ALGEBRA & TRIGONOMETRY

CHAPTER 1

Practice Test Answer Key

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

$3.141500.000$

$= \boxed{3,141,500}$

6. $0.00000002.12$

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

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

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

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

$= -2(64)+144$

$= -128+144$

$= \boxed{16}$

8. $4(x+3)-(6x+2)$

$= \underline{4x}+\underline{12}-\underline{6x}-\underline{2}$

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

9. $3^5 \cdot 3^{-3} = 3^5 \cdot \dfrac{1}{3^3} = \dfrac{3^5}{3^3}$

$= 3^{5-3}$

$= 3^2$

$= \boxed{9}$

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

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

12. $(16y^0)\,2y^{-2}$

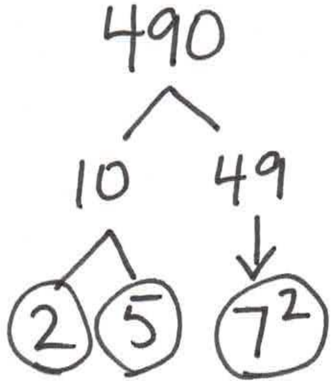
$= (16 \cdot 1)\,2 \cdot \frac{1}{y^2}$

$= 16 \cdot 2 \cdot \frac{1}{y^2}$

$= \boxed{\frac{32}{y^2}}$

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

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



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

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

Now we need to rationalize the denominator.

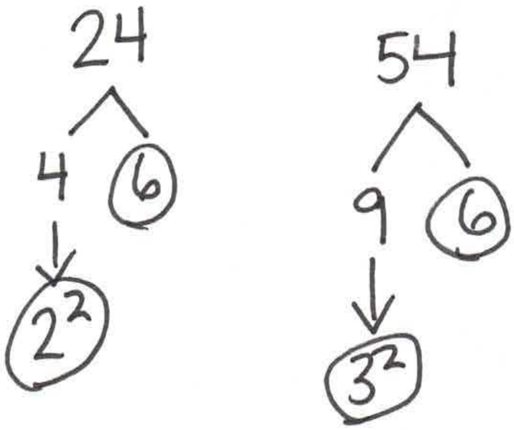
$$\frac{11b}{(1+\sqrt{b})} \cdot \frac{(1-\sqrt{b})}{(1-\sqrt{b})} = \frac{11b-11b\sqrt{b}}{1-\sqrt{b}+\sqrt{b}-\sqrt{b}^2}$$

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

OR

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

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



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

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

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

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

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

19. $(13q^3+2q^2-3)-(6q^2+5q-3)$

$= 13q^3+2q^2-3-6q^2-5q+3$

$= \boxed{13q^3-4q^2-5q}$

20. $(6p^2+2p+1)+(9p^2-1)$

$= 6p^2+2p+1+9p^2-1$

$= 15p^2+2p$

21. $(n-2)(n^2-4n+4)$

$= \underbrace{n^3-4n^2+4n}\underbrace{-2n^2+8n-8}$

$= \boxed{n^3-6n^2+12n-8}$

22. $(a-2b)(2a+b) = 2a^2+ab-4ab-2b^2$

$= \boxed{2a^2-3ab-2b^2}$

23. $16x^2-81 = 4^2x^2-9^2$

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

$a=4x \quad b=9$

Use $a^2-b^2=(a-b)(a+b)$

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

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

Use trial and error

OR

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

25. $27c^3-1331 = (3c-11)((3c)^2+(3c)(11)+11^2)$

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

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

$a=3c \quad b=11$

Use $a^3-b^3=(a-b)(a^2+ab+b^2)$

26. $3x(x-6)^{-\frac{1}{4}} + 2(x-6)^{\frac{3}{4}}$

$= (x-6)^{-\frac{1}{4}}\left(3x + 2(x-6)^{\frac{4}{4}}\right)$

$= (x-6)^{-\frac{1}{4}}\left(3x + 2(x-6)\right)$

$= (x-6)^{-\frac{1}{4}}\left(3x + 2x - 12\right)$

$= \boxed{(x-6)^{-\frac{1}{4}}(5x-12)}$

27. $\dfrac{2z^2+7z+3}{z^2-9} \cdot \dfrac{4z^2-15z+9}{4z^2-1}$

$= \dfrac{\cancel{(2z+1)}\cancel{(z+3)}}{\cancel{(z-3)}\cancel{(z+3)}} \cdot \dfrac{(4z-3)\cancel{(z-3)}}{(2z-1)\cancel{(2z+1)}}$

$= \boxed{\dfrac{4z-3}{2z-1}}$

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

LCD: xy

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

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

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

LCD: $18ab$

$$= \frac{\overset{9}{\cancel{18}}a\cancel{b}\left(\frac{a}{\underset{1}{\cancel{2}}\cancel{b}}\right)-\overset{2}{\cancel{18}}\cancel{a}b\left(\frac{2b}{\underset{1}{\cancel{9}}\cancel{a}}\right)}{3\,\cancel{18}\cancel{a}b\left(\frac{3a-2b}{\underset{1}{\cancel{6}}\cancel{a}}\right)}$$

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

p.11

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

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