Business Mathematics
Exam I, Form A, Fall 2006

W. A. Kirk Name_____

Instructions. Do not use graphing calculators. Turn off your cell phones.

1. $\dfrac{1}{x^{-2}+y^{-1}} =$

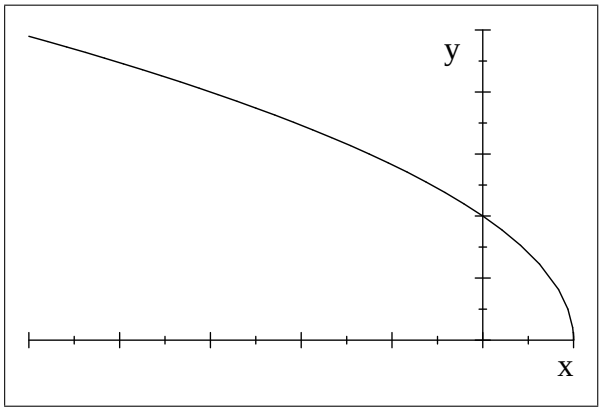
   (a) $\dfrac{x^2y}{y+x^2}$.

   (b) x^2+y.

   (c) $\dfrac{x^2+y}{x^2y}$.

   (d) $\dfrac{xy}{x^2+y}$.

2. Which of the functions does the following graph represent? (Assume a is positive.)



   (a) $f(x) = \sqrt{x-a}$

   (b) $f(x) = \sqrt{x+a}$

   (c) $f(x) = \sqrt{a-x}$

   (d) $f(x) = \sqrt{-a-x}$

3. $\dfrac{\left(\dfrac{2}{x}-3\right)}{\left(1-\dfrac{1}{x-1}\right)} =$

(a) $\dfrac{(2-3x)(x-1)}{x(x+2)}, \qquad x \neq 0,1,2$

(b) $\dfrac{(3x-2)(x-1)}{x(x-2)}, \qquad x \neq 0,1,2$

(c) $\dfrac{(2+3x)(x-1)}{x(x-2)}, \qquad x \neq 0,1,2$

(d) $\dfrac{(2-3x)(x-1)}{x(x-2)}, \qquad x \neq 0,1,2$

4. Let L_1 be the line passing through the pair of points $(-2,-1)$ and $(1,5)$, and let L_2 be the line passing through the pair of points $(1,3)$ and $(5,-5)$. Then L_1 and L_2 are

(a) parallel.

(b) perpendicular.

(c) neither parallel nor perpendicular.

5. $\left(\sqrt{32}\right)^{-2/5} =$

(a) $\frac{1}{4}$

(b) 4

(c) $\frac{1}{2}$

(d) 2

6. If a function f has an inverse, f^{-1}, then the graph of f^{-1} is the same as the graph of f

(a) reflected in the y-axis.

(b) reflected in the origin.

(c) reflected in the y-axis.

(d) reflected in the line $y = x$.

7. If $f(x) = \sqrt{x}$ and $g(x) = \sqrt{4 - x^2}$, then the domain of $\dfrac{f}{g}(x)$ is

   (a) $[0, 2]$

   (b) $(0, 2)$

   (c) $[0, 2)$

   (d) $(0, 2]$

8. A college purchased exercise equipment worth \$12,000 for the new campus fitness center. The equipment has a useful life of 8 years. The salvage value at the end of 8 years is \$2000. Which of the following linear equations describes the book value of the equipment each year?

   (a) $V = -1250t + 12,000.$

   (b) $V = -1000t + 12,000.$

   (c) $V = -1200t + 12,000.$

   (d) $V = -8000t + 12,000$

9. $(3x-1)^2 + (3x-1) =$

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

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

   (c) $x(3x-1)$

   (d) $(3x-1)(3x)$

10. Let $f(x) = -(a+|x|)$, with $a > 0$. Determine the interval(s) for which $f(x) > 0$.

    (a) $(-\infty, -a)$

    (b) $(-\infty, -a) \cup (a, \infty)$

    (c) $(-a, a)$

    (d) $f(x)$ is never positive.

11. The inverse of the function $f(x) = 7x + 1$ is

(a) $g(x) = \dfrac{x-1}{7}$

(b) $g(x) = \dfrac{x+1}{7}$

(c) $g(x) = \dfrac{x}{7} - 1$

(d) $g(x) = \dfrac{x}{7} + 1$

12. The domain of the inverse of $f(x) = \sqrt{x} - 2$ is

(a) $(-\infty, \infty)$

(b) $[0,\infty)$

(c) $[-2, \infty)$

(d) $f(x)$ does not have an inverse.

13. The inequality $\dfrac{2}{x} > \dfrac{5}{x+6}$ is satisfied on the interval(s)

(a) $(-6, 0)$.

(b) $(-\infty, -6)$ and $(4, \infty)$.

(c) $(-\infty, -6)$ and $(0, 4)$.

(d) $(0, 4)$.

14. The zeros of $f(x) = x^2 + 4x + 1$ are

(a) $-2 \pm \sqrt{5}$.

(b) $-2 \pm \sqrt{3}$.

(c) $-4 \pm \sqrt{12}$.

(d) The function does not have any zeros.

15. Let $f(x) = x^3 - 5x^2 - 11x + 8$. If you express $f(x)$ in the form $f(x) = (x+2)\,q(x) + r$, then $r =$

(a) -2.

(b) -4.

(c) 2.

(d) 4.

16. How many (real) zeros does the function $f(x) = x^2 - 2x + 3$ have?

(a) None

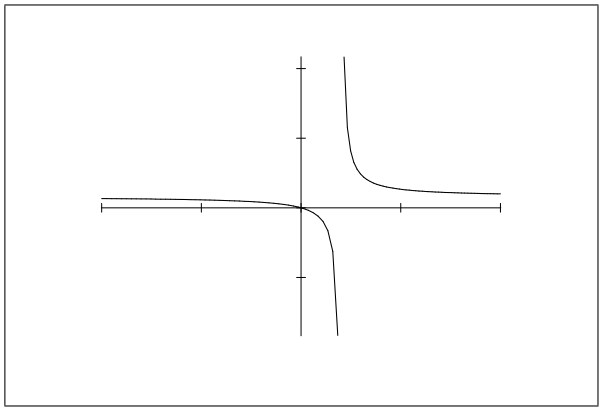
(b) One

(c) Two

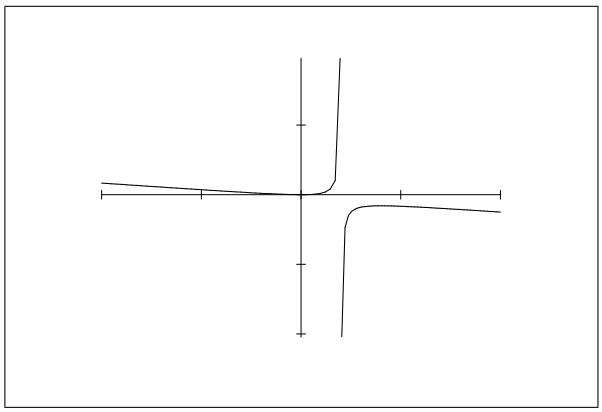
(d) Three

17. Which of the following represents the graph of $f(x) = \dfrac{x^2}{x-1}$?

(a)



(b)



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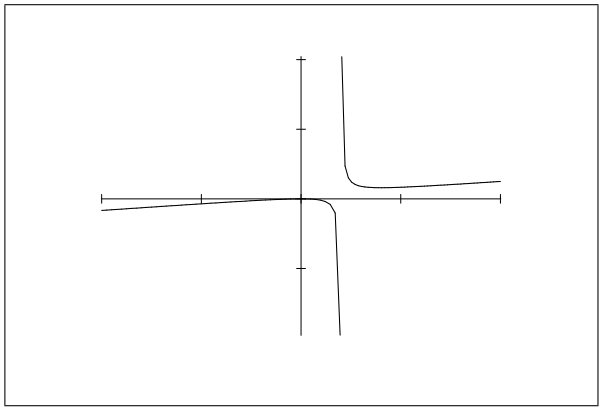


18. The solution to the inequality $|1 - 4x| < 4$, in interval notation, is

(a) $\left(-\frac{3}{2}, \frac{5}{2}\right)$

(b) $\left(-\frac{1}{4}, \frac{3}{4}\right)$

(c) $\left(-\frac{1}{3}, \frac{4}{3}\right)$

(d) $\left(-\frac{3}{4}, \frac{5}{4}\right)$

19. A business has a production cost of $C = 0.5x + 500$ for producing x units of a product. The average cost per unit, $\bar{C}$, is given by

$$\bar{C} = \frac{C}{x} = \frac{0.5x + 500}{x}, \quad x > 0.$$

Determine the average cost per unit as x increases without bound.

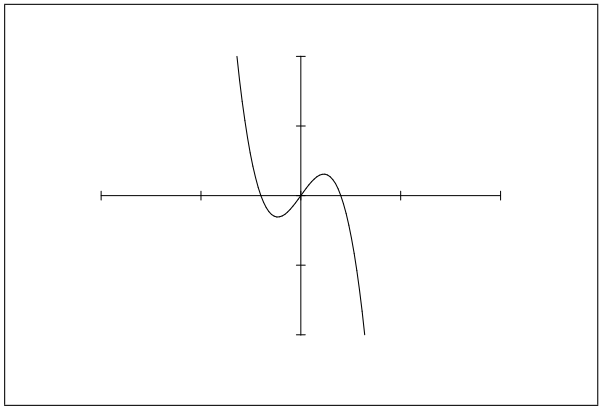
(a) \$100

(b) \$0.05

(c) \$0.5

(d) \$500

20. The figure below shows the graph of a polynomial function g. Which of the indicated functions could defing $g\,(x)$?



(a) $x^3 - 4$

(b) $x^3 - 4x$

(c) $-x^3 + 4x$

(d) $x^4 - x^2$