7

exponent

$\boxed{2}^{\boxed{3}} = \boxed{x} \longrightarrow \log_{\boxed{2}} \boxed{x} = \boxed{3}$ (log form)

base result

result

base exponent

8

result exponent

$\boxed{y} = \log_{\boxed{b}} \boxed{x} \longrightarrow \boxed{b}^{\boxed{y}} = \boxed{x}$

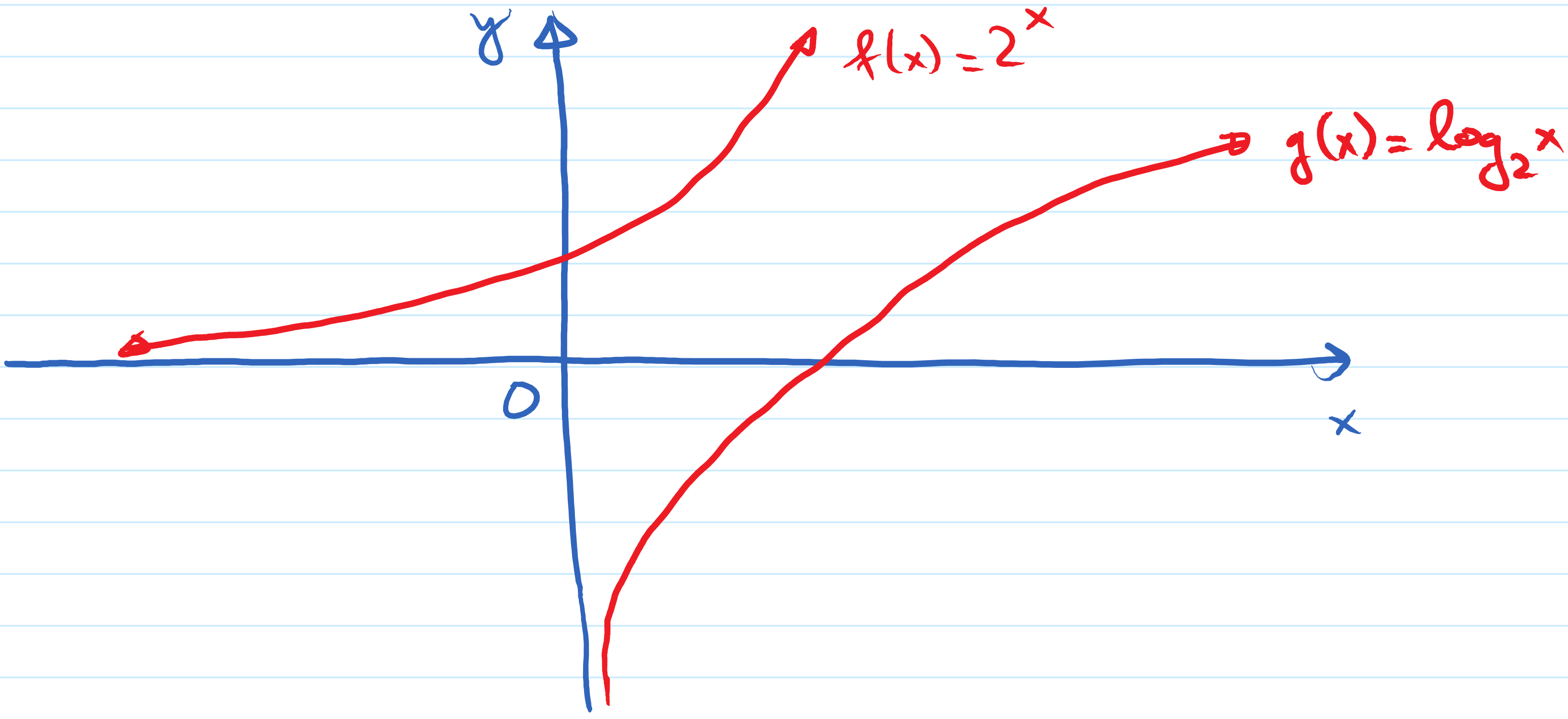
exponent base

result

base

(exponential form)

9



10 $\log_b(x^4 y) = \log_b(x^{\boxed{4}}) + \log_b(y)$

product rule

$= 4\log_b(x) + \log_b(y)$

power rule

(11) $\boxed{3}\log_b x + \boxed{7}\log_b z = \log_b x^3 + \log_b z^7$

Power rule

$= \log_b\left(x^3 \cdot z^7\right)$

product rule

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

power rule

$= \ln\left(\frac{x^2}{y^6}\right)$

quotient rule

(13) To find domain: Set $(x-7)(x+4) = 0$

Solve: $x - 7 = 0$; $x + 4 = 0$

$x = 7$; $x = -4$.

Domain: $\boxed{\{x \mid x \neq 7, -4\}}$

(14) $f(x) = \frac{-3x+7}{5x+2}$. Degree of top = 1.

Degree of bottom = 1.

So, horizontal asymptote: $\boxed{y = \frac{-3}{5} = -\frac{3}{5}}$

15

no x^4 term

$$
\begin{array}{c|cccccc}
 & 5 & 0 & -5 & 3 & -2 & 7 \\
2 & & 10 & 20 & 30 & 66 & 128 \\
\hline
 & 5 & 10 & 15 & 33 & 64 & \boxed{135}
\end{array}
$$

Remainder

Quotient: $5x^4 + 10x^3 + 15x^2 + 33x + 64$.

Final Result:

$$\frac{5x^5 - 5x^3 + 3x^2 - 2x + 7}{x-2} = \boxed{\underbrace{5x^4 + 10x^3 + 15x^2 + 33x + 64}_{\text{Quotient}} + \frac{135}{x-2}}$$

Remainder

16 $f(x) = 4x^2 + 16x + 5$

$a = 4$; $b = 16$; $c = 5$

$$x_{vertex} = -\frac{b}{2a} = -\frac{16}{2\cdot(4)} = -2$$

$$y_{vertex} = 4(-2)^2 + 16(-2) + 5 = -11$$

plug x_{vertex} into $f(x)$

Vertex: $\boxed{(-2,-11)}$

17

$$(f\circ g)(x) = f\underbrace{(g(x))}_{\text{plug } g(x) \text{ into } f} = f(\underbrace{x^2-1}_{g(x)})$$

$$= 5(x^2-1) - 4 = 5x^2 - 5 - 4$$

$$= \boxed{5x^2 - 9}$$

$$(g\circ f)(x) = g(f(x)) = (5x-4)^2 - 1$$

$$= (5x-4)(5x-4) - 1$$

$$= 25x^2 - 40x + 16 - 1$$

$$= \boxed{25x^2 - 40x + 15}$$

$$(f\circ g)(1) = 5(1)^2 - 9 = \boxed{-4}$$

plug 1 into $(f\circ g)(x)$

$$(g\circ f)(1) = 25(1)^2 - 40(1) + 15 = \boxed{0}$$

plug 1 into $(g\circ f)(x)$

(18) $g(x) = f(x-1) - 6$ → move down 6 units

Move right 1 unit

→ Choice C.

(19) (a) $g(0) = 0 + 4 = \boxed{4}$.

> -4 plug in 1st formula

(b) $g(-7) = -(-7+4) = -(-3) = \boxed{3}$

< -4 plug in 2nd formula

(c) $g(2) = 2 + 4 = \boxed{6}$

> -4 plug in 1st formula

(20) Go to the point on graph where $y = 8$, then find the x-coordinate of that point

→ Answer: $x = -5$