

Name: Key

Date: _____

Part I. Multiple choice. Show all work on a separate sheet of paper.

$$\frac{x^{5/2}}{x^{7/4}} = x^{3/4}$$

1. The expression $\frac{(\sqrt{x})^5}{\sqrt[4]{x^7}}$ can be written, for $x > 0$, as

- (a) $\sqrt[4]{x^3}$ (b) $\sqrt{x^5}$ (c) $\frac{1}{\sqrt{x^3}}$ (d) $\frac{1}{\sqrt[4]{x^9}}$

2. What is the value of $\sum_{m=1}^3 (2m+1)^{m-1}$?

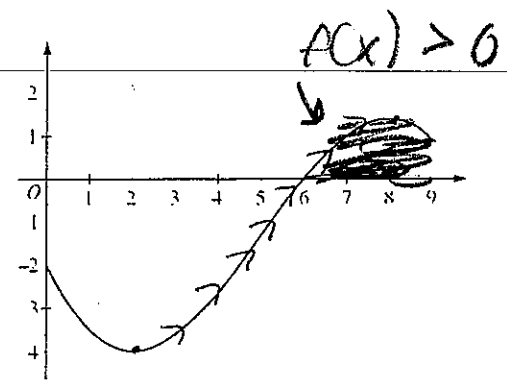
- (a) 15 (b) 55 (c) 57 (d) 245

3. In a lab experiment, 1500 grams of a radioactive isotope decays at a rate of 6% per day. Which of the following is a recursive definition representing the mass a radioactive sample on the n th day of the experiment?

$$1 - 0.06 = .94$$

- (a) $a_n = 1500(0.94)^{n-1}$ (b) $a_1 = 1500$
 $a_n = 0.06a_{n-1}$ (c) $a_n = 1500(0.06)^{n-1}$ (d) $a_1 = 1500$
 $a_n = 0.94a_{n-1}$

4. Given the graph of f at the right, for what values of x is $f(x) > 0$ and increasing?



- (a) $2 < x < 8$ (c) $6 < x < 9$
 (b) $6 < x < 8$ (d) $0 < x < 2$

2nd Test
 0 False
 1 True

5. Which of the following is not an identity?

- (a) $(2a+b)^3 = 8a^3 + 12a^2b + 6ab^2 + b^3$ (c) $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$
 (b) $(a+b)^2 - (a-b)^2 = 2b^2$ (d) $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$

$$a^3 - a^2b + ab^2 + a^2b - ab^2 + b^3$$

$$(a+b)(a+b) - (a-b)(a-b)$$

$$a^2 + ab + ab + b^2 - (a^2 - ab - 2a + b^2) = 4ab$$

$$x + b = -11$$

$$x^2 + 6x + 11 = 0$$

6. The solutions to the equation $x + 6 + \frac{11}{x} = 0$ are

- (a) $x = -3 \pm i\sqrt{2}$ (b) $x = -6 \pm i\sqrt{11}$ (c) $x = -3 \pm 2i\sqrt{2}$ (d) $x = -6 \pm 2i\sqrt{11}$
- $$x = \frac{-6 \pm \sqrt{(6)^2 - 4(1)(11)}}{2(1)} = \frac{-6 \pm \sqrt{8}}{2}$$

7. The expression $\frac{x^3 - 6x^2 - 3x + 1}{x+2}$ is equivalent to

$$-2 \begin{array}{r|rrrr} 1 & -6 & -3 & 1 \\ \downarrow & -2 & 16 & -26 \\ \hline & 1 & -8 & 13 & 25 \end{array}$$

(a) $x^2 - 4x - 11 - \frac{25}{x+2}$

(c) $x^2 - 4x + 5 - \frac{9}{x+2}$

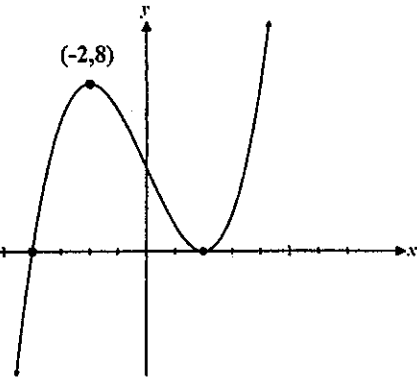
(b) $x^2 - 8x + 13 - \frac{25}{x+2}$

(d) $x^2 - 8x + 13 - \frac{27}{x+2}$

$$x^2 - 8x + 13 + \frac{25}{x+2}$$

8. A polynomial $f(x)$ shown has zeroes at $x = -4$ and $x = 2$ and has a relative maximum at $(-2, 8)$. Which of the following is the value of $f(6)$?

$$y = a(x+4)(x-2)^2$$



(a) 12

(c) 24

$$8 = a(-2+4)(-2-2)^2$$

$$8 = 32a$$

$$a = \frac{1}{4}$$

(b) 40

(d) 64

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

$$f(6) = \frac{1}{4}(6+4)(6-2)^2 = 40$$

9. Which of the following graphs are odd functions?

(a) $f(x) = x^3 - 2$ X Neither

(c) $f(x) = 5^x$ X Neither

(b) $f(x) = |x| + 2$ X Even

(d) $f(x) = x^3 + x$ odd

x	y
-2	-10
-1	-2
1	2
2	10

10. Which of the following represents the solution(s) to the equation $\frac{2x}{3} - \frac{4}{x} = \frac{5}{3}$?

(a) $\{-\frac{3}{2}, 4\}$

(c) $\{\frac{3}{2}, -4\}$

(b) $\{32, 4\}$

(d) $\{32, -4\}$

$$\begin{array}{r} -24 \\ -8x \quad +3x \\ \hline -5 \end{array}$$

$$2x^2 - 12 = 5x$$

$$2x^2 - 5x - 12 = 0$$

$$\begin{array}{r} 2x^2 - 8x \quad +3x - 12 = 0 \\ 2x(x-4) \quad +3(x-4) = 0 \\ (2x+3)(x-4) = 0 \\ x = -3/2 \quad x = 4 \end{array}$$

Part II. Free response. Show all work on a separate sheet of paper.

11. Which function, $f(x)$ or $g(x)$, shown at the right has a greater average rate of change on the interval $[-2, 4]$?

$$\frac{f(x)}{4 - (-2)} = \frac{80 - 1.25}{6} = \frac{78.75}{6} = 13.125$$

$$g(x) = 4x^3 - 5x^2 + 3$$

$$\frac{g(x)}{4 - (-2)} = \frac{179 - 49}{6} = \frac{130}{6} = 21.67$$

x	f(x)
-4	0.3125
-3	0.625
-2	1.25
-1	2.5
0	5
1	10
2	20
3	40
4	80

12. Solve algebraically: $\sqrt{50 - 7x} + 6 = x$

$$\sqrt{50 - 7x} = (x - 6)$$

$$50 - 7x = (x - 6)(x - 6)$$

$$50 - 7x = x^2 - 12x + 36$$

$$\begin{array}{r} x^2 - 5x - 14 = 0 \\ (x-7)(x+2) = 0 \\ x = 7 \quad x = -2 \end{array}$$

check