Final Exam Review

Wednesday, December 4, 2019 11:04 AM

MC Section

(1) $f(x) = x^2 - 3x - 3$. Find $f(-3)$

Plug -3 into x:

$$f(-3) = (-3)^2 - 3(-3) - 3$$

$$= 9 + 9 - 3 = \boxed{15}$$ D

(2) Domain: left to right on x-axis.

$[-3, 0]$

Range: Lowest to highest on y-axis.

$[-1, 3]$

Answer: D

(3) 3 units left ; flip over x-axis. C.

(4) Take denominator, set $= 0$. Solve.

$$x^3 - 16x = 0$$

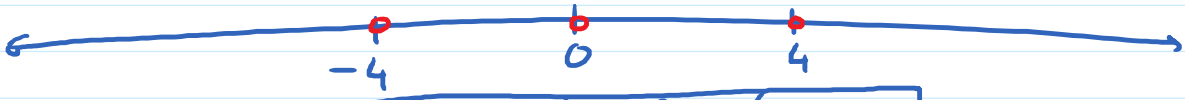
$$x(x^2 - 16) = 0.$$

$\boxed{x = 0}$; $x^2 - 16 = 0$

$x^2 = 16$

$\boxed{x = \pm 4}$

Domain:



$\boxed{(-\infty, -4) \cup (-4, 0) \cup (0, 4) \cup (4, \infty)}$ C

(5) Vertex of parabola

$f(x) = -2x^2 + 12x - 17$

$x_{vertex} = -\frac{b}{2a} = -\frac{12}{2(-2)} = 3$

$y_{vertex} = -2(3)^2 + 12(3) - 17$

$= -2 \cdot 9 + 36 - 17$

$= -18 + 36 - 17 = 1$

Vertex $\boxed{(3, 1)}$ D.

(6) leading term: ax^n

	n even	n odd
$a > 0$	↖ ↗	↙ ↗
$a < 0$	↙ ↘	↖ ↘

$-0.7x^6$. $a = -0.7 < 0$; $n = 6$ even. ↙ ↘ C

(7) $\log_{\boxed{b}} \underset{\text{quantity}}{\boxed{8}} = \boxed{3}$ ⟶ $b^3 = 8$

b: base; 3: exp

A

(8) $14^2 = y$ ⟶ $\log_{14} y = 2$ A

(9) $\ln x + 9 \ln y = \ln x + \ln y^9 = \ln(xy^9)$ B

Power Rule; product

(10) $\log 11 = 2.398$

(10) $\log_a 11 = 2.398$

$\log_a 5 = 1.609.$

$\log_a \frac{11}{5} = \log_a 11 - \log_a 5 = 2.398 - 1.609$

$= \boxed{0.789}$ A

quotient rule

(11) $e^{3x} = 5$

$\ln e^{3x} = \ln 5$

$3x = \ln 5 \rightarrow \boxed{x = \frac{\ln 5}{3}}$ B

(12) $6 + 6\ln x = 10$

$6\ln x = 4$ (subtract 6)

$\ln x = \frac{4}{6}$ (Divide by 6)

$\ln x = \frac{2}{3}$

quantity exp

$\log_e (x) = \frac{2}{3}.$

base

$x = e^{\frac{2}{3}}$ B

Inverse

$x = 2^{\frac{2}{3}}$ B

(13)

1	1	−3	1	5	−6
		1	−2	−1	4
	1	−2	−1	4	−2

Answer: $x^3 - 2x^2 - x + 4$: Quotient

-2 : Remainder

(14) Top > bottom → No H.A.

(15) $\log_b(y \cdot z^9) = \log_b y + \log_b z^9$

product

$= \log_b y + 9 \log_b z$

power

(16) $3^{3x-6} = 27$

$3^{3x-6} = 3^3$ (Rewrite using like bases)

$3x - 6 = 3$ (Set exponents equal)

$$3x = 9$$

$$\boxed{x = 3}$$

(17) $\log_6 x + \log_6 (x-35) = 2$.

Product Rule

$$\log_6 [x \cdot (x-35)] = 2$$ (exp)

6 — base

$$x \cdot (x-35) = 6^2$$

$$x \cdot (x-35) = 36$$

$$x^2 - 35x - 36 = 0$$

multiply: -36, add: -35, $-36 \cdot 1$

$$(x-36)(x+1) = 0$$

$$x - 36 = 0 \quad ; \quad x + 1 = 0$$

$$x = 36 \quad ; \quad x = -1$$

Check: $x = 36$ solution:

$$\log_6 36 + \log_6 (36-35) \stackrel{?}{=} 2$$

$$? \quad . \quad \log_6 1^{0} \stackrel{?}{=} 2 \quad \checkmark$$

$2 + \log_6 1 \overset{?}{=} 2$ ✓

~~$\log_6(-1) + \log_6(-1-35) = 2$~~

(18) $e^{x+6} = 4$

~~$\ln e^{x+6}$~~ $= \ln 4$

$x + 6 = \ln 4$

$\boxed{x = \ln 4 - 6}$