

**Derivatives Review1** – QUIZ REVIEW

Name: \_\_\_\_\_ Per \_\_\_ Due: \_\_\_\_\_

**1-3 Use the definition of the derivative to find  $f'(x)$ :**

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

2.  $f(x) = 2x + 1$

3.  $f(x) = \frac{1}{x}$

**4-15 Find the derivatives of the following:**

4.  $y = 3x^8 + 2x + 1$

5.  $y = \frac{x^2 + 1}{5}$

6.  $y = \pi^3$

7.  $y = \frac{4x + 1}{x^2 - 5}$

8.  $y = (\ln x)(6x^2 - x)$

9.  $y = \frac{\ln x}{\sin x}$

10.  $y = (x^3 + 2x)^{37}$

11.  $y = \left(x^3 - \frac{7}{x}\right)^{-2}$

12.  $y = \sin^3 x$

13.  $y = \sqrt{\sin(5x)}$

14.  $y = \left(\frac{x-5}{2x+1}\right)^3$

15.  $y = \sin^2(\sqrt{7x})$

**16-21 Use implicit differentiation to find the derivatives:**

16.  $x^2 + y^2 = 100$

17.  $x^3 - y^3 = 6xy$

18.  $\frac{1}{y} + \frac{1}{x} = 1$

19.  $\sqrt{xy} + 1 = y$

20.  $x^2y + 3xy^3 - x = 3$

21. Find the slope of the tangent to  $x^2y - 5xy^2 + 6 = 0$  at  $(3,1)$ .

22. Find the equation of the tangent line of  $xy = 8$  at  $(2,4)$ .

23. Find the equation of the tangent line of  $y^2 - 3xy + 2x^2 = 4$  at  $(3,2)$ .

## Derivatives Review 2 – Quiz Review

*Find the derivatives of the following:*

1.  $y = 6x^2 - 10x - 5x^{-2}$

2.  $y = (2x - 7)^{-1}(x + 5)$

3.  $y = \frac{5x + 1}{2\sqrt{x}}$

4.  $y = \frac{\sqrt{x} - 1}{\sqrt{x} + 1}$

5.  $y = (\sin x)(6x^2 - 4)$

6.  $y = -\frac{1}{3}(x^7 + 2x)$

7.  $y = \sin(5x^2 - 9)$

8.  $y = \ln(\sqrt{x})$

9.  $y = x^3 \sin^2(5x)$

10.  $y = (3x^2 + 2x - 1)^6$

11.  $y = \sqrt{4 + 3\sqrt{x}}$

12.  $y = \sin(\sin(x^2))$

**Use Implicit Differentiation to find the following derivatives:**

13.  $y^2 - x + 1 = 0$

14.  $\sin(x^2 y^2) = x$

15.  $x^3 y^2 - 5x^2 y + x = 1$

16.  $\sin xy = y$

17.  $x^{2/3} - y^{2/3} - y = 1$

18.  $\sqrt{x} + \sqrt{y} = 8$

**Use the definition of the derivative to find  $f'(x)$ :**

19.  $f(x) = 6x^2 - x$

20.  $f(x) = \sqrt{x}$

21.  $f(x) = 7x - 2$

22. Find the equation of the tangent line of  $xy^2 = \sin(x + 2y)$  at  $(0,0)$ .

23. Find the equation of the tangent line of  $y^2 - x + 1 = 0$  at  $(10,3)$ .

24. Find the slope of  $x^3y + y^3x = 10$  at  $(1,2)$ .

25. Find the second derivative of  $x^3 + y^3 = 1$

**In questions 26-32, differentiable functions  $f$  and  $g$  have the values shown in the table below.**

$x$	$f$	$f'$	$g$	$g'$
<b>0</b>	<b>2</b>	<b>1</b>	<b>5</b>	<b>-4</b>
<b>1</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>-3</b>
<b>2</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>-2</b>
<b>3</b>	<b>10</b>	<b>4</b>	<b>0</b>	<b>-1</b>

26. If  $A = f + 2g$ , then  $A'(3) =$

- a. -2                      b. 2                      c. 7                      d. 8                      e. 10

27. If  $B = f \cdot g$ , then  $B'(2) =$

- a. -20                      b. -7                      c. -6                      d. -1                      e. 13

28. If  $D = \frac{1}{g}$ , then  $D'(1) =$

- a.  $-\frac{1}{2}$       b.  $-\frac{1}{3}$       c.  $-\frac{1}{9}$       d.  $\frac{1}{9}$       e.  $\frac{1}{3}$

29. If  $H(x) = \sqrt{f(x)}$ , then  $H'(3) =$

- a.  $\frac{1}{4}$       b.  $\frac{1}{2\sqrt{10}}$       c. 2      d.  $\frac{2}{\sqrt{10}}$       e.  $4\sqrt{10}$

30. If  $K(x) = \left(\frac{f}{g}\right)(x)$ , then  $K'(0) =$

- a.  $-\frac{13}{25}$       b.  $-\frac{1}{4}$       c.  $\frac{13}{25}$       d.  $\frac{13}{16}$       e.  $\frac{22}{25}$

31. If  $M(x) = f(g(x))$ , then  $M'(1) =$

- a. -12      b. -6      c. 4      d. 6      e. 12

32. If  $P(x) = f(x^3)$ , then  $P'(1) =$

- a. 2      b. 6      c. 8      d. 12      e. 54

**Derivatives Review 1 Solutions:**

1.  $6x$

8.  $6x - 1 + (12x - 1)\ln x$

2. 2

9.  $\frac{\sin x - x \ln x \cos x}{x \sin^2 x}$

14.

$\left(\frac{33}{(2x+1)^2}\right)\left(\frac{x-5}{2x+1}\right)^2$

3.  $\frac{-1}{x^2}$

10.

$37(3x^2 + 2)(x^3 + 2x)^{36}$

15.  $\frac{7 \sin \sqrt{7x} \cos \sqrt{7x}}{\sqrt{7x}}$

4.  $24x^7 + 2$

11.  $\frac{-6x^2 - \frac{14}{x^2}}{(x^3 - \frac{7}{x})^3}$

16.  $\frac{-x}{y}$

5.  $\frac{2x}{5}$

12.  $3 \sin^2 x \cos x$

17.  $\frac{x^2 - 2y}{2x + y^2}$

6. 0

13.  $\frac{5 \cos(5x)}{2\sqrt{\sin(5x)}}$

18.  $\frac{-y^2}{x^2}$

7.  $\frac{-4x^2 - 2x - 20}{(x^2 - 5)^2}$

$$19. \frac{y}{2\sqrt{xy-x}}$$

$$20. \frac{1-2xy-3y^3}{x^2+9xy^2}$$

$$22. y = -2x + 8$$

$$21. \frac{1}{21}$$

$$23. y = \frac{6}{5}x - \frac{8}{5}$$

**Derivatives Review 2 Solutions**

$$1. 12x - 10 + \frac{10}{x^3}$$

$$11. \frac{3}{4\sqrt{x}(\sqrt{4+3\sqrt{x}})}$$

$$20. \frac{1}{2\sqrt{x}}$$

$$2. \frac{-17}{(2x-7)^2}$$

$$12. 2x \cos(x^2) \cos(\sin(x^2))$$

$$21. 7$$

$$3. \frac{5x-1}{4x\sqrt{x}}$$

$$13. \frac{1}{2y}$$

$$22. y = -\frac{1}{2}x$$

$$4. \frac{1}{\sqrt{x}(\sqrt{x}+1)^2}$$

$$14. \frac{\sec(x^2y^2) - 2xy^2}{2yx^2}$$

$$23. y = \frac{1}{6}x + \frac{4}{3}$$

$$5. (6x^2 - 4)\cos x + 12x \sin x$$

$$15. \frac{10xy - 3x^2y^2 - 1}{2x^3y - 5x^2}$$

$$24. -\frac{14}{13}$$

$$6. \frac{-1}{3}(7x^6 + 2)$$

$$16. \frac{y \cos(xy)}{1 - x \cos(xy)}$$

$$25. \frac{-2xy^3 - 2x^4}{y^5}$$

$$7. 10x \cos(5x^2 - 9)$$

$$17. \frac{2\sqrt[3]{y}}{\sqrt[3]{x}(2+3\sqrt[3]{y})}$$

$$26. b$$

$$27. b$$

$$28. e$$

$$29. d$$

$$30. c$$

$$31. a$$

$$32. b$$

$$8. \frac{1}{2x}$$

$$18. \frac{-\sqrt{y}}{\sqrt{x}}$$

$$9. 3x^2 \sin^2(5x) + 10x^3 \sin(5x) \cos(5x)$$

$$10. (36x+12)(3x^2+2x-1)^5$$

$$19. 12x - 1$$