

2.7 #2 HW

17.) 17a.) Area of rectangle = $2x \cdot 2y = \underline{4xy}$

① solve for y in the given equation and sub in for y in the area formula

$$x^2 + y^2 = 4 \rightarrow y^2 = 4 - x^2 \rightarrow y = \sqrt{4 - x^2}$$

$$\text{Area} = 4xy \rightarrow \boxed{\text{Area} = 4x(\sqrt{4 - x^2})} \quad \boxed{0 < x < 2}$$

b.) Perimeter of rectangle = $2L + 2W = 2(2x) + 2(2y) = \underline{4x + 4y}$

Perimeter of rectangle = $4x + 4y$

$$P(x) = 4x + 4(\sqrt{4 - x^2}) \quad \boxed{0 < x < 2}$$

c.) graph $A(x) = 4x(\sqrt{4 - x^2})$ AND find the x-coordinate of the max [2nd TRACE \rightarrow MAX]

Xmin 0 Xmax 2 Xscl 0.5

Ymin -10 Xmax 10 Xscl 1

MAX (1.414, 8) \rightarrow $\boxed{x \approx 1.414}$

d.) Graph $P(x) = 4x + 4\sqrt{4 - x^2}$ AND find the x-coordinate of the max [2nd TRACE \rightarrow MAX]

Xmin 0 Xmax 2 Xscl 0.5

Ymin -10 Ymax 20 Yscl 5

MAX (1.414, 11.314) \rightarrow $\boxed{x \approx 1.414}$

19.) a.) Area of square = $\left(\frac{4x}{4}\right)^2 = \boxed{x^2}$

Area of circle = πr^2

① need to find the radius by using the circumference of the circle

$$C = 2\pi r \rightarrow 10 - 4x = 2\pi r$$

$$\frac{10 - 4x}{2\pi} = \frac{2\pi r}{2\pi} \rightarrow \frac{10 - 4x}{2\pi} = r$$

② Area of circle = $\pi \left(\frac{10 - 4x}{2\pi}\right)^2$

$$= \frac{\pi (10 - 4x)^2}{4\pi^2} = \boxed{\frac{(10 - 4x)^2}{4\pi}}$$

Total Area = Area of square + Area of circle

$$= x^2 + \frac{(10 - 4x)^2}{4\pi}$$

b.) Domain \rightarrow set $10 - 4x = 0$ AND solve

$$10 - 4x = 0 \rightarrow \frac{10}{4} = \frac{4x}{4} \rightarrow \frac{5}{2} = x$$

Domain: $\left\{ x \mid 0 < x < \frac{5}{2} \right\}$

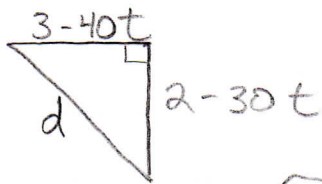
c.) Graph $A(x) = x^2 + \frac{(10 - 4x)^2}{4\pi}$ AND find the

x-coordinate of the min; Min (1.4, 3.5) $\rightarrow \boxed{x = 1.4 \text{ m}}$

xmin -10 xmax 10 xscl 1 ymin -20 ymax 20 yscl 5

HW 2.7 #2 continued

27.)



$$d = \sqrt{(3-40t)^2 + (2-30t)^2}$$

$$d = \sqrt{9 - 240t + 1600t^2 + 4 - 120t + 900t^2}$$

a.) $d(t) = \sqrt{2500t^2 - 360t + 13}$

b.) graph $d(t)$ AND find x-coordinate of the min [2nd TRACE \rightarrow min]

min (.072, .04) \rightarrow $t = .072$ hrs

31.)

* You can skip this problem, you will not see a problem of this difficulty level on your test.

$$d_1 = \frac{\sqrt{x^2 + (2)^2}}{3} = \frac{\sqrt{x^2 + 4}}{3} \quad [3 \text{ mi/hr}]$$

$$d_2 = \frac{12 - x}{5} \quad [\text{walks at } 5 \text{ mi/hr}]$$

a.) $T(x) = \frac{\sqrt{x^2 + 4}}{3} + \frac{12 - x}{5}$

b.) Domain $\rightarrow D = \{x \mid 0 \leq x \leq 12\}$

c.) $T(4) = \frac{\sqrt{(4)^2 + 4}}{3} + \frac{12 - (4)}{5} = 3.09$ hrs

d.) $T(8) = \frac{\sqrt{(8)^2 + 4}}{3} + \frac{12 - (8)}{5} = 3.55$ hrs

