

Suppose $f(x) = x^2 - 2x + 5$, $g(x) = -x^3 + 6$ and $h(x) = x^2 - 3$ find the following.

1. $f(x-2)$

$$\begin{aligned} f(x-2) &= (x-2)^2 - 2(x-2) + 5 \\ &= (x-2)(x-2) - 2x + 4 + 5 \\ &= x^2 - 2x - 2x + 4 - 2x + 9 \\ &= \boxed{x^2 - 6x + 13} \end{aligned}$$

3. $g(3) = -(3)^3 + 6$
 $-27 + 6$
 $\boxed{-21}$

Simplify.

5. $3i(2 - 7i)$

$$\boxed{i^2 = -1}$$

$$6i - 21i^2$$

$$6i - 21(-1)$$

$$\boxed{6i + 21}$$

7. $\sqrt{32} \cdot \sqrt{2} = \sqrt{64} = \boxed{8}$

9. $\sqrt[3]{2m^3n^5} \cdot \sqrt[3]{24m^6}$

$$\sqrt[3]{48m^9n^5}$$

$$\boxed{2m^3n\sqrt[3]{6n^2}}$$

2. $h(x+3) = (x+3)^2 - 3$

$$= (x+3)(x+3) - 3$$

$$= x^2 + 3x + 3x + 9 - 3$$

$$= \boxed{x^2 + 6x + 6}$$

4. $h(-4) = (-4)^2 - 3$

$$16 - 3$$

$$\boxed{13}$$

6. $(5 - 3i)(2 + 7i)$

$$10 + 35i - 6i - 21i^2$$

$$10 + 29i + 21$$

$$\boxed{31 + 29i}$$

8. $(2\sqrt{5} - \sqrt{15})(7 + 3\sqrt{5})$

$$14\sqrt{5} + 6\sqrt{25} - 7\sqrt{15} - 3\sqrt{75}$$

$$\boxed{14\sqrt{5} + 6 \cdot 5 - 7\sqrt{15} - 15\sqrt{3}}$$

10. $\sqrt[3]{x^4} (\sqrt[3]{4x} - \sqrt[3]{32x})$

$$\sqrt[3]{4x^5} - \sqrt[3]{32x^5}$$

$$x\sqrt[3]{4x^2} - 2x\sqrt[3]{4x^2}$$

$$\boxed{-x\sqrt[3]{4x^2}}$$

$$\begin{array}{c} \sqrt{32} \\ \downarrow \\ 6\sqrt{2} \\ \downarrow \\ 4\sqrt{2} \\ \downarrow \\ 2\sqrt{2} \end{array}$$

11. $(4x^{-6}y^3z^5)^{-2}$ multiply

$$4^{-2}x^{12}y^{-6}z^{-2}$$

$$\frac{x^{12}}{16y^6z^2}$$

13. $\frac{4d^7c^{-6}h^{-4}s^{-2}}{12d^2c^{-3}h^5s^7}$ $d^{7-2} = d^5$
 $c^{-6-3} = c^{-9}$

$$\frac{1d^5c^{-9}h^{-4}s^{-2}}{3}$$

$$\frac{d^5}{3c^9h^4s^2}$$

15. $14 - 3(5^2 - 15) - 2\left(\frac{3}{2}\right)$

$$14 - 3(25 - 15) - 3$$

$$14 - 30 - 3$$

$$-16 - 3$$

$$\boxed{-19}$$

17. $2x^3(3x^4 - 7x^2 + 11x^4)$

$$6x^7 - 14x^5 + 22x^7$$

$$28x^7 - 14x^5$$

12. Subtract

$$\frac{16x^5y^4z^{-6}}{22x^{-4}y^{-5}z^{-9}} = \frac{8x^9y^9z^3}{11}$$

14. $2 - 3[(6^2 \cdot 3^{-2}) + 2] \div 6 + 1$

$$2 - 3\left[\frac{36}{9} + 2\right] \div 6 + 1$$

$$2 - 3[4 + 2] \div 6 + 1$$

$$2 - 3[6] \div 6 + 1$$

$$2 - 18 \div 6 + 1$$

$$2 - 3 + 1$$

$$-1 + 1 = \boxed{0}$$

16. $(2x - 4x^3 + 7x^5) - (x^3 + 5x^5 - 7)$

$$2x - 4x^3 + 7x^5 - x^3 - 5x^5 + 7$$

$$\boxed{2x^5 - 5x^3 + 2x + 7}$$

18. When $x = 3$, find $2x\sqrt{12x} - 3\sqrt{x^2} + 4x\sqrt{3x}$

$$2(3)\sqrt{12(3)} - 3\sqrt{3^2} + 4(3)\sqrt{3(3)}$$

$$6\sqrt{36} - 3(3) + 12\sqrt{9}$$

$$6 \cdot 6 - 3 \cdot 3 + 12 \cdot 3$$

$$36 - 9 + 36$$

$$\boxed{63}$$