

4.5

(47)  $C = 2\pi r$

$C = \pi d$

$\frac{dC}{dd} = \pi$

$dC = \pi dd$

(2)  $\frac{\pi dd}{\pi}$

(2)  $\frac{2}{\pi} dd$   
in/yr.

$y = \pi x$   
 $\frac{dy}{dx} = \pi$

$A = \pi r^2$

$A = \pi \left(\frac{d}{2}\right)^2$

$A = \frac{1}{4} \pi d^2$

$\frac{dA}{dd} = \frac{1}{2} \pi d$

$dA = \frac{1}{2} \pi d dd$   
 $= \frac{1}{2} \pi (10) \left(\frac{2}{\pi}\right)$

$= 10 \text{ in}^2/\text{yr.}$

(17)  $x^2 - 2x + 1 - \sin x = 0$

$x_n$	$f(x_n)$	$f'(x_n)$	$\frac{f(x_n)}{f'(x_n)}$
.5	-.2294	-1.878	.12219
.37781	.01823	-2.174	-.0084
.386198	.600084	-2.154	-.00004
.386236	.0000019	-2.154	-.0000009

$x_n = \frac{f(x_n)}{f'(x_n)}$

.37781

.38619813647

.386236869811

.386236870644

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④⑦  $d = 10$ ,  $dC = 2$

$$\frac{C}{\pi} = 2\pi r = \frac{\pi d}{\pi}$$

$$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$$

$$A = \pi r^2$$

$$d = \frac{1}{\pi} C$$

$$A = \pi \left( \frac{C}{2\pi} \right)^2$$

$$\frac{dA}{dC} = \frac{1}{\pi}$$

$$= \pi \frac{C^2}{4\pi^2}$$

$$dA = \frac{1}{\pi} dC$$

$$A = \frac{1}{4\pi} C^2$$

$$dA = \frac{1}{\pi} (2) = \boxed{\frac{2}{\pi} \text{ in / year}}$$

$$\frac{dA}{dC} = \frac{1}{2\pi} C$$

$$dA = \frac{1}{2\pi} C dC$$

$$= \frac{1}{2\pi} (10^2) (2) = \boxed{10 \text{ in}^2 / \text{year}}$$

③②  $f(x) = x^3 - x$      $a = 1$ ,  $dx = .1$      $x = 1 \rightarrow x = 1.1$

(a)  $[1.1^3 - 1.1] - [1^3 - 1] = .231$

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

$$dy = (3x^2 - 1) dx$$
$$= (3(1)^2 - 1)(.1) = .2$$

(c)  $|.231 - .2| = \boxed{.031}$

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(45)  $f'(x) = \cos(x^2)$   
(a)  $f'(0) = \cos(0^2) = 1$

$x$   
↓  
(0,1)

$$y = x + 1$$

(b)  $y = .1 + 1 = 1.1$