 \end{array}$$

$$=2a^2+a-\frac{5}{a-6}$$

12. $a^3-6a^2+12a-8$ *by* $a-2$

Solution:

$$a-2\overline{)a^3-6a^2+12a-8}$$

$$\begin{array}{r} a^2-4a+4 \\ -(a^3-2a^2) \\ \hline -4a^2+12a \\ -(-4a^2+8a) \\ \hline 4a-8 \\ -(4a-8) \\ \hline 0 \end{array}$$

$$=a^2-4a+4$$

13. $12x^3-11x^2+8x-4$ *by* $3x-2$

Solution:

$$3x-2\overline{)12x^3-11x^2+8x-4}$$

$$\begin{array}{r} 4x^2-x+2 \\ -(12x^3-8x^2) \\ \hline -3x^2+8x \\ -(-3x^2+2x) \\ \hline 6x-4 \\ -(6x-4) \\ \hline 0 \end{array}$$

$$=4x^2-x+2$$

14. $2c^3-9c^2-7c-1$ *by* $2c-3$

Solution:

$$2c-3\overline{)2c^3-9c^2-7c-1}$$

$$\begin{array}{r} c^2-3c-8 \\ -(2c^3-3c^2) \\ \hline -6c^2-7c \\ -(-6c^2+9c) \\ \hline -16c-1 \\ -(-16c+24) \\ \hline -25 \end{array}$$

$$=c^2-3c-8-\frac{25}{2c-3}$$

15. $y^2-y-110$ *by* $y+10$

Solution:

$$y+10\overline{)y^2-y-110}$$

$$\begin{array}{r} y-11 \\ -(y^2+10y) \\ \hline -11y-110 \\ -(-11y-110) \\ \hline 0 \end{array}$$

$$=y-11$$

16. $8d^2+3d+4$ *by* $d-3$

Solution:

$$d-3\overline{)8d^2+3d+4}$$

$$\begin{array}{r} 8d+27 \\ -(8d^2-24d) \\ \hline 27d+4 \\ -(27d-81) \\ \hline 85 \end{array}$$

$$=8d+27+\frac{85}{d-3}$$

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Dividing Polynomials Assignment

Divide the following polynomials using synthetic division.

17. $3x^3 - x^2 - 8x + 5 \ by \ x + 2$

Solution:

x^3	x^2	x	c	
3	−1	−8	5	−2
↓	−6	14	−12	
3	−7	6	−7	

$$= 3x^2 - 7x + 6 - \frac{7}{x+2}$$

18. $x^3 - x - 2 \ by \ x - 3$

Solution:

x^3	x^2	x	c	
1	0	−1	−2	3
↓	3	9	24	
1	3	8	22	

$$= x^2 + 3x + 8 + \frac{22}{x-3}$$

19. $a^4 + 16 \ by \ a + 2$

Solution:

a^4	a^3	a^2	a	c	
1	0	0	0	16	−2
↓	−2	4	−8	16	
1	−2	4	−8	32	

$$= a^3 - 2a^2 + 4a - 8 + \frac{32}{a+2}$$

20. $4x^5 - 3x + 122 \ \ by \ x + 2$

Solution:

x^5	x^4	x^3	x^2	x	c	
4	0	0	0	−3	122	−2
↓	−8	16	−32	64	−122	
4	−8	16	−32	61	0	

$$= 4x^4 - 8x^3 + 16x^2 - 32x + 61$$