

$$\textcircled{1} i^{15} + 2i^5 - i^8 + 3i$$

i	0.25
-1	0.50
$-i$	0.75
1	whole #

$$\frac{15}{4} = 3\textcircled{75} \quad \frac{5}{4} = 1\textcircled{25} \quad \frac{8}{4} = 2$$

$$-i + 2i - 1 + 3i$$

$$\boxed{-1 + 4i}$$

$$\textcircled{2} \sqrt[6]{64x^7yz^2}$$

$$64^{1/6} x^{7/6} y^{1/6} z^{2/6}$$

$$\boxed{2x^{7/6} y^{1/6} z^{1/3}}$$

$$\textcircled{3} \text{a) } f(x) + h(x)$$

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

$$\boxed{-x^2 + 1}$$

$$\text{b) } f(x) - g(x)$$

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

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

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

$$\text{c) } f(g(x))$$

$$x^2 + 1$$

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

$$(3x - 2)(3x - 2) + 1$$

$$9x^2 - 6x - 6x + 4 + 1$$

$$\boxed{9x^2 - 12x + 5}$$

$$\text{d) } g(h(x))$$

$$3x - 2$$

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

$$\boxed{-6x^2 - 2}$$

$$\textcircled{4} (2x - 3)^4$$

$$1(2x)^4(-3)^0 = 1(16x^4)(1) = 16x^4$$

$$4(2x)^3(-3)^1 = 4(8x^3)(-3) = -96x^3$$

$$6(2x)^2(-3)^2 = 6(4x^2)(9) = 216x^2$$

$$4(2x)^1(-3)^3 = 4(2x)(-27) = -216x$$

$$1(2x)^0(-3)^4 = 1(1)(81) = 81$$

$$\boxed{16x^4 - 96x^3 + 216x^2 - 216x + 81}$$

$$\textcircled{5} (y - 2x)^4$$

$$1(y)^4(-2x)^0$$

$$4(y)^3(-2x)^1$$

$$\rightarrow 6(y)^2(-2x)^2 = 6y^2(4x^2) = 24x^2y^2$$

$$4(y)^1(-2x)^3$$

$$1(y)^0(-2x)^4$$

$$\boxed{24}$$

⑥ $(3x-1)^5$

$1 (3x)^5 (-1)^0$
 $\rightarrow 5 (3x)^4 (-1)^1 = 5(81x^4)(-1) = \boxed{-405x^4}$
 $10 (3x)^3 (-1)^2$
 $10 (3x)^2 (-1)^3$
 $5 (3x)^1 (-1)^4$
 $1 (3x)^0 (-1)^5$

⑦ $(2x^3 - 3x^2 + x - 8) \div (x-2)$

$$\begin{array}{r} 2 \overline{) 2 \quad -3 \quad 1 \quad -8} \\ \underline{ \quad 4 \quad 2 \quad 6} \\ 2 \quad 1 \quad 3 \quad \underline{-2} \end{array}$$

$$\boxed{2x^2 + x + 3 - \frac{2}{x-2}}$$

⑧ $f(x) = \{(3,5), (-2,0), (7,4), (-4,5)\}$

$$\boxed{f^{-1}(x) = \{(5,3), (0,-2), (4,7), (5,-4)\}}$$

⑨ $y = -(x+2)(x-2)^2$

⑪ a) $x = 3, -\frac{5}{4}, 2$

$$\boxed{y = (x-3)(4x+5)(x-2)}$$

⑩ I of I: $(-1, 2)$
I of D: $(-\infty, -1) \cup (2, \infty)$

b) $x = 4, \sqrt{6}, -\sqrt{6}$

$$y = (x-4)(x-\sqrt{6})(x+\sqrt{6})$$

$$\boxed{y = (x-4)(x^2 - 6)}$$

c) $x = 5, 4i, -4i$

$$y = (x-5)(x-4i)(x+4i)$$

$$y = (x-5)(x^2 - 16i^2)$$

$$\boxed{y = (x-5)(x^2 + 16)}$$

⑫ $\frac{x+2}{x^2-4} = \frac{x+2}{(x+2)(x-2)} = \frac{1}{x-2}$

VA: $x=2$
HA: $y=0$

SA: NONE
X-int: NONE

Y-int: $(0, -\frac{1}{2})$
Holes: $(-2, \frac{1}{4})$

Domain: All \mathbb{R} 's except $x \neq 2, -2$
End Beh:
As $x \rightarrow \infty, f(x) \rightarrow 0$
As $x \rightarrow -\infty, f(x) \rightarrow 0$

$$(13) \frac{x+2}{x^2-2x-8} = \frac{x+2}{(x-4)(x+2)} = \frac{1}{x-4}$$

VA: $x=4$

SA: NONE

y-int: $(0, -\frac{1}{4})$

D: All IR's except $x \neq 4, -2$

HA: $y=0$

x-int: NONE

Holes: $(-2, -\frac{1}{6})$

End behavior:

As $x \rightarrow \infty, f(x) \rightarrow 0$

As $x \rightarrow -\infty, f(x) \rightarrow 0$

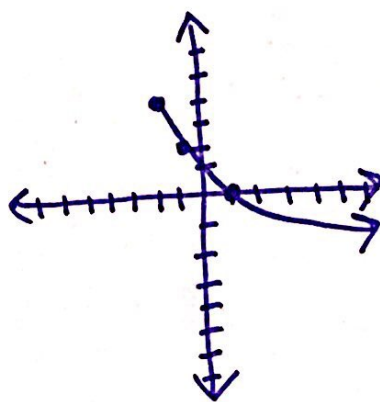
$$(14) f(x) = -2\sqrt{x+2} + 4$$

X	Y
-2	4
-1	2
2	0

start @ (-2, 4)

D: $[-2, \infty)$

R: $(-\infty, 4]$



Transformations: Reflect over x-axis, vertical stretch of 2, left 2, up 4

$$(15) \log_4 \frac{1}{256} = -4$$

$$4^{-4} = \frac{1}{256}$$

$$(16) \log_2 64 = 6$$

$$2^6 = 64$$

$$(17) 9^4 = 6561$$

$$\log_9 6561 = 4$$

$$(18) 6^{-3} = \frac{1}{216}$$

$$\log_6 \frac{1}{216} = -3$$

$$(19) y = \log_4 (x+3) - 2$$

$$x = \log_4 (y+3) - 2$$

$$x+2 = \log_4 (y+3)$$

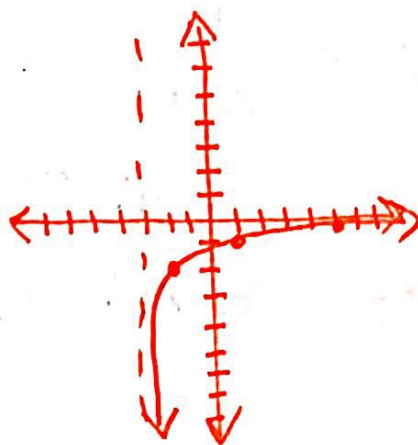
$$4^{x+2} = (y+3)$$

$$4^{x+2} - 3 = y$$

$$f^{-1}(x) = 4^{x+2} - 3$$

$$(20) y = \log_4(x+3) - 2$$

X	Y
-2	-2
1	-1
5	-0.5



End behavior:

$$\text{As } x \rightarrow \infty, f(x) \rightarrow \infty$$

$$\text{As } x \rightarrow -3, f(x) \rightarrow -\infty$$

$$(21) \log \frac{z^3 \sqrt[6]{x^7}}{y^4}$$

$$\log z^3 + \log \sqrt[6]{x^7} - \log y^4$$

$$\log z^3 + \log x^{7/6} - \log y^4$$

$$\boxed{3 \log z + \frac{7}{6} \log x - 4 \log y}$$

$$(22) \frac{x^2 - 6x - 27}{2x^2 + 2x} \div \frac{x^2 - 14x + 45}{x^2}$$

$$\frac{x^2 - 6x - 27}{2x^2 + 2x} \cdot \frac{x^2}{x^2 - 14x + 45}$$

$$\frac{(x-9)(x+3)}{2x(x+1)} \cdot \frac{x^2}{(x-9)(x-5)}$$

$$\boxed{\frac{x(x+3)}{2(x+1)(x-5)}}$$