

King Fahd University of Petroleum and Minerals
Prep-Year Math Program

Prep-Year Math II
FIRST EXAM
Semester I, Term 061
Saturday, October 7, 2006
Net Time Allowed: 75 minutes

MASTER VERSION

["]
Sources
"

1. The graph of the function $f(x) = -\ln|x+1|$ lies above the x -axis over the interval

~~(a)~~ $(-2, -1) \cup (-1, 0)$

See Example 6 P. 388

(b) $(-\infty, -2)$

See Problems # 67 and 68 P. 392

(c) $(-\infty, -1)$

(d) $(-1, \infty)$

(e) $(-\infty, -2) \cup (0, \infty)$

2. The solution set of the equation

$$\log(x-4) - \log(3x-10) = -\log x$$

contains

See Example 7 P. 412

See Problems 21 to 30 P. 415

~~(a)~~ one positive integer

(b) two positive integers

(c) two positive irrational numbers

(d) one positive irrational number

(e) no real numbers

3. $\log_2 x^3 y^2 - 2 \log_2 x \sqrt[3]{y} + 3 \log_2 \frac{x}{y} =$

~~(a)~~ $\log_2 \frac{x^4}{y^{5/3}}$

See Example 2 p. 396

(b) $\log_2 \frac{x^4}{y^{2/3}}$

See Problems # 9 & 14 p. 403-404

(c) $\log_2 \frac{x^2}{y^{5/3}}$

(d) $\log_2 \frac{x^2}{y^{1/3}}$

(e) $\log_2 \frac{x^3}{y^{5/3}}$

4. If $x = e^{(-\ln 3 + 2 \ln 5)}$ and $y = \ln \sqrt[4]{e^5}$, then $x + y =$

~~(a)~~ $\frac{115}{12}$

See Example 3 p. 385

(b) $\frac{101}{12}$

and the definitions and the inverse formulas on p. 383.

(c) $\frac{30}{7}$

(d) $\frac{100}{11}$

(e) $\frac{100}{7}$

5. If $\cot \theta = \frac{1}{2}$, $\pi < \theta < \frac{3\pi}{2}$, then $\sin \theta + \cos \theta =$

~~(a)~~ $\frac{-3}{\sqrt{5}}$

See Problems # 15 to 24 p. 497

(b) 3

(c) $\frac{-1}{\sqrt{5}}$

(d) $\frac{3}{\sqrt{5}}$

(e) $\frac{1}{\sqrt{5}}$

6. Which one of the following statements is **FALSE** about the

function $f(x) = -1 + \left(\frac{1}{2}\right)^{-x+3}$?

See Examples 2 and 3 p. 371

~~(a)~~ decreasing on $(-\infty, \infty)$ See problems # 17 to 34 p. 377

(b) increasing on $(-\infty, \infty)$

(c) f is a one-to-one function

(d) the range of f is $(-1, \infty)$

(e) the graph of f is asymptotic to $y = -1$

7. Let $W(t)$ be the wrapping function. If $W\left(-\frac{11\pi}{6}\right) = (a, b)$ and $W\left(\frac{10\pi}{3}\right) = (c, d)$, then $a + d =$

~~(a)~~ 0

(b) $\sqrt{3}$

(c) $\frac{-1}{2} - \frac{\sqrt{3}}{2}$

(d) $-\sqrt{3}$

(e) $\frac{1}{2} - \frac{\sqrt{3}}{2}$

See Example 1 p. 500

See Problems 1 to 10 p. 508

8. The smallest positive angle coterminal with the angle $(820.25)^\circ$ is

~~(a)~~ $100^\circ 15'$

(b) $20^\circ 52'$

(c) $100^\circ 15' 2''$

(d) $20^\circ 50' 2''$

(e) $100^\circ 15' 1''$

See Problems # 19 to 24 p. 473

9. An arc of length 150 m subtends a central angle of 300° in a circle of radius r . The radius r is equal to

~~(a)~~ $\frac{90}{\pi}$ m

(b) $\frac{1}{2}$ m

(c) $\frac{\pi}{90}$ m

(d) $\frac{180}{\pi}$ m

(e) 2500π m

See Example 5 p. 469

See Problems 59 to 64 p. 473

10. The exact value of $\csc(225^\circ) \cdot \tan(-240^\circ) + \sin 150^\circ$ is

~~(a)~~ $\frac{1}{2} + \sqrt{6}$

(b) $\sqrt{3} + \frac{1}{2}$

(c) $\frac{\sqrt{2} + 2\sqrt{3}}{\sqrt{3}}$

(d) $\frac{\sqrt{6} + 4\sqrt{3}}{\sqrt{2}}$

(e) $\sqrt{6} + 2\sqrt{3}$

See Example 4 p. 495

See Problems 37 to 48 p. 497

11. From the top of a 200-ft lighthouse, the angle of depression to a ship in the sea is 60° . How far is the ship from the base of the lighthouse?

~~(a)~~ $\frac{200\sqrt{3}}{3}$ ft

(b) 400 ft

(c) $200\sqrt{3}$ ft

(d) $\frac{400\sqrt{3}}{3}$ ft

(e) $400\sqrt{3}$ ft

See Examples 4 and 5 p. 482-483

See Problems # 65 and 66 p. 486

12. If $\cos 170^\circ = k$, then $\cos 350^\circ + 2\sec 190^\circ =$

~~(a)~~ $\frac{2 - k^2}{k}$

(b) $\frac{2k^2 + k}{k}$

(c) $-3k$

(d) $\frac{k^2 - 2}{k}$

(e) $-k + 2\sqrt{1 - k^2}$

An Application of the Concept
of "Reference Angles" p. 493

See Example 3 p. 494

See Problems 25 to 36 p. 497

13. If $\log_a 2 = 0.6$, then $\log_{2a} \left(\frac{a^2}{\sqrt{2}} \right)$ is equal to

~~(a)~~ $\frac{17}{16}$

(b) $\frac{16}{17}$

(c) $\frac{15}{17}$

(d) $\frac{17}{15}$

(e) $\frac{16}{15}$

An Application of "Change of Base formula" p. 397

See Example 3 p. 397

See Problems 15 to 22 p. 404

~~14.~~ The domain, in interval notation, of the function $f(x) = \sqrt{\ln(x-3)}$ is equal to

(a) $[4, \infty)$

(b) $(3, \infty)$

(c) $(3, 4]$

(d) $(-\infty, 3)$

(e) $(0, 3)$

See Example 5 p. 388

See Problems # 39 to 48 p. 391

15. If $3 \cdot 2^x = 2 \cdot 3^{x+1}$, then $x =$

~~(a)~~ $\frac{\ln 2}{\ln(2/3)}$

(b) $\frac{\ln 3}{\ln 6}$

(c) $\frac{\ln 2}{\ln 3}$

(d) $\frac{\ln 3}{\ln(3/2)}$

(e) $\frac{\ln 2}{\ln 6}$

See Example 3 p. 410

See Problems #17 to 20 p. 415