



## Solve polynomial equations

**1**

Find the remainder when  $f(x)$  is divided by  $(x + 2)$ .

$$f(x) = x^3 - 2x^2 + x$$

A

-18

B

18

C

2

D

0

**2**

Is  $(x - 1)$  a factor of  $f(x)$ ?

$$f(x) = x^5 + 2x^4 - 7x^3 - 8x^2 + 12x$$

A

No

B

Yes

**3**

Given  $f(-3) = -15$ , find the value of  $a$ .

$$f(x) = x^3 + ax^2 - 4x$$

A

0

B

1

C

2

D

-1

**4**

Given that  $(x + 1)$  is a factor of  $f(x)$ , find the value of  $a$ .

$$f(x) = x^4 + ax^3 - 4x^2 - 2x + 3$$

A

1

B

3

C

2

D

-2

**5**

Is this factoring step correct?

$$\begin{aligned} r^3 + 4r^2 + 3r + 12 \\ = (r + 4)(r^2 + 3) \end{aligned}$$

A

No

B

Yes

**6**

Is this factoring step correct?

$$\begin{aligned} (n + 5)(n^2 - 4) \\ = (n + 5)(n - 2)(n + 2) \end{aligned}$$

A

No

B

Yes

**7**

Which function has these roots and multiplicities?

$$x = -3 \text{ (multiplicity 3)}$$

$$x = 2 \text{ (multiplicity 4)}$$

A

$$f(x) = (x + 2)^4(x - 3)^3$$

B

$$f(x) = (x - 3)(x - 4)^2$$

C

$$f(x) = (x + 3)^4(x - 2)^3$$

D

$$f(x) = (x + 2)^3(x - 2)^4$$

E

$$f(x) = (x + 3)^3(x - 2)^4$$

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What are the roots and multiplicities of this function?

$$f(x) = (x - 1)(x - 3)^3$$

A

 $x = 1$  (multiplicity 3)  
 $x = 3$  (multiplicity 1)

B

 $x = 1$  (multiplicity 1)  
 $x = 3$  (multiplicity 3)

C

 $x = -3$  (multiplicity 3)  
 $x = -1$  (multiplicity 1)

D

 $x = 1$  (multiplicity 1)  
 $x = 2$  (multiplicity 3)

E

 $x = -3$  (multiplicity 1)  
 $x = -1$  (multiplicity 3)**9**

What behaviour would this function have at its x-intercepts?

$$f(x) = x(x - 1)^2$$

A

at  $x = 0$  : crosses the x – axis  
at  $x = 1$  : crosses the x – axis

B

at  $x = 0$  : touches the x – axis without crossing  
at  $x = 1$  : crosses the x – axis

C

at  $x = -1$  : touches the x – axis without crossing  
at  $x = 0$  : crosses the x – axis

D

at  $x = 0$  : crosses the x – axis  
at  $x = 1$  : touches the x – axis without crossing



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**10**

What x-intercept behaviour would these roots and multiplicities create?

$$x = -1 \text{ (multiplicity 3)}$$

$$x = 0 \text{ (multiplicity 4)}$$

- A at  $x = -1$ : touches the x-axis without crossing and flattens  
at  $x = 0$ : crosses the x-axis and flattens
- B at  $x = -1$ : crosses the x-axis and flattens  
at  $x = 0$ : touches the x-axis without crossing and flattens
- C at  $x = -1$ : touches the x-axis without crossing and flattens  
at  $x = 0$ : touches the x-axis without crossing and flattens
- D at  $x = 0$ : touches the x-axis without crossing and flattens  
at  $x = 1$ : crosses the x-axis and flattens

**11**

Which graph shows the x-intercept behaviour of this function?

$$f(x) = x^2(x - 3)^2$$

**12**

On which set of open intervals does this polynomial keep a constant sign?

$$x^2 + 7x + 12$$

- A  $(-\infty, -4) \cup (-4, -3) \cup (-3, \infty)$
- B  $(-\infty, -4) \cup (-4, -3) \cup (-3, -1) \cup (-1, \infty)$
- C  $(-\infty, -4) \cup (-4, -3) \cup (-3, 0) \cup (0, \infty)$
- D  $(-\infty, -4) \cup (-4, -3) \cup (-3, -2) \cup (-2, \infty)$