

1. T

$$f(x) = 24 \quad f'(x) = 0$$

$$f(x) = .2x + 18 \quad f'(x) = .2$$

2. F

slopes are not equal

$$\frac{dy}{dx} uv = u'v + uv'$$

3. T

4. Skip

5. T

$$y = \sqrt{x} = x^{1/2}$$

$$y' = \frac{1}{2}x^{-1/2}$$

$$y'(4) = \frac{1}{2}(4)^{-1/2}$$

$$= \frac{1}{2\sqrt{4}} = \frac{1}{4} = m$$

$$y = \frac{1}{4}(x+4)$$

$$0 = \frac{1}{4}(-4+4)$$

$$0 = 0 \quad \underline{\text{True}}$$

1. a)  $4x+1$

$$f(x) = 2x^2 + x$$

$$f'(x) = 4x + 1$$

b) 5

$$f'(1) = 4(1) + 1 = 5 \quad / \quad (1, 3)$$

c)  $y = 5x - 2$  or  $y - 3 = 5(x - 1)$

$$y - 3 = 5x - 5$$

$$y = 5x - 2$$

2. a)  $x_1, x_2, x_4, x_5$

b)  $x_1, x_2, x_5$

3. c

$$f(x) = 4x^3 + 5x$$

$$f'(x) = 12x^2 + 5$$

4. b

math #8

$$nDeriv((2+x)/(3-x), x, 2)$$

5. a, c, d

$$y = 2x^3 - 4x + 3$$

$$y' = 6x^2 - 4$$

6. d

$$y = x^3 - 3x^2 \quad (-1, -4)$$

$$y' = 3x^2 - 6x$$

$$y' = 3(-1)^2 - 6(-1) = 3 + 6 = 9$$

$$y + 4 = 9(x + 1)$$

$$\text{xint } (y=0)$$

$$0 + 4 = 9x + 9$$

$$-5 = 9x$$

$$\boxed{-\frac{5}{9} = x}$$

$$\text{yint: } x=0$$

$$y + 4 = 9(1)$$

$$y = 5$$

7. b

math #8

$$nDeriv((t^2 \cos(2t+3))/(t^2+4t+1), t, 2.75)$$

$$= -.67359...$$

8. a) Z  
b) W  
c) X  
d) Y

9. a, d

$$y = 3 \cos(x+2)$$

This graph has amplitude of 3.

Mins/Maxs occur at heights of 3 and -3; so horizontal tangent occur when  $y = 3$  or  $y = -3$

\* Answer is not a choice

10.  $y = -1.813x + 6.752$   $y = \cos\left(\frac{2\pi}{3}x\right)$   $x = 4, y = -0.5$

$$y' = -\sin\left(\frac{2\pi}{3}x\right) \cdot \frac{2\pi}{3} = -\frac{2\pi}{3} \sin\left(\frac{2\pi \cdot 4}{3}\right)$$

$$= -\frac{2\pi}{3} \sin\frac{8\pi}{3} = -1.813$$

$$y + 0.5 = -1.813(x - 4)$$

$$y = -1.813x + 7.252 - 0.5$$

$$y = -1.813x + 6.752$$

11. b

$$\frac{d}{dx} \left( \frac{g(x)}{f(x)} \right) = \frac{f(x)g'(x) - g(x) \cdot f'(x)}{(f(x))^2}$$

$$= \frac{4 \cdot (-3) - 5 \cdot \left(\frac{3}{2}\right)}{16} = \frac{-12 - 7.5}{16}$$

12. a, c

$$x^2 - 6x = 6 - 6y^2$$

$$m=0$$

$$2x - 6 = -12y \frac{dy}{dx}$$

$$\frac{dy}{dx} = \frac{2x-6}{-12y} = 0$$

$$2x - 6 = 0$$

$$2x = 6$$

$$\underline{x=3}$$

13. b, d

$$-12y = 0$$

$$y = 0$$

$$x^2 - 6x = 6 - 0$$

$$x^2 - 6x - 6 = 0$$

$$x = \frac{6 \pm \sqrt{36 - 4(1)(-6)}}{2}$$

$$x = \frac{6 \pm \sqrt{60}}{2} = \frac{6 \pm 2\sqrt{15}}{2} = 3 \pm \sqrt{15}$$

$$3^2 - 6(3) = 6 - 6y^2$$

$$-9 = 6 - 6y^2$$

$$-15 = -6y^2$$

$$\frac{5}{2} = y^2 \quad y = \pm \sqrt{\frac{5}{2}} = \pm \frac{\sqrt{5}\sqrt{2}}{\sqrt{2}\sqrt{2}} = \pm \frac{\sqrt{10}}{2}$$

14. b, c

$$f''(x) = x^{-4/3}$$

$$a) f(x) = \frac{4}{3}x^{-1/3} + 7$$

$$f'(x) = -\frac{4}{9}x^{-4/3}$$

$$f''(x) = \frac{16}{27}x^{-7/3} \quad \text{Nope}$$

$$c) f'''(x) = -\frac{4}{3}x^{-7/3}$$

$$f'''(x) = -\frac{4}{3}x^{-7/3}$$

$$b) f(x) = \frac{-9}{2}x^{2/3} + 7x$$

$$f'(x) = -3x^{-1/3} + 7$$

$$f''(x) = x^{-4/3}$$

$$y=5$$

15. skip

16. skip

17. A. c

$$s = 2x^3 - 5x^2 + 3x + 2$$

B. e

$$V = 6x^2 - 10x + 3$$

C. b

$$a = 12x - 10$$

18. b

$$y = -2 \sin x - 3 \sec^2 x$$

$$y' = -2 \cos x - (3 \sec x \cdot \sec x \tan x + 3 \sec x \tan x \sec x)$$

$$y' = -2 \cos x - 6 \sec^2 x \tan x$$

19. a

$$f(x) = \sqrt{3} \cos x \quad \text{at } x = \pi \quad y = -\sqrt{3}$$

$$f'(x) = \sqrt{3} \cdot -\sin x$$

$$f'(\pi) = \sqrt{3} \cdot \sin \pi = -\sqrt{3} \cdot 0 = 0$$

20. Skip

21. a

$$\frac{dy}{dx} = ? \quad y = \frac{(3x+5)^4 - 9x}{5}$$

$$y' = \frac{5(4(3x+5)^3 \cdot 3) - 9}{25} - \frac{((3x+5)^3 - 3 - 9x) \cdot 0}{25}$$

$$y' = \frac{60(3x+5)^3 - 45}{25} = \frac{12(3x+5)^3 - 9}{5}$$

22. c

$$2x^2 + 2x^2 y^3 - y - 10 = 10 \quad (1, 1)$$

$$4x + 4x \cdot y^3 + 2x^2 \cdot 3y^2 \frac{dy}{dx} - \frac{dy}{dx} = 0$$

$$\frac{dy}{dx} (2x^2 3y^2 - 1) = -4x - 4xy^3$$

$$\frac{dy}{dx} = \frac{-4x - 4xy^3}{2x^2 3y^2 - 1} = \frac{-4(1) - 4(1)(1)^3}{2(1)(3(1)) - 1}$$

$$y - 1 = \frac{-8}{5}(x - 1)$$