

Algebra and Trigonometry Review Solutions

$$1. a) \frac{1}{2} - \frac{1}{8} = \frac{4}{8} - \frac{1}{8} = \boxed{\frac{3}{8}}$$

$$b) \frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \boxed{\frac{3}{4}}$$

$$c) -2 - 3(-4) = -2 + 12 = \boxed{10}$$

$$d) (2uv + u^2v^2 - u) + (3u^2v^2 - uv + v + 1)$$

$$= 2uv - uv + u^2v^2 + 3u^2v^2 - u + v + 1$$

$$= \boxed{uv + 4u^2v^2 - u + v + 1}$$

$$e) (3x^2y^2 - xy + 2x + 1) - (x^2y^2 - 2xy - x + 3)$$

$$= 3x^2y^2 - xy + 2x + 1 - x^2y^2 + 2xy + x - 3$$

$$= \boxed{2x^2y^2 + xy + 3x - 2}$$

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

$$6x^2 + 3xy - 8xy - 4y^2$$

$$= \boxed{6x^2 - 5xy - 4y^2}$$

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

$$2x^4 - 4x^3 + 4x^2 - 6x - 3x^3 + 6x^2 - 6x + 9$$

$$= \boxed{2x^4 - 7x^3 + 10x^2 - 12x + 9}$$

$$h) \frac{1}{x} - \frac{1}{x+1} = \frac{x+1}{x(x+1)} - \frac{x}{x(x+1)} = \boxed{\frac{1}{x(x+1)}}$$

$$i) \frac{2x(x^2+1) - x^2(2x)}{x^2+1} = \frac{2x^3 + 2x - 2x^3}{x^2+1} = \boxed{\frac{2x}{x^2+1}}$$

$$j) \sqrt[3]{32} = \sqrt[3]{2^5} = \boxed{2\sqrt[3]{4}}$$

$$2. a) x^2 - 5x - 24 = \boxed{(x-8)(x+3)}$$

$$b) 2x^2 - 32 = 2(x^2 - 16) = \boxed{2(x+4)(x-4)}$$

$$c) 18x^2 - 3x - 6 = 3(6x^2 - x - 2) = \boxed{3(2x+1)(3x-2)}$$

$$3. \begin{array}{r} \boxed{x^2 + 2x - 1} \\ x-2 \overline{) x^3 - 5x + 2} \\ \underline{x^3 - 2x^2} \\ 2x^2 - 5x \\ \underline{2x^2 - 4x} \\ -x + 2 \\ \underline{-x + 2} \\ 0 \end{array}$$

$$4. a) 2x + 1 = 3x - 4$$

$$1 + 4 = 3x - 2x$$

$$\boxed{5 = x}$$

$$b) 3(x-2) < 4x-3$$

$$3x-6 < 4x-3$$

$$-6+3 < 4x-3x$$

$$\boxed{-3 < x}$$

4.c) $2t+7 - 3(1-t) = 1-2t$

$2t+7 - 3+3t = 1-2t$

$5t+4 = 1-2t$

$5t+2t = 1-4$

$7t = -3$

$t = \frac{-3}{7}$

d) $|3x+1|=5$

$3x+1=5$ or $3x+1=-5$

$3x=4$ or $3x=-6$

$x = \frac{4}{3}$ or $x = -2$

5 a) $3 < 1-2x < 9$

$3-1 < -2x < 9-1$

$2 < -2x < 8$

$-2 > 2x > -8$

$-1 > x > -8$

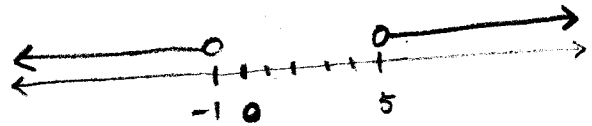


b) $|3x-6| > 9$

$3x-6 > 9$ or $3x-6 < -9$

$3x > 15$ or $3x < -3$

$x > 5$ or $x < -1$



6) $y - y_1 = m(x - x_1)$

$y - (-1) = -3(x - 2)$

$y + 1 = -3x + 6$

or $y = -3x + 5$

or $3x + y = 5$

7) $y = 2x - 1$ } $2x - 1 = -x + 8$

$y = -x + 8$

$3x = 9$ $x = 3$

$y = 2(3) - 1 = 6 - 1 = 5$

$(x, y) = (3, 5)$

8) a) $f(0) = 0^2 - 0 = 0$

b) $f(3) = 3^2 - 3 = 9 - 3 = 6$

c) $f(-2) = (-2)^2 - (-2) = 4 + 2 = 6$

d) $f(t) = t^2 - t$

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

f) $\frac{f(x+h) - f(x)}{h} = \frac{(x+h)^2 - (x+h) - [x^2 - x]}{h} = \frac{x^2 + 2xh + h^2 - x - h - x^2 + x}{h}$

$= \frac{2xh + h^2 - h}{h} = 2x + h - 1$

$$9. a) \cos\left(\frac{5\pi}{4}\right) = -\cos\left(\frac{\pi}{4}\right) = \boxed{\frac{-\sqrt{2}}{2}}$$

$$b) \tan\left(\frac{11\pi}{6}\right) = \tan\left(-\frac{\pi}{6}\right) = -\tan\left(\frac{\pi}{6}\right) = -\frac{\sin\frac{\pi}{6}}{\cos\frac{\pi}{6}} = -\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \boxed{-\frac{1}{\sqrt{3}}}$$

$$10) 120^\circ = 180^\circ - 60^\circ = \pi - \frac{\pi}{3} = \boxed{\frac{2\pi}{3}} \text{ radians}$$

$$= \boxed{\frac{-\sqrt{3}}{3}}$$

$$11) \cos \theta = \frac{1}{2}, \quad \cos^2 \theta + \sin^2 \theta = 1 \Rightarrow \sin^2 \theta = 1 - \cos^2 \theta \quad \text{So}$$

$$\Rightarrow \sin^2 \theta = 1 - \left(\frac{1}{2}\right)^2 = \frac{3}{4} \quad \text{So } \sin \theta = \pm \sqrt{\frac{3}{4}} = \pm \frac{\sqrt{3}}{2}$$

$$\sin \theta < 0 \quad \text{so } \sin \theta = -\frac{\sqrt{3}}{2}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta} = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \boxed{\frac{-1}{\sqrt{3}} = \frac{-\sqrt{3}}{3}}$$