

Chapter Review and 1 Review Packet  
Honors Advanced Algebra with Trig

c.  $\left(\frac{25m^3n^5}{m^{-2}n^6}\right)^{-1/2}$   
 $= \left(\frac{25m^5}{n}\right)^{-1/2} = \sqrt{\frac{n}{25m^5}}$   
 $= \left(\frac{n}{25m^5}\right)^{1/2} = \frac{1}{5m^2} \frac{\sqrt{n}}{\sqrt{m}}$  \*rationalize den.  
 $= \frac{1}{5m^2} \frac{\sqrt{n}}{\sqrt{m}} \cdot \frac{\sqrt{m}}{\sqrt{m}}$   
 $= \frac{1}{5m^2} \frac{\sqrt{nm}}{m} = \frac{\sqrt{nm}}{5m^3}$

e.  $\sqrt{18p^2} - p\sqrt{128} + \sqrt{8p^2}$   
 $= 3p\sqrt{2} - 8p\sqrt{2} + 2p\sqrt{2}$   
 $= -3p\sqrt{2}$

d.  $\frac{\sqrt[4]{8p^2q^5} \cdot \sqrt[4]{2p^3q}}{\sqrt[4]{p^5q^2}}$

$= \sqrt[4]{\frac{16p^5q^6}{p^5q^2}}$

$= \sqrt[4]{16q^4} = 2q$

f.  $\frac{2}{7-\sqrt{3}} \cdot \frac{7+\sqrt{3}}{7+\sqrt{3}}$   
 $= \frac{14+2\sqrt{3}}{49-3}$   
 $= \frac{14+2\sqrt{3}}{46}$   
 $= \frac{7+\sqrt{3}}{23}$

5. Perform each operation. Write answers in standard form.

a.  $(-8+2i)(-1+i)$   
 $= 8 - 8i - 2i + 2i^2$   
 $= 8 - 10i - 2$   
 $= 6 - 10i$

b.  $\frac{-7-i}{-1-i} \cdot \frac{-1+i}{-1+i}$   
 $= \frac{(-7-i)(-1+i)}{1-i^2}$   
 $= \frac{7-7i+i-i^2}{1+1}$   
 $= \frac{7-6i+1}{2}$   
 $= \frac{8-6i}{2} = 4-3i$

6. Simplify each power of  $i$

a.  $i^{110}$   
 $= \underbrace{i^2 \cdot i^2 \cdot \dots \cdot i^2}_{55 \text{ times}}$   
 $= -1$

b.  $i^{-27}$   
 $= \frac{1}{\underbrace{i^4 \cdot i^4 \cdot \dots \cdot i^4}_{6 \text{ times}} \cdot i^3}$   
 $= \frac{1}{-\sqrt{-1}}$   
 $= -\frac{1}{\sqrt{-1}} \cdot \frac{\sqrt{-1}}{\sqrt{-1}} = -\frac{\sqrt{-1}}{-1} = \sqrt{-1} = i$

$i = \sqrt{-1}$   
 $i^2 = -1$   
 $i^3 = -\sqrt{-1}$   
 $i^4 = 1$

7. Solve each equation

a.  $(2 - 3x)^2 = 8$

$$2 - 3x = \pm 2\sqrt{2}$$

$$-3x = -2 \pm 2\sqrt{2}$$

$$x = \frac{-2 \pm 2\sqrt{2}}{-3}$$

$$x = \frac{2 \pm 2\sqrt{2}}{3}$$

b.  $(-2x + 5)^2 = -8$

$$-2x + 5 = \pm 2\sqrt{2}i$$

$$-2x = -5 \pm 2\sqrt{2}i$$

$$x = \frac{-5 \pm 2\sqrt{2}i}{-2}$$

$$x = \frac{5}{2} \pm \sqrt{2}i$$

8. Solve each by completing the square:

a.  $x^2 - 10x + 18 = 0$

$$x^2 - 10x = -18$$

$$x^2 - 10x + 5^2 = -18 + 25$$

$$(x - 5)^2 = 7$$

$$x - 5 = \pm \sqrt{7}$$

$$x = 5 \pm \sqrt{7}$$

b.  $-2x^2 + 4x + 3 = 0$

$$x^2 - 2x - 3/2 = 0$$

$$x^2 - 2x = 3/2$$

$$x^2 - 2x + 1 = 3/2 + 1$$

$$(x - 1)^2 = 5/2$$

$$x - 1 = \pm \sqrt{5/2}$$

$$x = 1 \pm \sqrt{5/2}$$

$$x = 1 \pm \frac{\sqrt{10}}{2}$$

rationalize  
den

9. Evaluate the discriminant for each equation. Then use it to determine the number and type of solutions.

a.  $8x^2 = -2x - 6$

$$4x^2 + x + 3 = 0$$

$$b^2 - 4ac \Rightarrow 1^2 - 4(4)(3)$$

$$= 1 - 48$$

$$= -47$$

2 complex solutions

b.  $x(9x + 6) = -1$

$$9x^2 + 6x + 1 = 0$$

$$b^2 - 4ac \Rightarrow 6^2 - 4(9)(1)$$

$$= 36 - 36$$

$$= 0$$

one rational solution

10. A model rocket is launched from the roof of a building. Its flight path is modeled by  $h = -5t^2 + 30t + 10$  where  $h$  is the height of the rocket above the ground in meters and  $t$  is the time after the launch in seconds.

a. What is the rocket's height at time  $t = 4$ ?

$$\begin{aligned} h &= -5(4)^2 + 30(4) + 10 \\ &= -80 + 120 + 10 \\ &= 50 \end{aligned}$$

50 m

b. At what time does the rocket hit the ground?

$$0 = -5t^2 + 30t + 10$$

$$0 = t^2 - 6t - 2$$

$$t = \frac{6 \pm \sqrt{36 - 4(1)(-2)}}{2(1)}$$

$$t = \frac{6 \pm \sqrt{44}}{2}$$

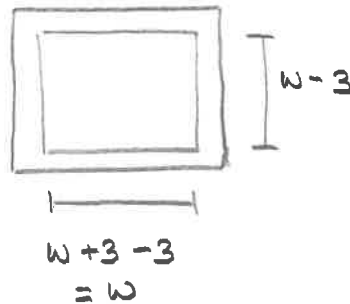
$t = 6.32 \text{ sec}$

$$t \approx 6.32, -0.32$$

11. Zach went into a <sup>Frame</sup>frame-it-yourself shop. He wanted a frame 3 inches longer than it was wide. The ~~from~~ he chose extended 1.5 inches beyond the picture on each side. Find the outside dimensions of the frame if the area of the unframed picture is 70 in<sup>2</sup>.



$$l = w + 3$$



outside = 10 in by 13 in dimensions

$$A_{\text{unframed}} = 70 = (w-3)(w)$$

$$70 = w^2 - 3w$$

$$0 = w^2 - 3w - 70$$

$$0 = (w-10)(w+7)$$

$$w = 10, -7$$

$$w = 10$$

12. Solve each equation:

a.  $\frac{13}{x^2+10} = \frac{2}{x}$

$$x(x^2+10) \left[ \frac{13}{x^2+10} = \frac{2}{x} \right]$$

$$13x = 2(x^2+10)$$

$$13x = 2x^2 + 20$$

$$0 = 2x^2 - 13x + 20$$

$$0 = (2x-5)(x-4)$$

$$x = \frac{5}{2}, 4$$

Both solutions check out

b.  $2 - \frac{5}{x} = \frac{3}{x^2}$

$$x^2 \left[ 2 - \frac{5}{x} = \frac{3}{x^2} \right]$$

$$2x^2 - 5x = 3$$

$$2x^2 - 5x - 3 = 0$$

$$(2x+1)(x-3) = 0$$

$$x = -\frac{1}{2}, 3$$

Both solutions check out

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c.  $\frac{2}{x+2} + \frac{1}{x+4} = \frac{4}{x^2+6x+8}$   
 $(x+2)(x+4) \left[ \frac{2}{x+2} + \frac{1}{x+4} = \frac{4}{(x+4)(x+2)} \right]$

$2(x+4) + x+2 = 4$   
 $2x + 8 + x + 2 = 4$   
 $3x + 10 = 4$   
 $3x = -6$   
 $x = -2$

solution makes den 0  
**No Solutions**

d.  $(x^2 - 6x)^{\frac{1}{4}} = 2$   
 $x^2 - 6x = 2^4$   
 $x^2 - 6x - 16 = 0$   
 $(x-8)(x+2) = 0$   
 **$x = -2, 8$**

e.  $\sqrt{2x+3} = x+2$   
 $2x+3 = (x+2)^2$   
 $2x+3 = x^2 + 4x + 4$   
 $0 = x^2 + 2x + 1$   
 $0 = (x+1)^2$   
 **$x = -1$**

f.  $\sqrt{x} - \sqrt{x+3} = -1$


$\sqrt{x} = -1 + \sqrt{x+3}$   
 $x = (-1 + \sqrt{x+3})^2$   
 $x = 1 - 2\sqrt{x+3} + x+3$   
 $-2 = \sqrt{x+3}$   
 $4 = x+3$   
 **$x = 1$**

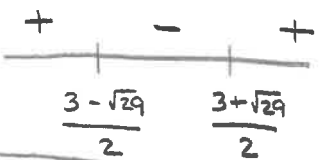
Solution checks out

g.  $\sqrt[5]{2x} = \sqrt[5]{3x+2}$   
 $2x = 3x+2$   
 **$x = -2$**

check:  
 $\sqrt[5]{-4} = \sqrt[5]{-6+2}$   
 $\sqrt[5]{-4} = \sqrt[5]{-4} \checkmark$

13. Solve each inequality. Give the solution set using interval notation.

a.  $x^2 + 4x - 21 > 0$   
 $(x+7)(x-3) > 0$   
 $x = -7, 3$   
  
 **$(-\infty, -7) \cup (3, \infty)$**

b.  $x^2 - 3x \geq 5$   
 $x^2 - 3x - 5 \geq 0$   
 $x = \frac{3 \pm \sqrt{9 - 4(1)(-5)}}{2(1)}$   
 $= \frac{3 \pm \sqrt{29}}{2}$   


**$(-\infty, \frac{3-\sqrt{29}}{2}] \cup [\frac{3+\sqrt{29}}{2}, \infty)$**

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c.  $\frac{x+7}{2x+1} \leq 1$

$$\frac{x+7}{2x+1} - 1 \leq 0$$

$$\frac{x+7-(2x+1)}{2x+1} \leq 0$$

$$\frac{-x+6}{2x+1} \leq 0$$

$$x = 6$$

$$x \neq -1/2$$



$$(-\infty, -1/2) \cup [6, \infty)$$

d.  $\frac{3}{x+2} > \frac{2}{x-4}$

$$\frac{3}{x+2} - \frac{2}{x-4} > 0$$

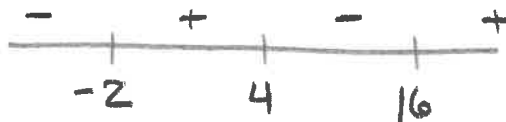
$$\frac{3(x-4) - 2(x+2)}{(x+2)(x-4)} > 0$$

$$\frac{3x-12-2x-4}{(x+2)(x-4)} > 0$$

$$\frac{x-16}{(x+2)(x-4)} > 0$$

$$x = 16$$

$$x \neq -2, 4$$



$$(-2, 4) \cup (16, \infty)$$

