



ALGEBRA and TRIGONOMETRY

CHAPTER 1

Practice Test Answer Key

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① -13 is a rational number

② $\sqrt{2}$ is an irrational number

③ $2(x+3) - 12$; $x = 2$

$$= 2(2+3) - 12$$

$$= 2(5) - 12$$

$$= 10 - 12$$

$$= \boxed{-2}$$

④ $y(3+3)^2 - 26$; $y = 1$

$$= 1(3+3)^2 - 26$$

$$= 1(6)^2 - 26$$

$$= 36 - 26$$

$$= \boxed{10}$$

5) 3.1415×10^6

$$3.\underbrace{141500000}_\uparrow$$
$$= \boxed{3,141,500}$$

6) $0.\underbrace{00000000}_\uparrow 212$

$$= \boxed{2.12 \times 10^{-8}}$$

7) $-2 \cdot (2 + 3 \cdot 2)^2 + 144$

$$= -2 \cdot (2 + 6)^2 + 144$$

$$= -2(8)^2 + 144$$

$$= -2(64) + 144$$

$$= -128 + 144$$

$$= \boxed{16}$$

$$\textcircled{8.} \quad 4(x+3) - (6x+2)$$

(p.3)

$$= 4x + 12 - 6x - 2$$

$$= \boxed{-2x + 10}$$

$$\textcircled{9.} \quad 3^5 \cdot 3^{-3} = 3^5 \cdot \frac{1}{3^3} = \frac{3^5}{3^3}$$

$$= 3^{5-3}$$

$$= 3^2$$

$$= \boxed{9}$$

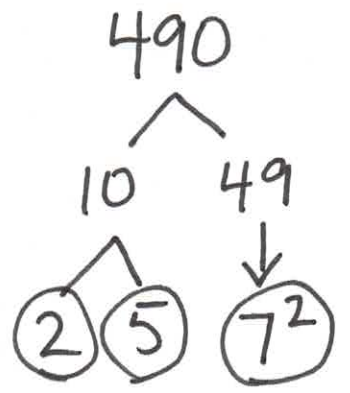
$$\textcircled{10.} \quad \left(\frac{2}{3}\right)^3 = \frac{2^3}{3^3} = \boxed{\frac{8}{27}}$$

$$\textcircled{11.} \quad \frac{8x^3}{(2x)^2} = \frac{8x^3}{2^2 x^2} = \frac{8x^3}{4x^2} = 2x^{3-2} = \boxed{2x}$$

$$\begin{aligned} \textcircled{12.} \quad & (16y^0) 2y^{-2} \\ & = (16 \cdot 1) 2 \cdot \frac{1}{y^2} \\ & = 16 \cdot 2 \cdot \frac{1}{y^2} \\ & = \boxed{\frac{32}{y^2}} \end{aligned}$$

$$\textcircled{13.} \quad \sqrt{441} = \sqrt{21^2} = \boxed{21}$$

$$\textcircled{14.} \quad \sqrt{490} = \sqrt{2 \cdot 5 \cdot 7^2} = \boxed{7\sqrt{10}}$$



$$\textcircled{15.} \quad \sqrt{\frac{9x}{16}} = \frac{\sqrt{9x}}{\sqrt{16}} = \boxed{\frac{3\sqrt{x}}{4}}$$

p.5

$$\textcircled{16.} \quad \frac{\sqrt{121b^2}}{1+\sqrt{b}} = \frac{\sqrt{11^2b^2}}{1+\sqrt{b}} = \frac{\sqrt{(11b)^2}}{1+\sqrt{b}} = \frac{11b}{1+\sqrt{b}}$$

Now we need to rationalize the denominator,

$$\frac{11b}{(1+\sqrt{b})} \cdot \frac{(1-\sqrt{b})}{(1-\sqrt{b})} = \frac{11b - 11b\sqrt{b}}{1 - \sqrt{b} + \sqrt{b} - \sqrt{b}^2}$$

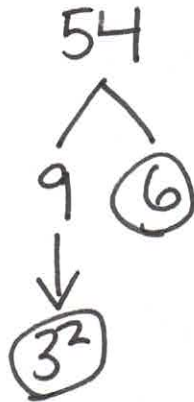
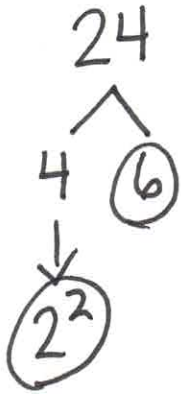
$$= \boxed{\frac{11b - 11b\sqrt{b}}{1-b}}$$

OR

$$= \boxed{\frac{11b(1-\sqrt{b})}{1-b}}$$

$$\textcircled{17.} \quad 6\sqrt{24} + 7\sqrt{54} - 12\sqrt{6}$$

(p.6)



$$= 6\sqrt{\textcircled{2^2} \cdot 6} + 7\sqrt{\textcircled{3^2} \cdot 6} - 12\sqrt{6}$$

$$= (6)(2)\sqrt{6} + (7)(3)\sqrt{6} - 12\sqrt{6}$$

$$= 12\sqrt{6} + 21\sqrt{6} - 12\sqrt{6}$$

$$= \boxed{21\sqrt{6}}$$

$$\textcircled{18.} \quad \frac{\sqrt[3]{-8}}{\sqrt[4]{625}} = \frac{\sqrt[3]{(-2)^3}}{\sqrt[4]{5^4}} = \boxed{\frac{-2}{5}}$$

$$\begin{aligned} \textcircled{19.} & (13q^3 + 2q^2 - 3) - (6q^2 + 5q - 3) \\ & = \underline{13q^3} + \underline{2q^2} - \underline{3} - \underline{6q^2} - \underline{5q} + \underline{3} \\ & = \boxed{13q^3 - 4q^2 - 5q} \end{aligned}$$

$$\begin{aligned} \textcircled{20.} & (6p^2 + 2p + 1) + (9p^2 - 1) \\ & = \underline{6p^2} + 2p + \underline{1} + \underline{9p^2} - \underline{1} \\ & = 15p^2 + 2p \end{aligned}$$

$$\begin{aligned} \textcircled{21.} & (n-2)(n^2-4n+4) \\ & = \underline{n^3 - 4n^2 + 4n} - \underline{2n^2 + 8n - 8} \\ & = \boxed{n^3 - 6n^2 + 12n - 8} \end{aligned}$$

$$\begin{aligned} \textcircled{22.} & (a-2b)(2a+b) = 2a^2 + ab - 4ab - 2b^2 \\ & = \boxed{2a^2 - 3ab - 2b^2} \end{aligned}$$

$$\textcircled{23.} \quad 16x^2 - 81 = 4^2x^2 - 9^2$$

0.8

$$= (4x)^2 - 9^2$$

$$a = 4x \quad b = 9$$

$$\text{Use } a^2 - b^2 = (a - b)(a + b)$$

$$= \boxed{(4x - 9)(4x + 9)}$$

$$\textcircled{24.} \quad y^2 + 12y + 36 = \boxed{(y + 6)(y + 6)}$$

Use trial and error

$$\text{OR} \\ \boxed{(y + 6)^2}$$

$$\textcircled{25.} \quad 27c^3 - 1331 = (3c - 11)((3c)^2 + (3c)(11) + 11^2)$$

$$(3c)^3 - 11^3$$

$$a = 3c \quad b = 11$$

$$= \boxed{(3c - 11)(9c^2 + 33c + 121)}$$

$$\text{Use } a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

(p.9)

$$\begin{aligned} \textcircled{26.} \quad & 3x(x-6)^{-\frac{1}{4}} + 2(x-6)^{\frac{3}{4}} \\ &= (x-6)^{-\frac{1}{4}} \left(3x + 2(x-6)^{\frac{4}{4}} \right) \\ &= (x-6)^{-\frac{1}{4}} (3x + 2(x-6)) \\ &= (x-6)^{-\frac{1}{4}} (3x + 2x - 12) \\ &= \boxed{(x-6)^{-\frac{1}{4}} (5x - 12)} \end{aligned}$$

$$\begin{aligned} \textcircled{27.} \quad & \frac{2z^2 + 7z + 3}{z^2 - 9} \cdot \frac{4z^2 - 15z + 9}{4z^2 - 1} \\ &= \frac{(2z+1)(z+3)}{(z-3)(z+3)} \cdot \frac{(4z-3)(z-3)}{(2z-1)(2z+1)} \\ &= \boxed{\frac{4z-3}{2z-1}} \end{aligned}$$

$$\textcircled{28.} \quad \frac{x}{y} + \frac{2}{x} = \frac{x \cdot \frac{x}{x}}{y \cdot x} + \frac{2 \cdot \frac{y}{y}}{x \cdot y}$$

LCD: xy

$$= \frac{x^2}{xy} + \frac{2y}{xy}$$

$$= \boxed{\frac{x^2 + 2y}{xy}}$$

$$\textcircled{29.} \quad \frac{\frac{a}{2b} - \frac{2b}{9a}}{\frac{3a-2b}{6a}} = \left(\frac{\frac{a}{2b} - \frac{2b}{9a}}{\frac{3a-2b}{6a}} \right) \cdot \frac{18ab}{18ab}$$

$$\text{LCD: } 18ab$$

$$= \frac{18ab \left(\frac{a}{2b} \right) - 18ab \left(\frac{2b}{9a} \right)}{3 \cdot 18ab \left(\frac{3a-2b}{6a} \right)}$$

$$= \frac{9a^2 - 4b^2}{3b(3a-2b)} \quad \downarrow$$

$$= \frac{(3a-2b)(3a+2b)}{3b(3a-2b)}$$

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$$= \boxed{\frac{3a+2b}{3b}}$$