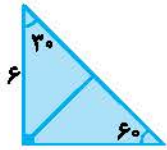


۸. گزینه (۱) -

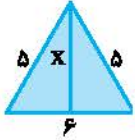


$$\text{روابط مثلث قائم الزاویه} \quad 6 = \frac{\sqrt{3}}{2} \Rightarrow \text{وتر} = \frac{12}{\sqrt{3}} = 4\sqrt{3}$$

$$13^2 = 5^2 + x^2 \Rightarrow x^2 = 144 \Rightarrow x = 12$$

۹. گزینه (۱) -

۱۰. گزینه (۳) -

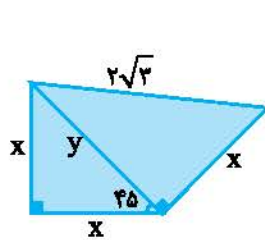


$$x^2 = 5^2 - 3^2 = 16 \Rightarrow x = 4$$

$$S = 6 \times \frac{\sqrt{3}}{4} a^2 = 6 \times \frac{\sqrt{3}}{4} \times 2^2 = 6\sqrt{3}$$

۱۱. گزینه (۲) -

۱۲. گزینه (۴) -



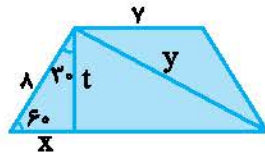
$$\text{روابط مثلث قائم الزاویه} \quad x = \frac{\sqrt{2}}{2} y$$

$$\text{فیثاغورس: } (2\sqrt{2})^2 = x^2 + y^2 = \left(\frac{\sqrt{2}}{2} y\right)^2 + y^2 \Rightarrow \frac{3}{2} y^2 = 12 \Rightarrow y^2 = 8$$

$$\Rightarrow y = 2\sqrt{2} \Rightarrow x = \frac{\sqrt{2}}{2} y = 2$$

$$\text{مساحت چهارضلعی} = \frac{2 \times 2}{2} + \frac{2\sqrt{2} \times 2}{2} = 2 + 2\sqrt{2} = 2(1 + \sqrt{2})$$

۱۳. گزینه (۱) -



$$x = \frac{1}{2} \text{ وتر} = \frac{1}{2} \times 8 = 4$$

$$t^2 = 8^2 - 4^2 = 48$$

$$y^2 = t^2 + (7 + 4)^2 = 48 + 121 = 169 \Rightarrow y = 13$$

پاسخ پرسش‌های طبقه‌بندی درس ۱ فصل هفتم، توان

۱. الف) درست

ب) نادرست

پ) نادرست

ت) درست

۲. الف) مربع، مکعب

ب) بزرگتر، کوچکتر

پ) بزرگتر

ت) یک

$$3^2 \times 3^{63} = 3^0 \times 3^{63} = 3^{63}$$

۳.

$$64 \times 1^{21} = 2^6 \times (2^3)^{21} = 2^6 \times 2^{63} = 2^{69}$$

$$27 \times 3^{27} = 3^3 \times 3^{27} = 3^{30}$$

$$\frac{(2a)^7}{(2a)^7} = \frac{(2^7 a)^7}{(2a)^7} = \frac{2^7 a^7}{2^7 a^7} = 1$$

۴.

$$-2^3 < (-1)^{11} < \left(\frac{1}{3}\right)^8 < 98 < (-5)^8$$

۵.

۶.

الف) $-2^{11} \equiv (-2)^{11}$

ب) $-5^{10} \leq (-5)^{10}$

پ) $\left(\frac{5}{2}\right)^9 \geq \left(\frac{5}{2}\right)^7$

ت) $\left(-\frac{3}{4}\right)^{12} \geq \left(-\frac{3}{4}\right)^{11}$

ث) $(-19)^0 \equiv (+20)^0$

ج) $\left(-\frac{3}{4}\right)^8 \geq \left(\frac{-3}{4}\right)^8$

ج) $(-0/3)^0 \leq (-0/3)^9$

ح) $(-1/2)^8 \geq (-1/2)^9$

خ) $(2^3)^0 \equiv (2^0)^3$

د) $(-1)^{50} \geq (-1)^{101}$

الف) $7^{\square} < 100 \Rightarrow \square = 1, 2$

۷.

ب) $3^{\square} < 3000 \Rightarrow \square = 1, 2, 3, 4, 5, 6, 7$

پ) $(-5)^{\square} < 400 \Rightarrow \square = 1, 2, 3, 5, \dots$ (تمام اعداد فرد و عدد ۲)

ت) $(-3)^{\square} > 50 \Rightarrow \square = 4, 6, 8, 10, \dots$ (اعداد زوج از ۴ به بعد)

الف) $\left(-\frac{4}{3}\right)^3 \times 5^3 = \left(-\frac{4}{3} \times 5\right)^3 = \left(-\frac{20}{3}\right)^3$

۸.

ب) $\left(-\frac{2}{5}\right)^8 \times 5^8 = \left(-\frac{2}{5} \times 5\right)^8 = (-2)^8 = 2^8$

پ) $125 \times 216 = 5^3 \times 6^3 = 30^3$

ت) $5^a \times 12^a = 60^a$

ث) $(abc)^8 \times a^0 \times c^2 \times b^0 \times c^7 = (abc)^8 \times (abc)^0 = (abc)^8$

ج) $(a+b)(a+b)^7 = (a+b)^8$

الف) $2^2 + (-2)^3 - 1 \times 2^8 = 4 + 8 - 16 = -4$

۹.

ب) $(12 \times 19)^0 - (13 \times 20)^0 - (14 \times 21)^0 = +1 - 1 - 1 = -1$

$$\text{پ)} (3^2 + 2^3) \times 15^0 - 3^6 \div 9 = (9 + 8) - 3^2 = 17 - 9 = 8$$

$$\text{ت)} 7 - 7 \times 2^3 - 2^3 \div 8^0 + 1^7 = 7 - 7 \times 8 - 8 + 1 = -56$$

$$\text{ث)} -\frac{12a^0 + 4(a+1)^0}{2(a-1)^0 + 12a^0} = -\frac{12+4}{2+12} = -1$$

$$\text{ج)} \frac{1 - (-2)^0 - 4^2}{1^{12} + 3 \times 2^6} = \frac{1 - (-32) - 16}{1 + 3 \times 16} = \frac{1 + 32 - 16}{1 + 48} = \frac{17}{49}$$

۱۰.

$$(9 \times 5)^3 \times 5^2 \times 7 = 9^3 \times 5^5 \times 7 \Rightarrow \begin{cases} \text{مربع کامل} \xrightarrow{\times 9 \times 5 \times 7} (9^2 \times 5^3 \times 7)^2 \\ \text{مکعب کامل} \xrightarrow{\times 5 \times 7^2} (9 \times 5^2 \times 7)^3 \end{cases}$$

پاسخ پرسش های طبقه بندی درس ۲ فصل هفتم، تقسیم اعداد توان دار

۱. الف) درست

ب) درست

پ) نادرست

ت) نادرست

ث) نادرست

ج) درست

۲. الف) توان های

ب) یک

پ) 5^{13}

۳.

$$\frac{9^8}{3} = \frac{(3^2)^8}{3} = \frac{3^{16}}{3} = 3^{15}$$

$$\frac{8^5}{4} = \frac{(2^3)^5}{2^2} = \frac{2^{15}}{2^2} = 2^{13}$$

$$\frac{125^5}{5} = \frac{(5^3)^5}{5} = \frac{5^{15}}{5} = 5^{14}$$

$$\text{الف)} 5^{12} \div 5^4 = 5^8$$

۴.

$$\text{ب)} 8^6 \div 8 = 8^5$$

$$\text{پ)} 6^{15} \div 6^3 = 6^{12}$$

$$(-2)^9 \div (-2)^5 = (-2)^4 = 2^4$$

ت)

$$\text{الف)} \frac{7^{12} \times 7^{\square}}{7^9} = 7^{20} \Rightarrow \square = 17$$

۵.

$$\text{ب)} \frac{5^{24} \div 5^{\square}}{5^2} = 5^2 \Rightarrow \square = 20$$

$$\text{پ)} \frac{4^{\square} \div 4^8}{4^6} = 4^5 \Rightarrow \square = 17$$

$$\text{ت)} \frac{3^{18} \div 3^9}{3^{\square}} = 3^1 \Rightarrow \square = 8$$

۶.

$$\text{الف)} 18^2 \div 18^9 = 18^{-7}$$

$$\text{ب)} \left(-\frac{2}{y}\right)^8 \div \left(-\frac{2}{y}\right)^8 = \left(-\frac{2}{y}\right)^0$$

$$\text{پ)} \frac{(-6)^{19}}{(-6)^2} = (-6)^{17}$$

$$\text{ت)} 7^{11} \div (o/y)^{11} = \left(\frac{y}{o/y}\right)^{11} = 1^{11}$$

$$\text{ث)} (2/4)^{10} \div (2/4)^6 = (2/4)^4$$

$$\text{ج)} \left(\frac{6}{\Delta}\right)^{18} \div \left(\frac{6}{\Delta}\right)^{17} = \left(\frac{6}{\Delta}\right)^1$$

$$\text{ح)} (-5)^{20} \div 5^{11} = 5^9$$

$$\text{ز)} (-8)^{13} \div (-8)^3 = (-8)^{10}$$

$$\text{غ)} \left(\frac{3}{f}\right)^{22} \div (o/y\Delta)^y \div (o/y\Delta) = (o/y\Delta)^{22-y-1} = (o/y\Delta)^{21}$$

$$\text{د)} (-7)^{18} \div 7^8 \div 1^{10} = 7^{10}$$

$$\text{ذ)} (\Delta^2)^8 \div \Delta^8 \div (-\Delta)^6 = \Delta^{16-8-6} = \Delta^2$$

$$\text{ر)} (2^5)^3 \div 2^3 \div (-2)^7 = 2^{15-3-7} (-1)^7 = -2^5$$

$$\text{الف)} \frac{20^9 \div 5^9}{3^6 \times 4^6} = \frac{4^9}{3^6 \times 4^6} = \frac{4^3}{3^6}$$

۷.

$$\text{ب)} \frac{(a^5)^2 \times a^8}{a^7 \div a^2} = \frac{a^{10} \times a^8}{a^5} = a^{13-5} = a^8$$

$$\text{پ)} \frac{(ab)^{12} \div (ab)^7}{(ab)^9 \div (ab)} = \frac{(ab)^{10}}{(ab)^8} = (ab)^2$$

$$\text{ت)} \frac{(a+b)^8 \div (a+b)^7}{(a+b)^7} = \frac{(a+b)^1}{(a+b)^7} = (a+b)^{-6}$$

$$\text{الف)} 37^0 \div 9^7 = (3^3)^0 \div (3^2)^7 = 3^{10} \div 3^{14} = 3^{-4} \quad .8$$

$$\text{ب)} 625^0 \div 125^7 = (5^4)^0 \div (5^3)^7 = 5^{20} \div 5^{21} = 5^{-1}$$

$$\text{الف)} 2^{2x+1} = (2^{2x})(2) = (2^x)^2(2) = (5^2)(2) = 50 \quad .9$$

$$\text{ب)} 8^x - 1 = (2^3)^x - 1 = (2^x)^3 - 1 = 5^3 - 1 = 125 - 1 = 124$$

$$\text{پ)} 2^{2x-3} = (2^{2x})(2^{-3}) = (2^x)^2(2^{-3}) = (5^2)\left(\frac{1}{8}\right) = \frac{25}{8}$$

$$\text{ت)} 4^{x-2} - 2^{2x} = 2^{2x-4} - 2^{2x} = (2^x)^2(2^{-4}) - (2^x)^2 = (5^2)\left(\frac{1}{16}\right) - (5^2) = \frac{25}{16} - 125$$

$$\text{الف)} 9^a = (3^2)^a = (3^a)^2 = 2^2 = 4 \quad .10$$

$$\text{ب)} 27^{a+1} = 3^{3a+3} = (3^a)^3(3^3) = (2^3)(3^3) = 6^3 = 216$$

$$\text{پ)} 81^{a-1} = 3^{4a-4} = (3^a)^4(3^{-4}) = (2^4)(3^{-4}) = \left(\frac{2}{3}\right)^4$$

$$\text{الف)} \frac{2^{-7} \times 5^0}{5^{-5} \times 2^7} = \frac{5^0 \times 5^0}{2^7 \times 2^7} = \left(\frac{5}{2}\right)^{10} \quad .11$$

$$\text{ب)} \frac{3^7 \times 5^{-3}}{5^{-10}} = 3^7 \times 5^{-3} \times 5^{10} = 3^7 \times 5^7 = 15^7$$

$$\text{پ)} \frac{5^{-11} \times 10^{13}}{5^7 \times 10^{-5}} = \frac{10^{13} \times 10^5}{5^7 \times 5^{11}} = \frac{10^{18}}{5^{18}} = \left(\frac{10}{5}\right)^{18} = 2^{18}$$

پاسخ پرسش های طبقه بندی درس ۳ فصل هفتم، جذر تقریبی

۱. الف) درست

ب) نادرست

پ) درست

ت) نادرست

ث) درست

ج) نادرست

۲. الف) بزرگتر

ب) ۹ و ۱۰

پ) ۶

ت) ۲- و ۸-

$$\sqrt{100} = 10 \text{ و } -\sqrt{100} = -10$$

۳.

$$\sqrt{0/01 \div 0/16} = \sqrt{\frac{1}{16}} = \frac{1}{4} = 0/25$$

$$\sqrt{\frac{1}{4} - \frac{1}{25}} = \sqrt{1/25 - 0/04} = \sqrt{1/21} = 1/1$$

$$\text{الف) } \sqrt{196} = 14$$

۴.

$$\text{ب) } \sqrt{\sqrt{256}} = \sqrt{16} = 4$$

$$\text{پ) } \sqrt{\frac{64}{16}} = \sqrt{4} = 2$$

$$-2 - \sqrt{2} < -\frac{13}{5} < -0/8 < 1 - \sqrt{2} < \sqrt{2} - 1$$

۵.

$$\text{الف) } \sqrt{4/7} \squareq 2/1$$

۶.

$$\text{ب) } \sqrt{19} \squareq 4/08$$

$$\text{پ) } 2 + \sqrt{15} \squareq 5$$

$$\text{ت) } 3 - \sqrt{12} \squareq -\sqrt{2}$$

پاسخ پرسش‌های طبقه‌بندی درس ۴ فصل هفتم، نمایش اعداد رادیکالی روی محور اعداد

۱. الف) درست

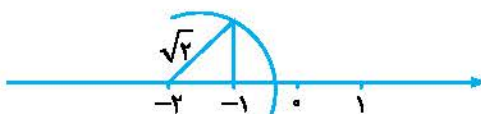
ب) نادرست

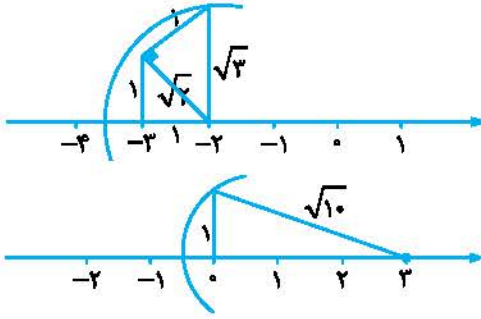
پ) درست

۲. الف) ۶ و ۷ و ۸

ب) ۱۵ عدد $\{-8, -7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6\}$

۳.



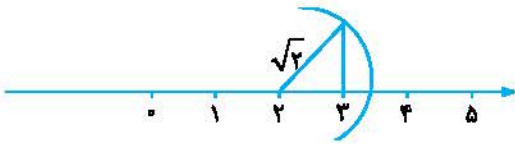


الف) $\sqrt{13} = \sqrt{4+9}$

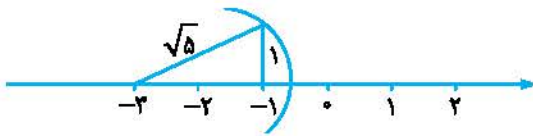
۴.

ب) $-\sqrt{8} = -\sqrt{4+4}$

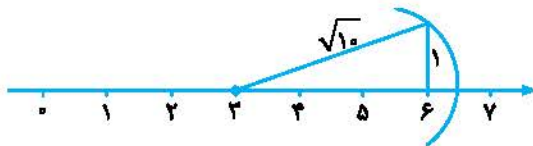
۵.



الف) $2 + \sqrt{2}$



ب) $-3 + \sqrt{5}$



پ) $3 + \sqrt{10}$

پاسخ پرسش‌های طبقه‌بندی درس ۵ فصل هفتم، خواص ضرب و تقسیم رادیکال‌ها

۱. الف) نادرست

ب) درست

پ) نادرست

ت) درست

ث) درست

ج) نادرست

۲. الف) $\sqrt{0.09} = 0.3$

ب) $\sqrt{\frac{25 \times 81}{100}} = \frac{5 \times 9}{10} = 4.5$

پ) $\sqrt{3600} = 60$

$$(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3}) = 2 + \cancel{\sqrt{6}} - \cancel{\sqrt{6}} - 3 = -1$$

۳.

$$\sqrt{3}(\sqrt{7} - \sqrt{3}) + \sqrt{7}(\sqrt{7} - \sqrt{3}) = \cancel{\sqrt{21}} - 3 + 7 - \cancel{\sqrt{21}} = +4$$

$$-2\sqrt{9 \times 3} - 3\sqrt{3} + \sqrt{81 \times 3} = -2 \times 3\sqrt{3} - 3\sqrt{3} + 9\sqrt{3} = -6\sqrt{3} - 3\sqrt{3} + 9\sqrt{3} = 0$$

۴.

الف) $\sqrt{410} \simeq 20$

ب) $\sqrt{200} \simeq 14$

پ) $\sqrt{650} \simeq 25$

ت) $\sqrt{930} \simeq 30$

ث) $\sqrt{1610} \simeq 40$

ج) $\sqrt{9990} \simeq 100$

۵.

الف) $\sqrt{3} \times \sqrt{12} = \sqrt{36} = 6$

ب) $\sqrt{15} \times \sqrt{5} \times \sqrt{3} = \sqrt{15 \times 15} = 15$

پ) $\sqrt{8} \times \sqrt{6} \times \sqrt{3} = \sqrt{8 \times (2 \times 3) \times 3} = 4 \times 3 = 12$

ت) $\sqrt{18} \times \sqrt{50} = \sqrt{(9 \times 2) \times (2 \times 25)} = 3 \times 2 \times 5 = 30$

ث) $\sqrt{2} \times \sqrt{32} \times \sqrt{3} \times \sqrt{27} = \sqrt{(2 \times 32) \times (3 \times 27)} = 8 \times 9 = 72$

ج) $\sqrt{\frac{75}{2}} \times \sqrt{\frac{128}{3}} = \sqrt{\frac{25 \times 3 \times \cancel{2} \times \cancel{2} \times 64}{\cancel{2} \times 3}} = 5 \times 8 = 40$

۶.

الف) $\sqrt{128} \div \sqrt{8} = \sqrt{\frac{128}{8}} = \sqrt{\frac{8 \times 16}{8}} = \sqrt{16} = 4$

ب) $\sqrt{243} \div \sqrt{27} = \sqrt{\frac{243}{27}} = \sqrt{\frac{9 \times 27}{27}} = \sqrt{9} = 3$

پ) $\sqrt{1000} \div \sqrt{10} = \sqrt{\frac{1000}{10}} = \sqrt{100} = 10$

ت) $\sqrt{256} \div \sqrt{32} = \sqrt{\frac{8 \times 32}{32}} = \sqrt{8} = \sqrt{4 \times 2} = 2\sqrt{2}$

ث) $\sqrt{0.01} \div \sqrt{2/25} = \sqrt{\frac{1}{225}} = \frac{1}{15}$

ج) $\sqrt{1/44} \div \sqrt{0.04} = \sqrt{\frac{144}{4}} = \sqrt{\frac{4 \times 36}{4}} = \sqrt{36} = 6$

۷.

الف) $\sqrt{(\sqrt{1/96} + \sqrt{4/84} + \sqrt{9/64} + \sqrt{10/84})(3+7)} = \sqrt{(1/4 + 2/2 + 3/1 + 3/3) \times 10^3}$
 $= \sqrt{10 \times 10^3} = 100$

$$\text{ب) } \sqrt{(\sqrt{7}\sqrt{5}(\sqrt{27} \div \sqrt{3}) + 1)^2 + 8} = \sqrt{(\sqrt{7}\sqrt{5} \times 3 + 1)^2 + 8} = \sqrt{(\sqrt{7} \times 3)^2 + 8} = \sqrt{7 \times 3 + 8} = \sqrt{36} = 6$$

$$\text{الف) } \frac{2}{3}\sqrt{5} + \frac{3}{5}\sqrt{5} - \frac{17}{5}\sqrt{5} = (\frac{2}{3} + \frac{3}{5} - \frac{17}{5})\sqrt{5} = (\frac{2}{3} - \frac{14}{5})\sqrt{5} = (\frac{10}{15} - \frac{42}{15})\sqrt{5} = -\frac{32}{15}\sqrt{5}$$

$$\text{ب) } -12\sqrt{10} - 11\sqrt{10} - 10\sqrt{10} - \dots + 11\sqrt{10} + 12\sqrt{10} = 0$$

$$\text{پ) } 3\sqrt{2} + \sqrt{3} - \sqrt{3} - 7\sqrt{3} - \sqrt{2} = (3-1)\sqrt{2} + (1-1-7)\sqrt{3} = 2\sqrt{2} - 7\sqrt{3}$$

$$\text{ت) } 2 - 2\sqrt{6} + \sqrt{2} - \sqrt{6} + 3\sqrt{2} - 11 = (-2-1)\sqrt{6} + (1+3)\sqrt{2} + 2-11 = -3\sqrt{6} + 4\sqrt{2} - 9$$

$$\text{الف) } (\sqrt{5} + \sqrt{2})(\sqrt{5} + \sqrt{2}) - 2\sqrt{10} = 5 + \cancel{2\sqrt{10}} + 2 - \cancel{2\sqrt{10}} = 7$$

$$\text{ب) } (1 + \sqrt{2})(1 + \sqrt{2}) + (1 - \sqrt{2})(1 - \sqrt{2}) = 1 + \cancel{2\sqrt{2}} + 2 + 1 - \cancel{2\sqrt{2}} + 2 = 6$$

$$\text{پ) } (\sqrt{2} + 1)(3 - \sqrt{2}) = 3\sqrt{2} - 2 + 3 - \sqrt{2} = 2\sqrt{2} + 1$$

$$\text{ت) } (1 - \sqrt{2})(1 - \sqrt{2})(1 + \sqrt{2})(1 + \sqrt{2}) = (1 - 2\sqrt{2} + 2)(1 + 2\sqrt{2} + 2)$$

$$= 1 + 2\sqrt{2} + 2 - 2\sqrt{2} - 8 - 4\sqrt{2} + 2 + 4\sqrt{2} + 4 = +1$$

$$\text{الف) } \sqrt{2} - 3\sqrt{4 \times 2} + 5\sqrt{6 \times 2} = \sqrt{2} - 3 \times 2\sqrt{2} + 5 \times 2\sqrt{2} = +15\sqrt{2}$$

$$\text{ب) } 7\sqrt{4 \times 6} - \sqrt{9 \times 6} + 3\sqrt{25 \times 6} = 7 \times 2\sqrt{6} - 3\sqrt{6} + 3 \times 5\sqrt{6} = +26\sqrt{6}$$

$$\text{پ) } -\sqrt{25 \times 3} + 5\sqrt{9 \times 3} + 12\sqrt{4 \times 3} = -5\sqrt{3} + 5 \times 3\sqrt{3} + 12 \times 2\sqrt{3} = -34\sqrt{3}$$

پاسخ سؤالات تشریحی (بدون پاسخ) فصل هفتم، توان و جذر

$$\text{الف) } (\frac{49}{25})^3 \times (\frac{4}{10})^{-6} \times (\frac{2}{5})^6 = (\frac{7^2}{5^2})^3 \times (\frac{2}{5})^{-6} \times (\frac{2}{5})^6 = \frac{7^6}{5^6} \times \frac{1}{5^6 \times 5^{-6}} \times 2^{-6} \times 2^6 = 1$$

$$\text{ب) } (-18)^{-5} \times (-27)^8 \times 4^8 = -(2 \times 3^2)^{-5} \times (3^3)^8 \times (2^2)^8 = -2^{-5} \times 3^{-10} \times 3^{24} \times 2^{16} = -2 \times 3^8 = -18$$

$$\text{پ) } 81^3 [\frac{5}{5} \times (\frac{3^{-2}}{5})^2]^8 = (3^4)^3 [2 \times \cancel{5} \times \frac{3^{-2}}{\cancel{5}}]^8 = 3^{12} \times 2^8 \times 3^{-12} = 2^8 = 8$$

$$\text{ت) } (\frac{\sqrt{5}+1}{2})^{2000} \times (\frac{\sqrt{5}-1}{2})^{2000} = (\frac{(\sqrt{5}+1)(\sqrt{5}-1)}{2 \times 2})^{2000} = (\frac{5-1}{2 \times 2})^{2000} = (\frac{4}{4})^{2000} = 1$$

$$\text{الف) } (32^8 + 4^{10})^8 = [(2^5)^8 + (2^2)^{10}]^8 = [2^{40} + 2^{20}]^8 = [2 \times 2^{20}]^8 = (2^{21})^8 = 2^{168}$$

$$\text{ب) } (2^2)^3 \times 2^{(-2)^2} \times (2^{-3})^2 \times (-2^2)^3 = -2^6 \times 2^4 \times 2^{-6} \times 2^6 = -2^{10}$$

$$\text{پ) } (24^{18} + 24^{18} + 24^{18})(6^{17} + 6^{17}) = (3 \times 24^{18})(2 \times 6^{17}) = 6 \times 24^{18} \times 6^{17} = 24^{18} \times 6^{18} = 144^{18}$$

$$625^{15} = (5^4)^{15} = 5^{60} \quad \text{بنابراین: } 5^{60} < \boxed{3 \times 5^{60}} < 5 \times 5^{60}$$

عدد مورد نظر

$$\text{الف)} \frac{(x^{-a})^{-a}(x^{-b})^{-b}(x^a)^{rb}}{(y^{-a})^{-a}(y^{-b})^{-b}(y^{rb})^a} = \frac{x^{a^2+b^2+rab}}{y^{a^2+b^2+rab}} = \left(\frac{x}{y}\right)^{(a+b)^2}$$

$$\text{ب)} \frac{(0/0A)^{-2} \times 2^2 \times 2 \times 5^{-2}}{(0/5)^{-5} \times 2^2 \times 2^{-5}} = \frac{(\Delta^{-2})^{-2} \times (2^2)^2}{(2^{-1})^{-5} \times (2^5)^2 \times (2^2)^{-5}} = \frac{\Delta^9 \times 2^{22} \times 2^{-2} \times \Delta^{-9}}{2^5 \times 2^{10} \times 2^{-10}} = \frac{2^{21}}{2^{10}} = 2^{11}$$

$$\text{الف)} \frac{\Delta^{50} + \Delta^{29} - 6 \times \Delta^{28}}{2\Delta^{25} - 2\Delta^{24}} = \frac{\Delta^{28}(\Delta^2 + \Delta - 6)}{2\Delta^{24}(\Delta - 1)} = \frac{\Delta^{28} \times 22}{(\Delta^2)^{24} \times 22} = \frac{\cancel{\Delta^{28}}}{\cancel{\Delta^{24}}} = 1$$

$$\text{ب)} \frac{a^x + 2a^{x-1} + 2a^{x-2}}{a + 2 + \frac{2}{a}} = \frac{a^{x-2}(a^2 + \cancel{2a} + 2)}{\frac{1}{a}(a^2 + \cancel{2a} + 2)} = \frac{a^{x-2}}{a^{-1}} = a^{x-1}$$

$$\text{پ)} \frac{2^{a+2} - 2^{a+1} - 2^a}{2^a + 2^a + 2^a + 2^a + 2^a} = \frac{2^a(2^2 - 2 - 1)}{5 \times 2^a} = \frac{2^a \times \cancel{2}}{2^a \times \cancel{2}} = \left(\frac{2}{2}\right)^a$$

$$B = 2^{x-1} = (2^2)^{x-1} = 2^{2x-2+2-2} = 2^{2x+2-2} = 2^{x+1} \times 2^{x+1} \times 2^{-2} = A \times A \times 2^{-2} = \frac{1}{16} A^2$$

$$2^{1996} + (2^2)^{997} + (2^2)^{996} = (2^2)^x \Rightarrow 2^{1996}(1 + 1 + 2) = 2^{2x}$$

$$\Rightarrow 2^{1996} \times 2^2 = 2^{2x} \Rightarrow 2^{1998} = 2^{2x} \Rightarrow 2x = 1998 \Rightarrow x = \frac{1998}{2} = 999$$

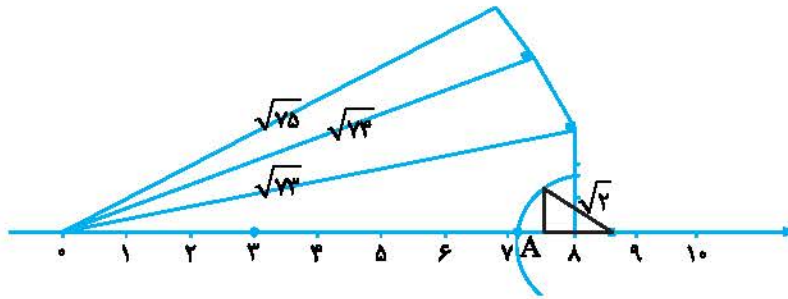
$$\text{الف)} \sqrt{2^2} - \sqrt{1/5} + \sqrt{6/25} = \sqrt{2^2} - \sqrt{1/5} + 2/5 = \sqrt{2^2} - \sqrt{2} = \sqrt{22} - 2 = \sqrt{25} = 5$$

$$\text{ب)} \sqrt{1 + 2\sqrt{1 + 3\sqrt{1 + 4\sqrt{1 + 5\sqrt{(1+6)^2}}}}} = \sqrt{1 + 2\sqrt{1 + 3\sqrt{1 + 4\sqrt{36}}}} \\ = \sqrt{1 + 2\sqrt{1 + 3\sqrt{25}}} = \sqrt{1 + 2\sqrt{16}} = \sqrt{9} = 3$$

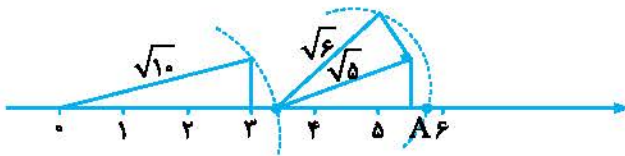
$$\text{پ)} \sqrt{2 + 2\sqrt{2 + 2\sqrt{2 + 2\sqrt{2 + 2\sqrt{2}}}}} = \sqrt{2 + 2\sqrt{2 + 2\sqrt{2 + 2\sqrt{2 + 2\sqrt{2}}}}} \\ = \sqrt{2 + 2\sqrt{2 + 2\sqrt{2 + 2\sqrt{2}}}} = \sqrt{2 + 2\sqrt{2 + 2\sqrt{2}}} = \sqrt{2 + 2\sqrt{2}} = \sqrt{2} = 2$$

$$\text{ت)} \sqrt{1^2 + 2^2 + 3^2 + \dots + 10^2} = \sqrt{1 + 4 + 9 + 16 + 25 + 36 + 49 + 64 + 81 + 100} = \sqrt{385} = 55$$

$$A = 2 + \sqrt{5} \\ B = -2 + \sqrt{2} \Rightarrow \overrightarrow{AB} = B - A = (-2 + \sqrt{2}) - (2 + \sqrt{5}) = -2 + \sqrt{2} - 2 - \sqrt{5} = -4 + \sqrt{2} - \sqrt{5}$$



$$A = 5\sqrt{3} - \sqrt{2} = \sqrt{75} - \sqrt{2}$$



$$A = \sqrt{10} + \sqrt{6}$$



$$\sqrt{2}$$

$$\sqrt{\frac{7}{6 \times 6}} - 10\sqrt{\frac{2}{7 \times 7}} - 6\sqrt{\frac{2}{5 \times 5}} + \sqrt{\frac{7}{2 \times 2}} + \frac{92\sqrt{2}}{35} = \frac{1}{6}\sqrt{7} - \frac{10}{7}\sqrt{2} - \frac{6}{5}\sqrt{2} + \frac{1}{2}\sqrt{7} + \frac{92}{35}\sqrt{2}$$

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$$= (\frac{1}{6} + \frac{1}{2})\sqrt{7} + (-\frac{10}{7} - \frac{6}{5} + \frac{92}{35})\sqrt{2} = (\frac{1}{6} + \frac{3}{6})\sqrt{7} + (-\frac{50}{35} - \frac{42}{35} + \frac{92}{35})\sqrt{2} = \frac{4}{6}\sqrt{7}$$

$$x^8 - 36\sqrt{3} = (\sqrt{9 + \sqrt{9 + \sqrt{9}}})^8 - 36\sqrt{3} = (\sqrt{9 + \sqrt{12}})^8 - 36\sqrt{3}$$

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$$= (9 + \sqrt{12})(9 + \sqrt{12}) - 36\sqrt{3} = 81 + 18\sqrt{2} + 12 - 36\sqrt{3} = 93 + 36\sqrt{2} - 36\sqrt{3} = 93$$

$$\frac{\sqrt{2(\frac{4}{c})(\frac{2}{c})(c^2)} + \sqrt{\frac{(\frac{4}{c})(\frac{2}{c})^2}}}{\frac{1}{4}\sqrt{\frac{4(\frac{4}{c})(c^2)}{2c}} + \sqrt{\frac{(\frac{4}{c})(c)}{(2c)^2}}} = \frac{\sqrt{16c^2} + \sqrt{16c^2}}{\frac{1}{4}\sqrt{16c^2} + \sqrt{1}} = \frac{4c^2 + 4c^2}{\frac{1}{4} \times 4c^2 + 1} = \frac{8c^2}{c^2 + 1}$$

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پاسخ پرسش‌های چهارگزینه‌ای فصل هفتم: توان و جذر

$$(\frac{2}{3})^4 \times (2 \times 3)^4 \times 2^4 = 2^{24}$$

۱. گزینه (۲) -

$$(-3^{-2})^9 = -3^{-18}$$

۲. گزینه (۳) -

$$\frac{3}{4} \times \square = 2^4 \times 3 \Rightarrow \square = \frac{4 \times 2^4 \times 3}{3} = 2^6$$

بنابراین: $\square^2 = 2^{12} = 4096$

۳. گزینه (۲) -

$$2^{1394}(2-1) = 2^{1394}$$

۴. گزینه (۴) -

۵. گزینه (۱) - $3^{2X-1} = 12 \Rightarrow 3^{2X-2+1} = 12 \Rightarrow (3^{X-1})^2 \times 3^1 = 12 \Rightarrow (3^{X-1})^2 = 4 \Rightarrow 3^{X-1} = 2$
۶. گزینه (۱) - اعداد منفی زمانی که به توان های زوج برسند، مثبت می شوند.
۷. گزینه (۴) - $(3 \times 4)^{y+r} = (3 \times 4)^{2X-y+1} \Rightarrow y+r=0 \Rightarrow y=-r$
 $2X-y+1=0 \Rightarrow 2X-(-r)+1=0 \Rightarrow X=-2$
۸. گزینه (۳) - $5^{104} \times 4^{52} = (5^2)^{52} \times 2^{52} = (100)^{52}$ مجموع ارقام $= 1+0+0+\dots=1$
۹. گزینه (۱) - $\frac{(a^{-2} - b^{-2})}{(a^{-2} + b^{-2})(a^{-2} - b^{-2})} = \frac{1}{a^{-2} + b^{-2}}$
۱۰. گزینه (۱) - $\frac{a^x \times b^y \times c^{-z}}{a^{-x} \times c^y \times b^{-1}} \times \frac{a^{-1} \times b^{-1}}{a^x \times c^{-z} \times b} = a^x \times b^y \times c^{-z} = \left(\frac{ab}{c}\right)^z$
۱۱. گزینه (۲) - $\frac{A^a}{\left(\frac{1}{r}\right)^{1-b}} = (r^r)^a \times r^{1-b} = r^{ra-b+1} = (r^{ra-b})(r^1) = 2 \times 2 = 4$
۱۲. گزینه (۴) - $9^y = 3^{X-9} \Rightarrow (3^2)^y = 3^{X-9} \Rightarrow 2y = X-9 \Rightarrow X = 21$
 $2^X = (2^r)^{y+1} \Rightarrow 2^X = 2^{ry+r} \Rightarrow X = ry+r \Rightarrow y=6$
۱۳. گزینه (۱) - $\sqrt{16 \times 2} - 2\sqrt{9 \times 2} + 3\sqrt{36 \times 2} - \sqrt{4 \times 2} = 4\sqrt{2} - 2 \times 3\sqrt{2} + 3 \times 6\sqrt{2} - 2\sqrt{2} = 14\sqrt{2}$
۱۴. گزینه (۲) - $x^f = (\sqrt{1+\sqrt{2}})^f = (1+\sqrt{2})^f = (1+\sqrt{2})(1+\sqrt{2}) = 1+2\sqrt{2}+2=3+2\sqrt{2}$
۱۵. گزینه (۳) - $A^2 = (2\sqrt{3+2\sqrt{3+2\sqrt{\dots}}})^2 \Rightarrow A^2 = 4(3+2\sqrt{3+2\sqrt{\dots}})$
 $\Rightarrow A^2 = 4(3+A) \Rightarrow A^2 = 12+4A \Rightarrow A^2-4A=12 \Rightarrow A(A-4)=6 \times 2 \Rightarrow A=6$
۱۶. گزینه (۱) - $(\sqrt{2}-2\sqrt{3})(\sqrt{4}+\sqrt{3}) + \sqrt{54} = \sqrt{16} + \sqrt{6} - 2\sqrt{12} - 6 + \sqrt{9 \times 6}$
 $= 4 + \sqrt{6} - 2 \times 2\sqrt{3} - 6 + 3\sqrt{6} = -2$
۱۷. گزینه (۱) - $\sqrt{2} + \sqrt{3} < \sqrt{12} < \sqrt{27} - 1 < 3\sqrt{4} < 4 + \sqrt{5}$
۱۸. گزینه (۲) - $3 < \sqrt{13} < 4 \Rightarrow 9 < 3\sqrt{13} < 12$
۱۹. گزینه (۳) - $\Rightarrow -8 < -17 + 3\sqrt{13} < -5 \xrightarrow{\div 3} -2 < \frac{-17+3\sqrt{13}}{3} < -\frac{5}{3}$
 $\frac{A+B}{2} = \frac{1-\sqrt{13}-1+\sqrt{10}}{2} = \frac{\sqrt{10}-\sqrt{13}}{2}$

پاسخ پرسش های طبقه بندی درس ۱ فصل هشتم، دسته بندی داده ها

۱. الف) نادرست

ب) درست