

5.1 - 5.4 Test Review

Learning Target 5A

Simplify.

1. $\frac{-10p^4r}{-5p^5t^2r} =$

$$= \frac{2t^2}{p^2}$$

2. $3g^2(-gh^2)^5(4g^{-3}h^5)$

$$3g^2[-g^5h^{10}](4g^{-3}h^5)$$

$$= -12g^{2+5-3}h^{10+5}$$

$$= -12g^4h^{15}$$

3. $\left(\frac{5x^2y}{20x^{-2}y^5}\right)^{-3}$

$$\left(\frac{x^7}{4y^4}\right)^{-3} \Rightarrow \left(\frac{4y^4}{x^7}\right)^3$$

$$= \frac{64y^{12}}{x^{21}}$$

Learning Target 5B

4. $(7b^2 + 6b - 7) - (4b^2 - 2)$

$$7b^2 + 6b - 7 - 4b^2 + 2$$

$$= 3b^2 + 6b - 5$$

5. $5c(2c^2 - 3c + 4) - 2c(7c - 8)$

$$10c^3 - 15c^2 + 20c - 14c^2 + 16c$$

$$= 10c^3 - 29c^2 + 36c$$

Learning Target 5C

6. $\frac{6x^4y^5 + 12x^5y^2 - 18x^2y}{3xy}$

$$\frac{6x^4y^5}{3xy} + \frac{12x^5y^2}{3xy} - \frac{18x^2y}{3xy}$$

$$= 2x^3y^4 + 4x^4y - 6x$$

7. $(24a^3b^2 - 16a^2b^3) \div (8ab) \rightarrow \frac{24a^3b^2 - 16a^2b^3}{8ab}$

$$= \frac{24a^3b^2}{8ab} - \frac{16a^2b^3}{8ab}$$

$$= 3a^2b - 2ab^2$$

Use long division to find the quotient. Include the remainder in your answer if there is one.

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

$$x-2 \overline{) 3x^2 + 10x + 20} + \frac{50}{x-2}$$

$$- \underline{3x^2 - 6x^2}$$

$$10x^2 + 0x$$

$$- \underline{10x^2 - 20x}$$

$$20x + 10$$

$$- \underline{20x - 40}$$

$$50$$

9. $(12x^2 - 13x + 3) \div (3x - 1)$

$$3x-1 \overline{) 12x^2 - 13x + 3}$$

$$- \underline{12x^2 - 4x}$$

$$-9x + 3$$

$$- \underline{-9x + 3}$$

$$0$$

$$= 4x - 3$$

Use synthetic division to find the quotient. You must put the variable back into your answer to write the quotient correctly! Watch for missing terms and remember to include the remainder in your answer if there is one.

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

$$\begin{array}{r|rrrrr} 3 & 1 & -2 & 0 & 3 & 1 \\ & +\downarrow & 3 & 3 & 9 & 36 \\ \hline & 1 & 1 & 3 & 12 & 37 \end{array}$$

$x^3 + x^2 + 3x + 12 + \frac{37}{x-3}$

11. $(4x^2 + 5x + 1) \div (x + 1)$

$$\begin{array}{r|rrr} -1 & 4 & 5 & 1 \\ & +\downarrow & -4 & -1 \\ \hline & 4 & 1 & 0 \end{array}$$

$4x + 1$

12. $(3x^3 - 8x^2 + 11x - 14) \div (x - 2)$

$$\begin{array}{r|rrrr} 2 & 3 & -8 & 11 & -14 \\ & +\downarrow & 6 & -4 & 14 \\ \hline & 3 & -2 & 7 & 0 \end{array}$$

$3x^2 - 2x + 7$

13. $(x^4 + 6x^3 + 6x^2) \div (x + 5)$

$$\begin{array}{r|rrrrr} -5 & 1 & 6 & 6 & 0 & 0 \\ & +\downarrow & -5 & -5 & -5 & 25 \\ \hline & 1 & 1 & 1 & -5 & 25 \end{array}$$

$x^3 + x^2 + x - 5 + \frac{25}{x+5}$

Learning Target 5D

Write each function in standard form. Identify the degree, leading coefficient, and ending behavior of the graph.

14. $8x^5 - 12x^6 + 14x^3 - 9$

standard form: $-12x^6 + 8x^5 + 14x^3 - 9$

degree: 6

leading coefficient: -12

ending behavior: $x \rightarrow +\infty, f(x) \rightarrow -\infty$
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$



15. $13x^3 - 9x + 3x^5 - 18$

standard form: $3x^5 + 13x^3 - 9x - 18$

degree: 5

leading coefficient: 3

ending behavior: $x \rightarrow +\infty, f(x) \rightarrow +\infty$
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$



16. $4x - 3x^3 + 2x^2 - 6$

standard form: $-3x^3 + 2x^2 + 4x - 6$

degree: 3

leading coefficient: -3

ending behavior: $x \rightarrow +\infty, f(x) \rightarrow -\infty$
 $x \rightarrow -\infty, f(x) \rightarrow +\infty$



17. $-x^3 + 3 + 9x^4$

standard form: $9x^4 - x^3 + 3$

degree: 4

leading coefficient: 9

ending behavior: $x \rightarrow +\infty, f(x) \rightarrow +\infty$
 $x \rightarrow -\infty, f(x) \rightarrow +\infty$



If $c(x) = 2x^2 - 4x + 3$, and $f(x) = -x^3 + 4x^2 + 1$.

18. find $c(-2a)$

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

$$2(4a^2) + 8a + 3$$

$$8a^2 + 8a + 3$$

20. find $c(-4)$

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

$$2(16) + 16 + 3$$

$$32 + 16 + 3 = 51$$

19. find $f(-3)$

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

$$-(-27) + 4(9) + 1$$

$$27 + 36 + 1 = 64$$

21. find $3f(2a)$

$$f(2a) = -(2a)^3 + 4(2a)^2 + 1$$

$$= -(8a^3) + 4(4a^2) + 1$$

$$= -8a^3 + 16a^2 + 1$$

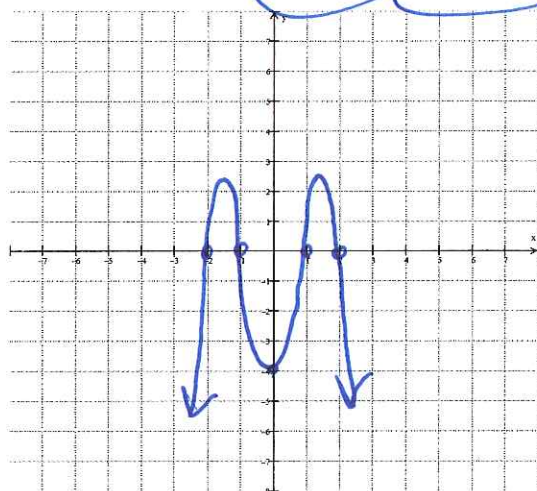
$$3f(2a) = 3(-8a^3 + 16a^2 + 1)$$

$$= -24a^3 + 48a^2 + 3$$

Learning Target 51

22. Graph $f(x) = -x^4 + 5x^2 - 4$

x	y
-3	-40
-2	0
-1	0
0	-4
1	0
2	0
3	-40



Y intercept: $(0, -4)$ X intercepts: $(-2, 0)$ $(-1, 0)$ $(1, 0)$ $(2, 0)$

relative maximum: 2.25 relative minimum: -4

Ending behavior: $x \rightarrow +\infty, f(x) \rightarrow -\infty$
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$

* calculator use to find maximum:

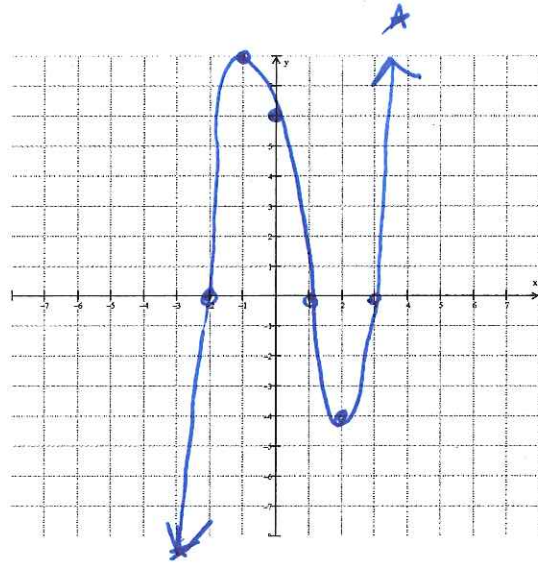
2^{nd} $\boxed{\text{Trace}}$ \downarrow $\boxed{\text{max}}$ $\boxed{\text{enter}}$

use left & right arrow keys to navigate to each side of the peak.

left boundary $\boxed{\text{enter}}$ right bound $\boxed{\text{enter}}$ guess $\boxed{\text{enter}}$

23. Graph $f(x) = x^3 - 2x^2 - 5x + 6$

x	y
-3	-24
-2	0
-1	8
0	6
1	0
2	-4
3	0
4	18



Y intercept: (0, 6)

X intercepts: (-2, 0) (1, 0) (3, 0)

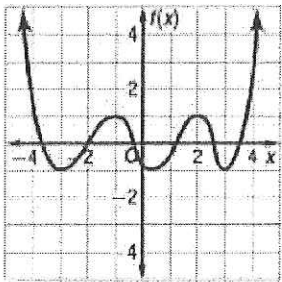
relative maximum: 8

relative minimum: -4

Ending behavior: $x \rightarrow +\infty, f(x) \rightarrow +\infty$
 $x \rightarrow -\infty, f(x) \rightarrow -\infty$

Identify the function as even or odd and describe ending behavior from the given graph.

24.

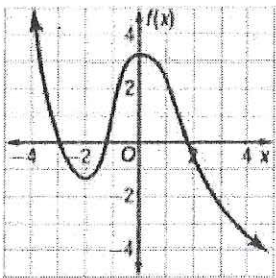


Even/Odd

$x \rightarrow +\infty, f(x) \rightarrow +\infty$

$x \rightarrow -\infty, f(x) \rightarrow +\infty$

25.



Even/Odd

$x \rightarrow +\infty, f(x) \rightarrow -\infty$

$x \rightarrow -\infty, f(x) \rightarrow +\infty$