# Homework 1

**Due** Feb 6 at 11:59pm **Points** 10 **Questions** 10
**Available** Jan 30 at 8am - Feb 6 at 11:59pm **Time Limit** None
**Allowed Attempts** Unlimited

Take the Quiz Again

## Attempt History

| | Attempt | Time | Score |
|---|---|---|---|
| **KEPT** | Attempt 2 | 2 minutes | 10 out of 10 |
| **LATEST** | Attempt 2 | 2 minutes | 10 out of 10 |
| | Attempt 1 | 36 minutes | 9 out of 10 |

Correct answers are hidden.

Score for this attempt: **10** out of 10
Submitted Feb 4 at 5:41pm
This attempt took 2 minutes.

### Question 1

1 / 1 pts

Calculate the complex number multiplication result: ( 2 – 3 j ) ( 3 + 5 j )

(a). -9 + j (b). -9 + 19 j (c). 21 + j

- a
- b
- c

## Question 2

1 / 1 pts

What is the complex conjugate of the complex number -7 + 5 j ?

(a). 7 + 5 j (b). -7 - 5 j (c). 7 - 5 j

- a
- (•) b
- c

## Question 3

1 / 1 pts

Calculate the complex number division result: (10 – 5 j ) / ( 1 + j )

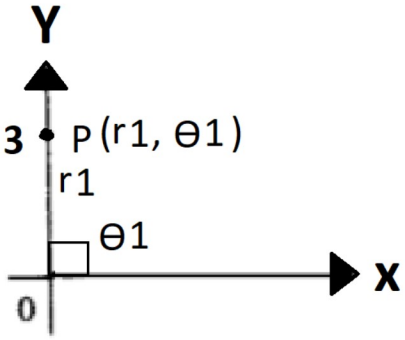
(a). 2.5 – 7.5 j (b). 7.5 – 7.5 j (c). 7.5 + 2.5 j

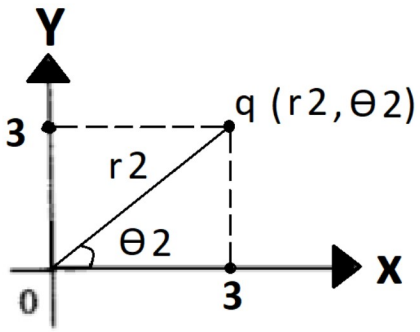
- (•) a
- b
- c

## Question 4

1 / 1 pts

For the cartesian coordinates shown in the diagram below, find the polar coordinates for the points P and q: (r1, Θ1) and (r2, Θ2).



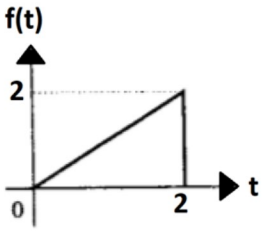

(a). (r1, Θ1) = ( 3, $\frac{\pi}{2}$ ) and (r2, Θ2) = ( $3\sqrt{2}, \frac{\pi}{4}$ ).
(b). (r1, Θ1) = ( 3, 0 ) and (r2, Θ2) = ( $3\sqrt{2}, \frac{\pi}{4}$ ) .
(c). (r1, Θ1) = ( 3, 0 ) and (r2, Θ2) = ( 3, $\frac{\pi}{4}$ ) .

- (•) a
- ( ) b
- ( ) c

## Question 5

1 / 1 pts

Find the energy of the following signal f(t) = t when t >=0, and t <=2, also f(t) =0 when t <0 or t >2.




(a). $E = \int_{-\infty}^{\infty} |f(t)|^2 dt = \int_0^2 t^2\, dt = \frac{1}{3}\ t^3\ |_0^2 = \frac{1}{3} \times 2^3 - 0\ = \frac{8}{3}$

(b). $E = \int_{-\infty}^{\infty} |f(t)|\, dt = \int_0^2 t\, dt = \frac{1}{2}\ t^2\ |_0^2 = \frac{1}{2} \times 2^2 - 0\ = 2$

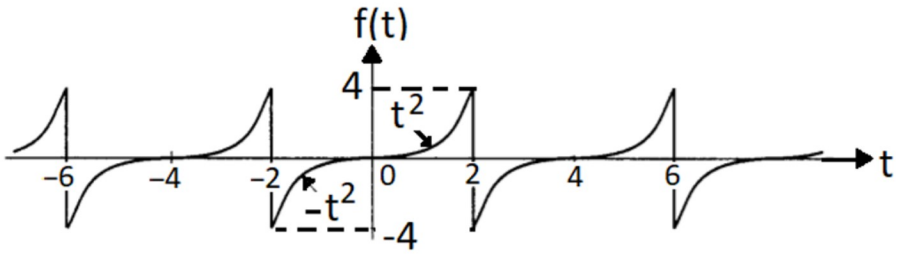
(c). $E = \frac{(0+2)}{2} = 1$ |

- (•) a
- ( ) b
- ( ) c

## Question 6

1 / 1 pts

Find the power of the periodic signal f(t) shown below.




(a). $P = \lim_{T\to\infty} \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} |f(t)|^2 dt = \frac{1}{T0} \int_{-\frac{T0}{2}}^{\frac{T0}{2}} |f(t)|^2 dt = \frac{1}{4} \int_{-2}^{2} t^4\, dt$

$= \frac{1}{4} \times \frac{1}{5} \times t^5 \,|_{-2}^{2} = \frac{1}{4} \times \frac{1}{5} \times (2^5 - (-2)^5) = \frac{1}{4} \times \frac{1}{5} \times 64 = \frac{16}{5}$

(b). $P = \lim_{T\to\infty} \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} |f(t)|\, dt = \frac{1}{T0} \int_{-\frac{T0}{2}}^{\frac{T0}{2}} |f(t)|\, dt = \frac{1}{4} \int_{-2}^{2} t^2\, dt$

$= \frac{1}{4} \times \frac{1}{3} \times t^3 \,|_{-2}^{2} = \frac{1}{4} \times \frac{1}{3} \times (2^3 - (-2)^3) = \frac{1}{4} \times \frac{1}{3} \times 16 = \frac{4}{3}$

(c). $P = \int_{-\frac{T0}{2}}^{\frac{T0}{2}} |f(t)|\, dt = \int_{-2}^{2} t^2\, dt$

$= \frac{1}{3} \times t^3 \,|_{-2}^{2} = \frac{1}{3} \times (2^3 - (-2)^3) = \frac{1}{3} \times 16 = \frac{16}{3}$

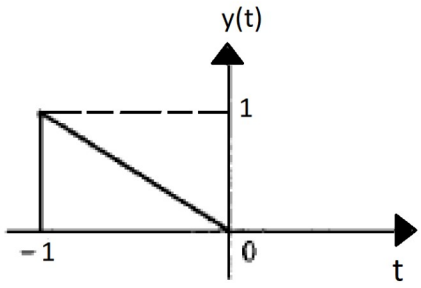
- (•) a
- ( ) b
- ( ) c

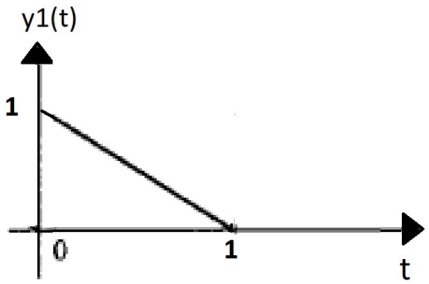
## Question 7

1 / 1 pts

Which statement about the following figures is true?

(a). y1(t) = y(t+1) (b). y1(t) = y(t-1) (c). y1(t) = y(t+2)



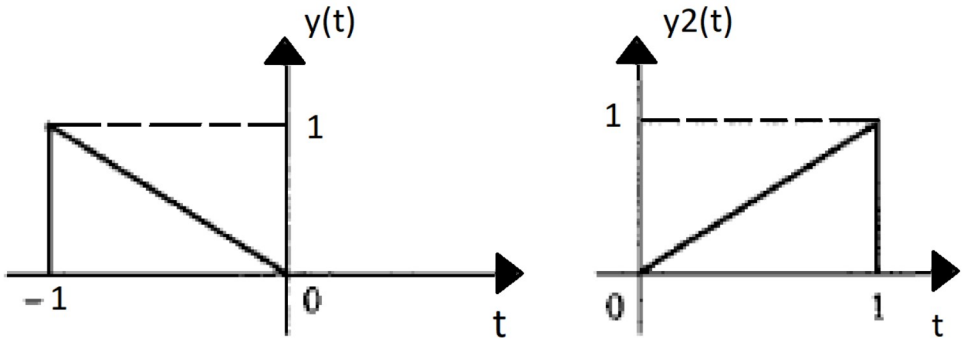

- a
- b
- c

## Question 8

1 / 1 pts

Which statement about the following figures is true?

(a). y2(t) = y(-t) (b). y2(t) = y(t-1) (c). y2(t) = y(t+1)



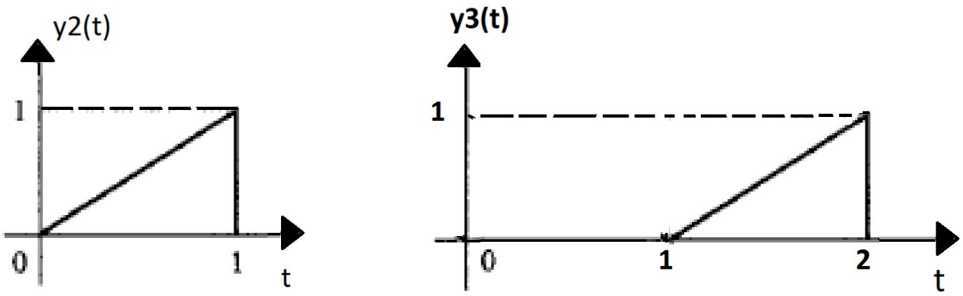

- (•) a
- ( ) b
- ( ) c

## Question 9

1 / 1 pts

Which statement about the following figures is true?

(a). y3(t) = y2(t+1) (b). y3(t) = y2(t-1)
(c). y3(t) = y2(t+2)



a

b

c

## Question 10

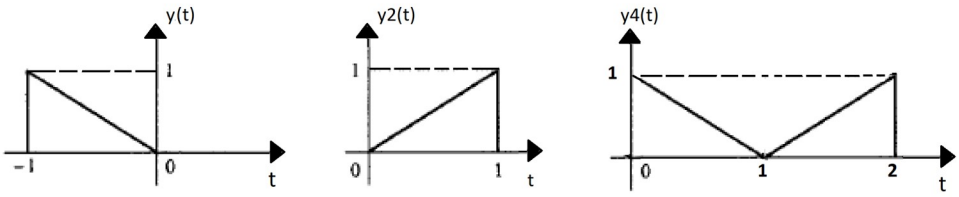
1 / 1 pts

Which statement about the following figures is true?

(a). y4(t) = y(t-1) + y2(t-1)

(b). y4(t) = y(t-1) + y2(t+1)

(c). y2(t) = y(t+1) + y2(t+1)




a

b

c

Quiz Score: **10** out of 10